# Fact Sheet

Public Comment Start Date: December 19, 2003
Public Comment Expiration Date: January 19, 2004

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

## Viola Water and Sewer District

### EPA Proposes To Issue NPDES Permit

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

This Fact Sheet includes:

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

### 401 Certification

EPA is requesting that the Idaho Department of Environmental Quality certify the NPDES permit for this facility, under section 401 of the Clean Water Act. Comments regarding the certification should be directed to:

Regional Administrator
Idaho Department of Environmental Quality
1118 “F” Street
Lewiston, ID 83501

## Public Comment

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

After the Public Notice expires, and all comments have been considered, EPA's regional Director for the Office of Water will make a final decision regarding permit issuance. If no substantive comments are received, the tentative conditions in the draft permit will become final, and the permit will become effective upon issuance. If comments are received, EPA will address the comments and issue the permit. The permit will become effective 30 days after the issuance date, unless an appeal is submitted to the Environmental Appeals Board within 30 days.

## Documents are Available for Review

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

United States Environmental Protection Agency
Region 10
1200 Sixth Avenue, OW-130
Seattle, Washington 98101
(206) 553-6251 or
Toll Free 1-800-424-4372 (within Alaska, Idaho, Oregon and Washington)

The fact sheet and draft permits are also available at:

EPA Idaho Operations Office
1435 North Orchard Street
Boise, Idaho 83706
(208) 378-5746

Idaho Department of Environmental Quality
Lewiston Regional Office
1118 "F" Street
Lewiston, ID 83501
(208) 799-4370
1-877-541-3304

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## Acronyms

| | |
|---|---|
| 1Q10 | 1 day, 10 year low flow |
| 7Q10 | 7 day, 10 year low flow |
| AML | Average Monthly Limit |
| $BOD_5$ | Biochemical oxygen demand, five-day |
| °C | Degrees Celsius |
| CFR | Code of Federal Regulations |
| CV | Coefficient of Variation |
| CWA | Clean Water Act |
| DMR | Discharge Monitoring Report |
| DO | Dissolved oxygen |
| EFH | Essential Fish Habitat |
| EPA | U.S. Environmental Protection Agency |
| ESA | Endangered Species Act |
| IDEQ | Idaho Department of Environmental Quality |
| lbs/day | Pounds per day |
| LTA | Long Term Average |
| mg/L | Milligrams per liter |
| ml | milliliters |
| ML | Minimum Level |
| µg/L | Micrograms per liter |
| mgd | Million gallons per day |
| MDL | Maximum Daily Limit |
| N | Nitrogen |
| NOAA | National Oceanic and Atmospheric Administration |
| NPDES | National Pollutant Discharge Elimination System |
| OW | Office of Water |
| O&M | Operations and maintenance |
| POTW | Publicly owned treatment works |
| QAP | Quality assurance plan |
| RP | Reasonable Potential |
| RPM | Reasonable Potential Multiplier |
| RWC | Receiving Water Concentration |
| s.u. | Standard Units |
| TES | Treatment Equivalent to Secondary |
| TMDL | Total Maximum Daily Load |
| TSD | Technical Support Document for Water Quality-based Toxics Control (EPA/505/2-90-001) |
| TSS | Total suspended solids |
| USFWS | U.S. Fish and Wildlife Service |
| USGS | United States Geological Survey |

| | |
|---|---|
| WLA | Wasteload allocation |
| WQBEL | Water quality-based effluent limit |
| WWTP | Wastewater treatment plant |

# I. Applicant

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

Viola Water and Sewer District
NPDES Permit # ID-002631-0

Mailing Address:
P.O. Box 13
Viola, ID 83872

Facility Address:
Trestle Road
Viola, ID 83872

Contact:
Jim Kouril, Chair
Viola Water and Sewer District Board

# II. Facility Information

The Viola Water and Sewer District Wastewater Treatment Plant is an NPDES minor facility treating domestic sewage from customers of the Viola Water and Sewer District. The plant provides secondary (biological) treatment of the wastewater using two waste stabilization ponds (lagoons). The facility serves a population of 120 and receives no wastewater from industrial users.

During most of the year, wastewater flows from the lift station into cell #1 (on the East side of the plant) and then into cell #2 (on the West). In the spring, when adequate dilution exists in Fourmile Creek, the facility may discharge wastewater by isolating one of the cells and allowing the wastewater to stabilize. The stabilized wastewater is then allowed to flow through the chlorine contact chamber and into Fourmile Creek. The facility has not discharged or land applied to date.

The design flow of the influent lift station is 10,800 gallons per day (average flow) and the average daily influent flow rate has been 4,562, 5,038 and 8,384 gallons per day for each of the past three years. The chlorine contact chamber has a design flow of 144,000 gallons per day, assuming a retention time of 150 minutes. The procedures in the operations and maintenance manual call for discharging the working volume of one of the cells in 20 days. For the larger of the two cells, this results in an average daily flow rate of 1,256,000 gal ÷ 20 days = 0.063 mgd. This figure was used as the design flow for the purposes of calculating permit limits.

# III. Receiving Water

This facility intends to discharge to Fourmile Creek in Latah County, Idaho.

## A. Low Flow Conditions

The application lists the critical low flow of the receiving stream as zero, and notes that the stream only runs six months out of the year. In a phone conversation on September 3, 2003, the applicant stated that the stream flows from approximately January through July of each year. The application listed the season of discharge as January through April of each year.

Daily streamflow data for Fourmile Creek were collected by the Unites States Geological Survey (USGS) at a station downstream of the outfall near Shawnee, Washington (station #13349000) between 1934 and 1940. These data were generally in agreement with the applicant's statements about the season when the stream flows, however, the stream had no flow between January 8 and February 11 of 1937.

