FACT SHEET FOR THE BRIDGE AND FERRY TERMINAL WASHING GENERAL PERMIT

DEPARTMENT OF ECOLOGY

October 19, 2016

Purpose of this General Permit

This permit was developed to allow regular maintenance cleaning, preparatory washing, and painting of bridge and ferry terminals and associated over water metal structures, over waters of the state.

After the collapse of the steel truss span on Interstate-5 over the Skagit River in 2013, bridge inspectors with the Washington State Department of Transportation (WSDOT) performed in-depth inspections on the remaining steel truss spans for that structure. They found quite a bit of dirt, debris, guano, etc., that had collected over time in the lower members of the remaining spans. Dry removal of dirt and debris revealed varying degrees of steel deterioration in the members that was previously hidden by the build-up.

For the latter half of 2013, WSDOT performed scheduled Fracture Critical (FC) inspections on other steel truss bridges in their inventory, even the ones that had dirt and debris build-up. A fracture critical bridge is a type of bridge that has a support member under tension whose failure would probably cause a portion of or the entire bridge to collapse. The inspectors reported inability to visually inspect these areas on Fracture Critical bridges to their superiors. The WSDOT Statewide Bridge Program Manager agreed that this inability would, in essence, not fully meet the federally mandated National Bridge Inspection Standards (NBIS) pertaining to inspection of these fracture critical bridges. WSDOT informed Federal Highway Administration (FHWA) that the inspections for these bridges could not be completed due to the dirt and debris and FHWA found the state out of compliance.

The FHWA letter of non-compliance directed WSDOT to develop a Plan of Corrective Action for all future FC bridge inspections within the state, specifically for bridges that need cleaning in order to visually inspect those areas described above. There are 257 FC bridges and 19 ferry terminals in WSDOT inventory. In addition to FC bridges in WSDOT inventory, it is estimated that statewide, local government agencies have responsibility for 71 more FC bridges. Cleaning, washing, and painting prolong the integrity and safety of these structures, and this permit allows both WSDOT and local jurisdictions to conduct those activities.

Summary

This fact sheet is a companion document to the National Pollutant Discharge Elimination System (NPDES) General Permit for washing bridge and ferry terminal overwater structures. This permit authorizes discharges from spot cleaning, maintenance washing (low pressure washing) and preparatory washing for painting (high pressure washing) of bridges and ferry terminals in Washington State. These activities are low volume (typically 18 gallons/minute maximum for bridge washing and 12 gallons/minute maximum for ferries) and intermittent. The permit allows maintenance washing and spot cleaning on bridges during high river flows typically occurring in fall, winter, or spring.

Preparatory washing on bridges occurs at a 15-year interval or longer. Currently, the operation involves full containment of the activity with no wastewater discharge to waters of state. The permit, however, includes waste discharge provisions for preparatory washing taken from an individual NPDES permit issued to Washington State Department of Transportation (WSDOT) in 2009. These provisions put seasonal limitations to preparatory washing to when the stream

flows are high in addition to other limitations on the discharge from pressure washing operation. They also require the use of filter trap to restrict dirt and old paint chips in the discharge.

During the application process for WSDOT's individual NPDES permit no. WA-0039039 (WSDOT bridge permit), an analysis of treatment options for preparatory washing demonstrated that a filter tarp slung below the bridge to catch paint chips and debris met the cost test for all known, available and reasonable methods of prevention, control, and treatment (AKART of Chapter 90.48 RCW, case-by-case of 40 CFR Part 125.3). The AKART determination is still valid and used for this general permit.

WSDOT's bridge permit required WSDOT to conduct annual monitoring on maintenance washing and preparatory washing projects during the life of the permit and submit monitoring reports to Ecology. In addition, WSDOT's bridge permit contained a compliance schedule authorizing WSDOT to develop and implement a study to develop waste specific translators, applicable to their washing activities, for copper, lead, and zinc. The data collected from the monitoring and the translator study was used to make a determination of reasonable potential for the exceedance of the water quality criteria associated with bridge washing activities. Results from the reasonable potential analysis were used to adjust the flow limitations developed in the WSDOT bridge permit and to determine the stream/river flows under which the effluent discharged to surface waters would not cause an exceedance of water quality criteria.