In order to guarantee dilution from the receiving stream, the season of discharge has been restricted to a period between February 15 and April 30 of each year. Since data for Fourmile Creek were only available for a short period of time and a minimum of 10 years of data are necessary for direct calculation of critical flows, the Maintenance of Variance Extension, Type 1 (MOVE.1) method (Hirsch, 1982) was used to extend the stream flow record by correlation to a long term stream flow monitoring station in the same basin. A USGS station on Missouri Flat Creek in Pullman, Washington (station #13348500) was chosen for the strong correlation of the parallel data to the Fourmile Creek station, and its long period of daily flow records (1934-1940 and 1960-1979). Based on the MOVE.1 results, the critical low flows of Fourmile Creek during the discharge season are a 1Q10 of 1.13 mgd and a 7Q10 of 1.59 mgd. Water quality-based effluent limits were based on these critical flows.

## B. Water Quality Standards

Federal regulations at 40 CFR 122.4(d) require NPDES permits to ensure compliance with the water quality standards of all affected States. A States's water quality standards[1] are composed of use classifications, numeric and/or narrative water quality criteria, and an anti-degradation policy. The use classification system designates the beneficial uses (such as cold water biota,

[1] Idaho's water quality standards are codified in *Water Quality Standards and Wastewater Treatment Requirements* (IDAPA 58.01.02). Washington's water quality standards are codified in *Water Quality Standards for Surface Waters of the State of Washington* (Chapter 173-201A WAC).

contact recreation, etc.) that each water body is expected to achieve. The numeric and/or narrative water quality criteria are the criteria deemed necessary by the State to support the beneficial use classification of each water body. The anti-degradation policy represents a three tiered approach to maintain and protect various levels of water quality and uses. At the point of discharge, Fourmile Creek is protected for the designated uses of cold water aquatic life habitat and secondary contact recreation. Secondary contact recreation is defined as recreational activity that involves limited direct contact with the water, such as fishing and boating.

The Viola Water and Sewer District wastewater treatment plant is located approximately 350 meters (1150 feet) upstream from the Washington border. Therefore it is necessary to make sure that the discharge will not cause a violation of Washington's water quality standards once the stream crosses the border. In the State of Washington, Fourmile Creek not specifically classified in WAC 173-201A-602. In the State of Washington, all unclassified streams are protected for the designated uses of salmon and trout spawning, noncore rearing, and migration; primary contact recreation; domestic, industrial and agricultural water supply; stock watering; wildlife habitat; harvesting; commerce and navigation; boating; and aesthetic values. Table 1 (below) compares the water quality standards for Fourmile Creek in Idaho and Washington.

**Table 1: Water Quality Criteria for Fourmile Creek**

| Parameter | Idaho Criterion | Washington Criterion |
|---|---|---|
| pH | 6.5 to 9.5 standard units | 6.5 to 8.5 standard units with a human-caused variation within the above range of less than 0.5 units |
| Chlorine | 0.011 mg/L chronic, 0.019 mg/L acute | 0.011 mg/L chronic, 0.019 mg/L acute |
| Fecal Coliform Bacteria | n/a | Maximum geometric mean of 100 organisms/100 ml with no more than 10% of samples above 200 organisms/100 ml |
| E. Coli Bacteria | Maximum geometric mean of 126 organisms/100 ml with no more than 10% of samples above 576 organisms/100 ml | n/a |

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

# IV. Effluent Limitations

## A. Basis for Permit Effluent Limits

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

## B. Proposed Effluent Limits

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

1. The pH must be no less than 6.5 and no greater than 9.0 standard units.

2. The monthly average effluent concentration of five-day Biochemical Oxygen Demand ($BOD_5$) shall not exceed 15 percent of the monthly average influent concentration of $BOD_5$.

3. The monthly average effluent concentration of Total Suspended Solids (TSS) shall not exceed 15 percent of the monthly average influent concentration of TSS.

4. There must be no discharge of any floating solids, visible foam in other than trace amounts, or oily wastes that produce a sheen on the surface of the receiving water.

5. The facility shall discharge only between February 15 and April 30 of each year.

6. Table 2 (below) presents the proposed average monthly, average weekly, average daily, and instantaneous maximum effluent limits for $BOD_5$, TSS, E. Coli bacteria, and chlorine.

**Table 2: Effluent Limits**

| Parameter | Units | Average Monthly Limit | Average Weekly Limit | Maximum Daily Limit | Maximum Instantaneous Limit |
|---|---|---|---|---|---|
| BOD5 | mg/L | 30 | 45 | — | — |
| | lb/day | 16 | 24 | — | --- |
| TSS | mg/L | 30 | 45 | — | — |
| | lb/day | 16 | 24 | — | — |
| E. Coli Bacteria | #/100ml | 126 | — | — | 576 |
| Total Residual Chlorine (Until December 31, 2007) | mg/L | 0.5 | 0.75 | — | — |
| | lb/day | 0.26 | 0.39 | — | — |
| Total Residual Chlorine (After January 1, 2007) | mg/L | 0.052 | — | 0.10 | — |
| | lb/day | 0.027 | — | 0.053 | — |

### C. Compliance Evaluation Levels

The proposed final effluent limit for chlorine is below the level at which it can be accurately quantified using EPA approved analytical methods. In this case, it is difficult to determine compliance with the effluent limits. The inability to measure the necessary level of detection is addressed by establishing the minimum level (ML) as the compliance evaluation level for use in reporting data to EPA. Effluent concentrations at or below the ML will be considered in compliance with the water quality based effluent limit. The ML for chlorine is 0.1 mg/L.

## V. Monitoring Requirements

### A. Basis for Effluent and Surface Water Monitoring

Section 308 of the CWA and federal regulation 40 CFR 122.44(i) require monitoring in permits to determine compliance with effluent limitations. Monitoring may also be required to gather effluent and surface water data to determine if additional effluent limitations are required and/or to monitor effluent impacts on receiving water quality. The permittee is responsible for conducting the monitoring and for reporting results on Discharge Monitoring Reports (DMRs) to the U.S. Environmental Protection Agency (EPA).

## B. Effluent Monitoring

Monitoring frequencies are based on the nature and effect of the pollutant, as well as a determination of the minimum sampling necessary to adequately monitor the facility's performance. Permittees have the option of taking more frequent samples than are required under the permit. These samples can be used for averaging if they are conducted using EPA approved test methods (generally found in 40 CFR 136) and if the Method Detection Limits are less than the effluent limits.

Table 3 presents the monitoring requirements for the Viola Water and Sewer District in the draft permit. The sampling location must be after the last treatment unit and prior to discharge to the receiving water. The monitoring samples must not be influenced by combination with other effluent. If no discharge occurs during the reporting period, "no discharge" shall be reported on the DMR.

**Table 3: Effluent Monitoring Requirements**

| Parameter | Unit | Sample Location | Sample Frequency | Sample Type |
|---|---|---|---|---|
| Flow | mgd | Effluent | 1/week | measure |
| $BOD_5$ | mg/L | Influent and Effluent | 1/week | grab |
| | lbs/day | Influent and Effluent | 1/week | calculation[1] |
| | % Removal | -- | -- | calculation[2] |
| TSS | mg/L | Influent and Effluent | 1/week | grab |
| | lbs/day | Influent and Effluent | 1/week | calculation[1] |
| | % Removal | -- | -- | calculation[2] |
| pH | standard | Effluent | 1/week | grab |
| E. Coli Bacteria | #/100 ml | Effluent | 5/month | grab |
| Chlorine | mg/L | Effluent | 1/ week | grab |
| Total Ammonia as N | mg/L | Effluent | 1/month | grab |

Notes:
1 Maximum daily loading is calculated by multiplying the concentration in mg/L by the average daily flow in mgd and a conversion factor of 8.34.
2 Percent removal is calculated using the following equation:
(average monthly influent - effluent) ÷ average monthly influent.

### C. Surface Water Monitoring

Table 4 presents the proposed surface water monitoring requirements for the draft permit. The Viola Water and Sewer District should work with the Idaho Department of Environmental Quality (IDEQ) Lewiston Regional Office to establish an appropriate upstream monitoring location. Sampling shall begin in February of 2005 and continue until April of 2008. Surface water monitoring results shall be submitted with the next permit application.

**Table 4: Surface Water Monitoring Requirements**

| Parameter (units) | Sample Locations | Sample Frequency[1] | Sample Type |
|---|---|---|---|
| Flow (mgd) | Upstream of outfall | 1/month | measure |
| Total Ammonia as N (mg/L) | Upstream of outfall | 1/month | grab |
| pH (s. u.) | Upstream of outfall | 1/month | grab |
| Temperature (°C) | Upstream of outfall | 1/month | grab |

Notes:
1 Monitoring must occur once during each of the following months: February, March and April. Monitoring is for four years of the permit (12 samples).

## VI. Sludge (biosolids) Requirements

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

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

## VII. Other Permit Conditions

### A. Quality Assurance Plan

The federal regulation at 40 CFR 122.41(e) requires the permittee to develop procedures to ensure that the monitoring data submitted is accurate and to explain data anomalies if they occur. The Viola Water and Sewer District is required to develop and implement a Quality Assurance Plan within 180 days of the effective

date of the final permit. The Quality Assurance Plan shall consist of standard operating procedures the permittee must follow for collecting, handling, storing and shipping samples, laboratory analysis, and data reporting.

### B. Operation and Maintenance Plan

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

### C. Additional Permit Provisions

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

## VIII. OTHER LEGAL REQUIREMENTS

### A. Endangered Species Act

The Endangered Species Act requires federal agencies to consult with National Oceanic and Atmospheric Administration Fisheries (NOAA Fisheries) and the U.S. Fish and Wildlife Service (USFWS) if their actions could beneficially or adversely affect any threatened or endangered species. In an email dated October 3, 2003, Bob Ries of NOAA Fisheries stated that the Palouse River drainage is inaccessible to anadromous fish upstream of Palouse Falls, which is some 75 river miles downstream from Fourmile Creek's confluence with the South Fork Palouse River. Therefore, there are no listed or threatened salmon or steelhead in Fourmile Creek. In a letter dated October 31, 2003, Suzanne Audet of the USFWS stated that no Federally listed, proposed, or candidate species are likely to occur in the vicinity of the discharge.

### B. Essential Fish Habitat

Essential fish habitat (EFH) is the waters and substrate (sediments, etc.) necessary for fish to spawn, breed, feed, or grow to maturity. The Magnuson-Stevens Fishery Conservation and Management Act (January 21, 1999) requires EPA to consult with NOAA Fisheries when a proposed discharge has the potential to adversely affect (reduce quality and/or quantity of) EFH. EPA has tentatively

determined that the discharge from the Viola Water and Sewer District WWTP will not affect any EFH species in the vicinity of the discharge, therefore consultation is not required for this action.

### C. State/Tribal Certification

Section 401 of the CWA requires EPA to seek State or Tribal certification before issuing a final permit. As a result of the certification, the State may require more stringent permit conditions or additional monitoring requirements to ensure that the permit complies with water quality standards.