Typically wastewater discharge permits limit the concentration or amount of pollutants allowed to be discharged. This permit limits the activities based on the river flow and tidal exchange as well as discharge flows typically generated in bridge washing operations. The reasonable potential analysis mentioned above determined minimum stream/river flows above which the discharge from a typical washing operation would not have a reasonable potential for the violation of water quality criteria. However, with as many bridges over a variety of streams statewide, there would likely be cases where the stream flows would be less than the minimum flows needed for adequate dilution of the wastewater within the mixing zone allowed in the stream under this permit. Under such circumstances, this permit limits the washing operations to occur during seasonally high stream flow periods and requires the Permittee to follow the operational BMPs and monitoring specified in the permit.

Furthermore, bridge and annual ferry terminal cleaning and washing operations are carried out infrequently (occurring at yearly or longer intervals) with intermittent discharges to the receiving waters over a relatively short period (hours or days rather than weeks or months). This allows the stream a much longer recovery time. In addition, the permit requires operational BMPs to prevent and mitigate the potential impacts of discharges resulting from the maintenance activities covered under this permit. Since bridge and ferry terminal cleaning and washing operations are maintenance activities that can lead to safer structures with longer service life, this permit includes a provision allowing short-term extended mixing zones per surface water quality standards in WAC 173-201A-400. Where the Permittee follows the requirements specified for the activities covered under this permit, the permit extends the size of mixing zones on short-term basis allowing sufficient mixing and dilution of the discharge.

This permit does not authorize the discharge of effluent to surface waters listed on as Category 4 or 5 on the 2015 WQ Assessment for copper, lead, or zinc. This permit contains Special and General Conditions which are based on applicable state and federal law and regulations.

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I. INTRODUCTION

The Federal Clean Water Act (CWA, 1972, and later modifications, 1977, 1981, and 1987) established water quality goals for the navigable (surface) waters of the United States. The National Pollutant Discharge Elimination System (NPDES) permit program is one of the mechanisms for achieving the goals of the CWA. The NPDES Permit program is administered by the Environmental Protection Agency (EPA). The EPA has delegated responsibility to administer the NPDES permit program to the State of Washington on the basis of Chapter 90.48 RCW. Chapter 90.48 RCW defines the Department of Ecology's authority and obligations in administering the wastewater discharge permit program.

State regulations specify procedures for issuing general permits (Chapter 173-226 WAC), water quality criteria for surface and ground waters (Chapters 173-201A and 173-200 WAC), and sediment management standards (Chapter 173-204 WAC). These regulations require that Ecology issue a permit before allowing discharge of wastewater to waters of the state. The regulations also establish the basis for effluent limitations and other requirements which are to be included in the draft permit. WAC 173-226-110 requires the preparation of a draft permit and an accompanying fact sheet before issuing a general permit under the NPDES permit program. The fact sheet and draft permit are available for review (see Appendix A—Public Involvement of the fact sheet for more detail on the Public Notice procedures).

After the public comment period has closed, The Department of Ecology (Ecology) will summarize the substantive comments and respond to each comment. The summary and response to comments will become part of the administrative record. Parties submitting comments will receive a copy of Ecology's response. Ecology will summarize comments and the resultant changes to the draft permit in Appendix D—Response to Comments.

II. BACKGROUND INFORMATION

A. Description of the Wastewater Discharge

Local government and State agencies that own bridges and ferry terminals are responsible for maintaining them. Typically, the maintenance of these structures entails one or more of the following steps depending on maintenance needs: Phase 1/Spot Cleaning- periodic inspections are performed that includes assessing the condition of protective paint coatings, Phase 2/Maintenance Washing- washing to remove dirt and other material from the structure, and Phase 3/Preparatory Washing –pressure washing prior to repainting as needed to protect structural integrity. All three phases of bridge and ferry transfer span and overwater metal structures maintenance generate discharges of wash water to waters of the state.