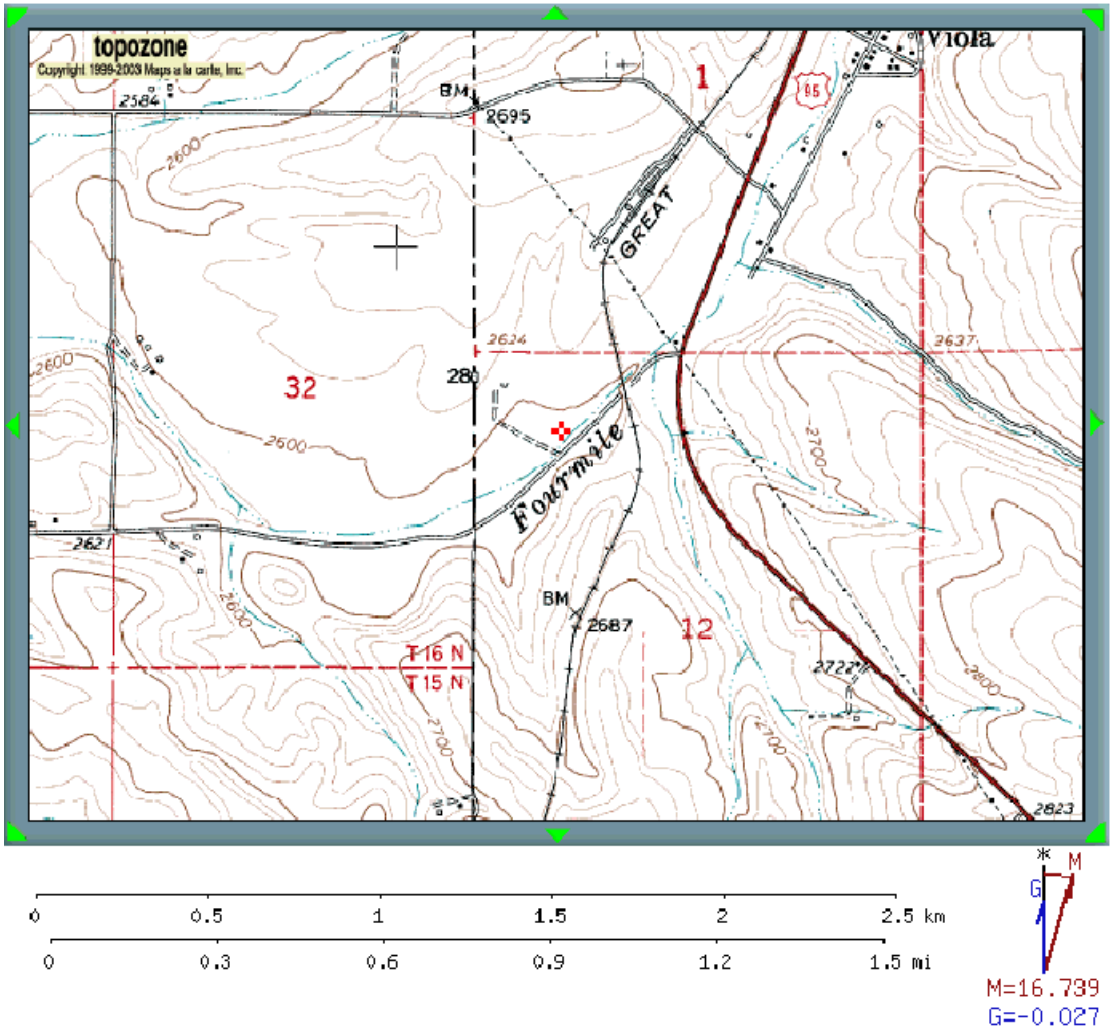
### D. Permit Expiration

The permit will expire five years from the effective date.

# Appendix A - Facility Information

## Map of Facility Location:

Source: *http://www.topozone.com*



## General Information

| | |
|---|---|
| NPDES ID Number: | ID-002631-0 |
| Facility Location: | Trestle Road, Southwest of Viola, Idaho |
| Mailing Address: | P.O. Box 13<br>Viola, ID 83872 |
| Facility Background: | This is the facility's first NPDES permit. |

## Collection System Information

| | |
|---|---|
| Service Area: | A portion of the town of Viola |
| Service Area Population: | 120 |
| Collection System Type: | 100% separated sanitary sewer |

## Facility Information

| | |
|---|---|
| Treatment Train: | Two waste stabilization ponds and chlorination |
| Design Flow: | The design flow of the influent lift station is 0.0108 mgd. The design flow of the chlorine contact chamber is 0.144 mgd, assuming a retention time of 150 minutes. The draft permit assumes a design flow of 0.063 mgd, sufficient to drain the working volume of the larger of the two stabilization ponds in 20 days, per the instructions in the O&M manual. |
| Existing Influent Flow: | 0.0046-0.0084 mgd |
| Outfall Location: | latitude 46° 49' 43" N; longitude 117° 02' 08" W |

## Receiving Water Information

| | |
|---|---|
| Receiving Water: | Fourmile Creek |
| Subbasin: | Palouse (HUC 17060108) |
| Beneficial Uses: | Idaho: Cold water aquatic life habitat, secondary contact recreation<br>Washington: Salmon and trout spawning, noncore rearing and migration; primary contact recreation; domestic, industrial and agricultural water supply; stock watering; wildlife habitat; harvesting; commerce and navigation; boating; and aesthetic values |
| Low Receiving Water Flow: | 1Q10: 1.13 mgd<br>7Q10: 1.59 mgd |

## Additional Notes

| | |
|---|---|
| Additional Requirements: | The facility will discharge only between February 15 and April 30 of each year. |
| Basis for $BOD_5$/TSS Limits: | The draft permit proposes secondary treatment requirements, as opposed to treatment equivalent-to-secondary requirements. Because the facility has not yet discharged, there are no data for the performance of this facility that justify the use of equivalent-to-secondary limits. |

# Appendix B - Basis for Effluent Limitations

The Clean Water Act (CWA) requires Publicly Owned Treatment Works (POTWs) to meet effluent limits based on available wastewater treatment technology. These types of effluent limits are called secondary treatment effluent limits.

EPA may find, by analyzing the effect of an effluent discharge on the receiving water, that secondary treatment effluent limits are not sufficiently stringent to meet water quality standards. In such cases, EPA is required to develop more stringent water quality-based effluent limits which are designed to ensure that the water quality standards of the receiving water are met.

Secondary treatment effluent limits may not limit every parameter that is in an effluent. Secondary treatment effluent limits for POTWs have only been developed for five-day biochemical oxygen demand ($BOD_5$), total suspended solids (TSS), and pH, yet effluent from a POTW may contain other pollutants such as bacteria, chlorine, ammonia, or metals depending on the type of treatment system used and the service area of the POTW (i.e., industrial facilities as well as residences may discharge into a POTW). When technology based effluent limits do not exist for a particular pollutant expected to be in the effluent, EPA must determine if the pollutant has the reasonable potential to cause or contribute to an exceedance of the water quality standards for the water body. If a pollutant causes or contributes to an exceedance of a water quality standard, water quality-based effluent limits for the pollutant must be incorporated into the permit.

The following discussion explains in more detail the derivation of technology and water quality-based effluent limits. Part A discusses technology based effluent limits, Part B discusses water quality based effluent limits, and Part C discusses facility specific limits.

## A. Technology Based Effluent Limits

### 1. $BOD_5$, TSS and pH

**Secondary Treatment**

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

| Table B-1: Secondary Treatment Effluent Limits | | | |
|---|---|---|---|
| **Parameter** | **Average Monthly Limit** | **Average Weekly Limit** | **Range** |
| $BOD_5$ | 30 mg/L | 45 mg/L | --- |
| TSS | 30 mg/L | 45 mg/L | --- |
| Removal Rates for $BOD_5$ and TSS | 85% | --- | --- |
| pH | --- | --- | 6.0 - 9.0 s.u. |

**Treatment Equivalent to Secondary**

Federal regulations include a special provision known as "treatment equivalent to secondary" (TES) for facilities which use waste stabilization ponds or trickling filters as their principal treatment process. The regulations allow less stringent limits for $BOD_5$ and TSS for such facilities provided the following requirements are met (40 CFR 133.101(g), and 40 CFR 133.105(d)):

- The $BOD_5$ and TSS effluent concentrations consistently achievable through proper operation and maintenance of the treatment works exceed the minimum level of the effluent quality described in Table B-1 above (Secondary Treatment Effluent Limits).
- A trickling filter or waste stabilization pond is used as the principal treatment process.
- The treatment works provide significant biological treatment of municipal wastewater (i.e., a minimum of 65% reduction of $BOD_5$ is consistently attained).

The Viola facility uses waste stabilization ponds as its primary treatment process, but it is not eligible for TES effluent limits because no data exist to show that the plant cannot consistently achieve secondary treatment effluent limits.

Effluent data may show that the facility cannot meet secondary treatment effluent limits through proper operation and maintenance but provides at least a 65% reduction of $BOD_5$. In that case, EPA will consider applying TES effluent limits when the permit is reissued. Federal regulations at 40 CFR 122.44(l)(2)(i)(B) would allow the less stringent TES effluent limits to be applied, since the effluent data would have justified the application of TES effluent limits had it been available at the time of permit issuance. The Viola Water and Sewer District may also apply for a modification during the term of the permit, pursuant to 40 CFR 122.62.

### 2. Chlorine

The Viola Water and Sewer District Wastewater Treatment Plant uses chlorine disinfection. A 0.5 mg/L average monthly limit for chlorine is derived from standard operating practices. The Water Pollution Control Federation's *Chlorination of Wastewater* (1976) states that a properly designed and maintained wastewater treatment plant can achieve adequate disinfection if a 0.5 mg/L chlorine residual is maintained after 15 minutes of contact time. A treatment plant that provides adequate chlorination contact time can meet the 0.5 mg/L limit on a monthly average basis. In addition to average monthly limits (AMLs), NPDES regulations require effluent limits for POTWs to be expressed as average weekly limits (AWLs) unless impracticable. The AWL is calculated to be 1.5 times the AML, resulting in an AWL for chlorine of 0.75 mg/L.

### 3. Mass-based Limits

The federal regulation at 40 CFR § 122.45 (f) require that effluent limits be expressed in terms of mass using the design flow of the facility, unless impracticable. The mass based limits are expressed in lbs/day and are calculated as follows:

Mass based limit (lbs/day) = concentration limit (mg/L) × design flow (mgd) × 8.34

## B. Water Quality-Based Effluent Limits

The following discussion is divided into four sections. Section 1 discusses the statutory basis for including water quality-based effluent limits in NPDES permits, section 2 discusses the procedures used to determine if water quality based effluent limits are needed in an NPDES permit, section 3 discusses the procedures used to develop water quality based effluent limits, and section 4 discusses the specific water quality based limits.

### 1. Statutory Basis for Water Quality-Based Limits

Section 301(b)(1)(C) of the CWA requires the development of limitations in permits necessary to meet water quality standards by July 1, 1977. Discharges to State or Tribal waters must also comply with limitations imposed by the State or Tribe as part of its certification of NPDES permits under section 401 of the CWA. Federal regulations at 40 CFR 122.4(d) prohibit the issuance of an NPDES permit which does not ensure compliance with the water quality standards of all affected States.

The NPDES regulation (40 CFR 122.44(d)(1)) implementing section 301 (b)(1)(C) of the CWA requires that permits include limits for all pollutants or parameters which are or may be discharged at a level which will cause, have the reasonable potential to cause, or contribute to an excursion above any State or Tribal water quality standard, including narrative criteria for water quality.

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

**2. Reasonable Potential Analysis**

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

Sometimes it is appropriate to allow a small area of the receiving water to provide dilution of the effluent. These areas are called mixing zones. Mixing zone allowances will increase the mass loadings of the pollutant to the water body, and decrease treatment requirements. Mixing zones can be used only when there is adequate receiving water flow volume and the receiving water is below the chemical specific numeric criterion necessary to protect the designated uses of the water body. Mixing zones must be authorized by the Idaho Department of Environmental Quality. The water quality-based effluent limit for chlorine has been calculated using a mixing zone. If the Idaho Department of Environmental Quality does not grant a mixing zone, the water quality based effluent limit for chlorine will be recalculated such that the criterion is met before the effluent is discharged to the receiving water.

**3. Procedure for Deriving Water Quality-Based Effluent Limits**

The first step in developing a water quality based permit limit is to develop a

wasteload allocation (WLA) for the pollutant. A wasteload allocation is the concentration or loading of a pollutant that the permittee may discharge without causing or contributing to an exceedance of water quality standards in the receiving water.

In cases where a mixing zone is not authorized, either because the receiving water already exceeds the criterion, the receiving water flow is too low to provide dilution, or the State does not authorize one, the criterion becomes the WLA. Establishing the criterion as the wasteload allocation ensures that the permittee will not contribute to an exceedance of the criterion. The wasteload allocations have been determined in this way for pH and E. Coli bacteria because the State does not generally authorize a mixing zone for these pollutants.

**4. Specific Water Quality-Based Effluent Limits**

(a) Toxic Substances

The water quality standards for Washington and Idaho require surface waters of the State to be free from toxic substances in concentrations that impair designated uses. Because there are no significant industrial discharges to the facility, and concentrations of priority pollutants from cities without a significant industrial component are low, it is anticipated that toxicity will not be a problem in the facility's discharge. Therefore, a water quality-based effluent limit for toxicity has not been proposed for the draft permit.

(b) Floating, Suspended or Submerged Matter/Oil and Grease

The Idaho Water Quality Standards require surface waters of the State to be free from floating, suspended, or submerged matter of any kind in concentrations causing nuisance or objectionable conditions that may impair designated beneficial uses. The Washington water quality standards state that aesthetic values must not be impaired by the presence of materials which offend the senses of sight, smell, touch or taste. The draft permit addresses these requirements with a narrative condition that states there must be no discharge of floating solids or visible foam or oil and grease other than trace amounts.

(c) Sediment/Total Suspended Solids (TSS)

The draft permit includes technology-based limits for TSS.

(e) pH

The Idaho water quality standards require surface waters of the State of Idaho to have a pH value within the range of 6.5 - 9.5 standard units. The Washington water quality standards require surface waters which are protected for salmon and trout spawning, noncore rearing and migration to have a pH within the range of 6.5 to 8.5. It is not expected that the Idaho Department of Environmental quality will authorize a mixing zone for pH. Therefore, at a minimum, the effluent must meet the Idaho water quality criteria as well as technology-based limits before it is discharged to the receiving water.

There are no data for the alkalinity of the effluent or of the receiving stream, however, an estimate using representative values shows that the discharge from the Viola WWTP will have a very small effect on the pH of Fourmile Creek at the Washington state line at critical conditions. Therefore, the draft permit incorporates the lower limit of the Washington and Idaho water quality standards (6.5 standard units), and the upper limit of the technology based effluent limits (9.0 standard units).

(f) Dissolved Oxygen (DO)

The Idaho water quality standards require the level of DO to exceed 6 mg/L at all times for water bodies that are protected for aquatic life use. The Washington water quality standards require surface waters which are protected for salmon and trout spawning, noncore rearing and migration to have a one-day minimum dissolved oxygen concentration of 8.0 mg/L or greater.

Fourmile Creek is not water quality limited for DO and it is not expected that the discharge from the Viola Water and Sewer District will cause a violation of DO criteria in either State, so the draft permit does not contain a water-quality based limit for DO. The draft permit does contain a technology-based limit for $BOD_5$.

(g) Ammonia

The water quality standards of Washington and Idaho contain identical water quality criteria to protect aquatic life, including salmonids, against short term and long term adverse impacts from ammonia. Currently, there are no effluent or upstream ammonia data to determine if the facility may cause or contribute to a water quality standard violation for ammonia.

Therefore, the draft permit does not propose effluent limits for ammonia. However, the draft permit requires effluent sampling for ammonia, and surface water sampling for ammonia, pH and temperature. These data will be used to determine if an ammonia limit is needed for the effluent discharge for the next permit.

(h) E. Coli and Fecal Coliform Bacteria

Fourmile Creek is designated for secondary contact recreation in the State of Idaho. According to the Idaho water quality standards, waters that are designated for secondary contact recreation are not to contain E. Coli bacteria significant to the public health in concentrations exceeding:

i. A single sample of 576 E. Coli organisms per 100 ml; or
ii. A geometric mean of 126 E. Coli organisms per 100 ml based on a minimum of five samples taken every three to five days over a thirty day period.

Fourmile Creek is designated for primary contact recreation in the State of Washington. The Washington water quality standards require that waters designated for primary contact recreation are not to contain fecal coliform bacteria in concentrations exceeding:

i. A single sample of 200 fecal coliform organisms per 100 ml; or
ii. A geometric mean of 100 fecal coliform organisms per 100 ml

Since E. Coli bacteria are a type of fecal coliform bacteria, the concentration of fecal coliform bacteria will be greater than or equal to the concentration of E. Coli bacteria in any given sample. EPA does not expect the Idaho Department of Environmental Quality to grant a mixing zone for bacteria. At a minimum, the effluent must meet the Idaho water quality criterion before it is discharged to the receiving water.

A reasonable potential analysis was conducted to determine if the discharge has a reasonable potential to violate Washington's water quality criteria for fecal coliform at the state line. The following assumptions were made for this analysis: the discharge from the Viola WWTP will be completely mixed with the receiving stream at the Washington state line, there will be no decay of bacteria between the discharge and the state line, the upstream density of fecal coliform bacteria in Fourmile Creek is zero, and the highest concentration of E. Coli bacteria in the discharge is 576 organisms/100 ml.

The lowest ratio of E. Coli to fecal coliform density found in a 2003 USGS study of rivers in Kansas (Water-Resources Investigations Report 03–4056) was 0.48. The lowest ratio will yield the highest density of fecal coliform from a sample with a known E. Coli density. As a conservative estimate, it was assumed that 48% of the fecal coliform bacteria in the discharge are E. Coli bacteria. Therefore, the maximum expected fecal coliform density in the discharge is 576 ÷ 0.48 = 1200 organisms/100 ml. Based on these assumptions, the discharge does not have a reasonable potential to cause a violation of the Washington water quality standards at the Washington state line.

(j) Total Residual Chlorine

The water quality standards for Idaho and Washington contain identical water quality criteria to protect aquatic life against short term and long term adverse impacts from chlorine. The Viola Water and Sewer District facility uses chlorine disinfection. The results of a reasonable potential analysis indicated that the facility would have the potential to exceed water quality criterion. Therefore, the draft permit includes a water quality-based effluent limit for residual chlorine. For additional information on the reasonable potential analysis see appendix C, for information on calculating effluent limits see appendix D. Pursuant to IDAPA 58.01.01.400.03, the permittee has been given a compliance schedule for the water quality based effluent limit for chlorine.

# Appendix C - Reasonable Potential Determination

To determine if a water quality based effluent limitation is required, the receiving water concentration of pollutants is determined downstream of where the effluent enters the receiving water. If the projected receiving water concentration is greater than the applicable numeric criterion for a specific pollutant, there is reasonable potential that the discharge may cause or contribute to an excursion above the applicable water quality standard and an effluent limit must be incorporated into the NPDES permit. The receiving water concentration is determined using the following mass balance equation:

$C_dQ_d = C_eQ_e + C_uQ_u$, which can be rearranged as follows:

$$C_d = \frac{C_eQ_e + C_uQ_u}{Q_d}$$

$C_d$ = receiving water concentration downstream of the effluent discharge
$Q_d = Q_e + Q_u$ = receiving water flow downstream of the effluent discharge
$C_e$ = maximum projected effluent concentration
$Q_e$ = maximum effluent flow
$C_u$ = upstream concentration of pollutant
$Q_u$ = upstream low flow

## Flow Conditions / Mixing Zones

The *Idaho Water Quality Standards and Wastewater Treatment Requirements* at IDAPA 16.01.02.060 allow twenty-five percent (25%) of the receiving water to be used for dilution for aquatic life criteria. The flows used to evaluate compliance with the criteria are:

- The 1 day, 10 year low flow (1Q10). This flow is used to protect aquatic life from acute effects. It represents the lowest daily flow that is expected to occur once in 10 years.

- The 7 day, 10 year low flow (7Q10). This flow is used to protect aquatic life from chronic effects. It the lowest 7 day average flow expected to occur once in 10 years.

In accordance with State water quality standards, only the Idaho Department of Environmental Quality may authorize mixing zones. The reasonable potential calculations are based on an assumed mixing zone of 25% for aquatic life. If the State does not authorize a mixing zone in its 401 certification, the permit limits will be re-calculated to ensure compliance with the standards at the point of discharge.

When a mixing zone (%MZ) is allowed, the mass balance equation becomes:

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

## Maximum Projected Effluent Concentration

The CWA requires that the limits for a particular pollutant be the more stringent of either technology-based effluent limits or water quality-based limits. The technology-based chlorine limit is 0.5 mg/L (average monthly limit). At a minimum, facilities must meet the technology-based effluent limit. When doing a reasonable potential calculation to determine if the technology-based chlorine limit would be protective of water quality standards it was assumed that the maximum effluent concentration would be 0.5 mg/L (500 µg/L).

## Reasonable Potential Calculations

The following are the calculations used to determine if the effluent chlorine has the reasonable potential to cause or contribute to an exceedance of the water quality standard.

Information and assumptions for this calculation are:

- Facility is discharging at a maximum chlorine concentration of 500 µg/L
- Wastewater treatment plant design flow = 0.063 mgd (during the periodic discharge)
- The upstream concentration of chlorine is assumed to be zero since there are no sources of chlorine upstream of the discharge.
- The 1Q10 and 7Q10 of the stream are 1.13 and 1.59 mgd, respectively
- Percent of the river available for mixing is 25%

(1) Determine if there is a reasonable potential for the acute aquatic life criterion to be violated.

$MZ = 25\%\ (0.25)$
$C_e = 500\ \mu g/L$
$Q_e = 0.063\ mgd$
$C_u = 0\ \mu g/L$
$Q_u = 1.13\ mgd$

$$C_d = \frac{(500 \times 0.063) + (0 \times (1.13 \times 0.25))}{0.063 + (1.13 \times 0.25)} = 91\ \mu g/L$$

Since 91 µg/L is greater than the acute aquatic life criterion (19 µg/L), there is a reasonable potential for the effluent to cause an exceedance to the water quality standard. Therefore, a water quality based effluent limit is required.

(2) Determine if there is a reasonable potential for the chronic aquatic life criterion to be violated.

MZ = 25% (0.25)
$C_e$ = 500 µg/L
$Q_e$ = 0.063 mgd
$C_u$ = 0 µg/L
$Q_u$ = 1.59 mgd

$$C_d = \frac{(500 \times 0.063) + (0 \times (1.59 \times 0.25))}{0.063 + (1.59 \times 0.25)} = 68 \text{ µg/L}$$

Since 68 µg/L is greater than the chronic aquatic life criterion (11 µg/L), there is a reasonable potential for the effluent to cause an exceedance of the water quality standard. Therefore, a water quality based effluent limit is required.

# Appendix D - Effluent Limit Calculation

To support the implementation of EPA's regulations for controlling the discharge of toxicants, EPA developed the *Technical Support Document for Water Quality-Based Toxics Control* (EPA/505/2-90-001, March 1991). The following is a summary of the procedures recommended in the TSD for deriving water quality-based effluent limitations for toxicants. This procedure translates water quality criteria for chlorine to "end of the pipe" effluent limits.

## Step 1- Determine the WLA

The acute and chronic aquatic life criteria are converted to acute and chronic waste load allocations ($WLA_{acute}$ or $WLA_{chronic}$) for the receiving waters based on the following mass balance equation:

$$Q_dC_d = Q_eC_e + Q_uC_u$$

$Q_d$ = downstream flow = $Q_u + Q_e$
$C_d$ = aquatic life criteria that cannot be exceeded downstream
$Q_e$ = effluent flow
$C_e$ = concentration of pollutant in effluent = $WLA_{acute}$ or $WLA_{chronic}$
$Q_u$ = upstream flow
$C_u$ = upstream background concentration of pollutant

Rearranging the above equation to determine the effluent concentration ($C_e$) or the wasteload allocation (WLA) results in the following:

$$C_e = WLA = \frac{Q_dC_d - Q_uC_u}{Q_e} = \frac{C_d(Q_u + Q_e) - Q_uC_u}{Q_e}$$

## Step 2 - Determine the LTA

The acute and chronic WLAs are then converted to Long Term Average concentrations ($LTA_{acute}$ and $LTA_{chronic}$) using the following equations:

$$LTA_{acute} = WLA_{acute}e^{[0.5\sigma^2 - z\sigma]}$$

where,
$\sigma^2$ = $\ln(CV^2 + 1)$
z = 2.326 for 99$^{th}$ percentile probability basis
CV = coefficient of variation = standard deviation/mean

$LTA_{chronic} = WLA_{chronic}e^{[0.5\sigma 4^2 - z\sigma 4]}$

where,

$\sigma_4^2$ = $\ln(CV^2/4 + 1)$
z = 2.326 for 99th percentile probability basis
CV = coefficient of variation = standard deviation/mean

### Step 3 - Determine the Most Limiting LTA

To protect a waterbody from both acute and chronic effects, the more limiting of the calculated $LTA_{acute}$ and $LTA_{chronic}$ is used to derive the effluent limitations.

### Step 4 - Calculate the Permit Limits

The maximum daily limit (MDL) and the average monthly limit (AML) are calculated as follows:

$MDL = LTA_{chronic}e^{[z\sigma - 0.5\sigma^2]}$
where,
$\sigma^2$ = $\ln(CV^2 + 1)$
z = 2.326 for 99th percentile probability basis
CV = coefficient of variation

$AML = LTA_{chronic}e^{[z\sigma n - 0.5\sigma n^2]}$
where,
$\sigma_n^2$ = $\ln(CV^2/n + 1)$
z = 1.645 for 95th percentile probability basis
CV = coefficient of variation = standard deviation/mean
n = number of sampling events required per month for chlorine = 4

| Table D-1: Chlorine Effluent Limit Calculations | | | |
|---|---|---|---|
| **Reasonable Potential** | | **LTAs** | |
| | | MDL Confidence Level | 0.99 |
| Mixing Zone | 25% | AML Confidence Level | 0.95 |
| 7Q10 (mgd) | 1.59 | Z-Score of MDL Confidence Level | 2.326 |
| 1Q10 (mgd) | 1.13 | Z-Score of AML Confidence Level | 1.645 |
| Qe (mgd) | 0.063 | CV | 0.6 |
| Cu (mg/l) | 0 | $CV^2$ | 0.360 |
| Ce (mg/l) | 0.5 | $\sigma_4^2$ | 0.086 |
| Max Chronic RWC (mg/l) | 0.068 | $\sigma_4$ | 0.294 |
| Max Acute RWC (mg/l) | 0.091 | $\sigma^2$ | 0.307 |
| | | $\sigma$ | 0.555 |
| **Criteria** | | n | 4 |
| Chronic WQ Criteria (mg/l) | 0.011 | $\sigma_n^2$ | 0.086 |
| Acute WQ Criteria (mg/l) | 0.019 | $\sigma_n$ | 0.294 |
| | | LTAc (mg/l) | 0.042 |
| **Reasonable Potential?** | **YES** | LTAa (mg/l) | 0.033 |
| | | Limiting LTA | 0.033 |
| **Wasteload Allocations** | | **Daily and Monthly Limits** | |
| WLAc (mg/l) | 0.080 | **MDL (mg/l)** | **0.104** |
| WLAa (mg/l) | 0.104 | **AML (mg/l)** | **0.052** |

| Table D-2: Reasonable Potential Calculations for Fecal Coliform at Washington Line | |
|---|---|
| Mixing Zone | 100% |
| 7Q10 (mgd) | 1.59 |
| 1Q10 (mgd) | 1.13 |
| Qe (mgd) | 0.063 |
| Cu (#/100 ml) | 0 |
| Ce (#/100 ml) | 1200 |
| Maximum RWC at 7Q10 (#/100ml) | 46 |
| Maximum RWC at 1Q10 (#/100 ml) | 63 |
| | |
| **Criteria** | |
| Max Geometric Mean (#/100 ml) | 100 |
| Max Single Sample (#/100 ml) | 200 |
| | |
| **Reasonable Potential?** | **NO** |