Painting of the bridge and ferry terminal structures does not generate effluent discharges. Prior to conducting painting of the structures, the permit requires preparation of a spill prevention and response plan to prevent and contain any incidental discharges. A wastewater discharge permit is not required for painting only.

Phase 1 Spot Cleaning

Structures are periodically inspected and may be spot cleaned with water to prepare the structure for inspection. This activity involves the following steps:

- Establish traffic control if needed
- Identify the facture critical points that need to be cleaned
- Construct a containment system around the work: plywood or other work platforms or drip tarps/#100 sieve filter fabric
- Remove dirt and debris using a combination of dry and/or wet methods such as hand scraping, flushing with water (high volume, low pressure system) or using a vacuum system.

Debris removed before washing can be disposed of in an upland location. The volume of water used for spot cleaning varies depending on how much of the structure requires inspection.

Phase 2 Maintenance Washing

i. Bridges

Washington State Department of Transportation (WSDOT) schedules and conducts maintenance washing of bridge and ferry terminal structures on a 1-5 year cycle, removing dirt and other material from these structures and extending the life of the paint. This type of washing entails high volume/low pressure washing. No containment is used during this activity to filter the water or catch debris. This activity involves the following steps:

- Establish traffic control - set up and break down are done on a daily basis to reduce traffic congestion.
- Establish fall protection systems (scaffolding, rigging, ropes, and other equipment).
- Remove dry debris, such as dust and bird feces, by hand and vacuum.
- Wash steel with clean water using a high-volume, low pressure system.

Debris removed before washing can be disposed of in an upland location. Approximately 400 to 600 gallons of water are used to clean a typical bridge structure (625 tons of steel).

ii. Ferry Transfer Spans & Overwater Metal Structures

Structures are washed on a monthly to semi-annual cycle removing dirt and other material and extending the life of the paint. This type of washing entails high volume/low pressure washing. No containment is used during this activity to filter the water or catch debris. This activity involves the following steps:

- Remove dry debris, such as dust and bird feces, by hand and vacuum.
- When necessary, apply a biodegradable degreaser (e.g. Simple Green) to transfer span surfaces. Surfaces are typically not washed after a degreaser is applied but washing may occur in some instances depending upon the activity.
- Wash steel transfer span with clean water using a high-volume, low pressure system. Debris removed before washing can be disposed of in an upland location. Approximately 200-600 gallons of water are used to clean ferry transfer spans.

Phase 3 Preparatory Washing

i. Bridges

Bridge painting occurs on a schedule dictated by the rate at which paint systems deteriorate. The rate of deterioration is determined when the bridge is spot cleaned for inspection. In the case of WSDOT, one of three paint system condition levels is identified during inspection at each bridge based on the following criteria:

- Condition level 1: Paint is in like new condition

- Condition level 2: Paint is peeling or deteriorating, but no steel is exposed
- Condition level 3: Paint is peeling or deteriorating and exposing the underlying steel.

When a bridge is identified in the later stages of condition level 2 or at condition level 3, and has 2 percent or more steel exposed, WSDOT adds it to their statewide painting list. Bridges needing painting or repainting are washed with low volume/high pressure washers. A filter tarp is used to filter the water and remove debris because this type of washing removes paint.

This activity involves the following steps:

- Establish traffic control
- Establish fall protection systems (scaffolding, rigging, ropes, and other equipment).
- Construct tarp systems around and beneath the work area using a #100 sieve filter tarp.
- Remove dry debris by hand and vacuum.
- Wash steel surfaces with a low-volume, high pressure (3200 pounds per square inch) system – effluent passes through a filter tarp to remove particulate material before discharge to the environment below.
- After the steel surfaces have dried, spot blast with metal slag (Blastox or Kleenblast) to remove flaking/chipping paint and oxidized steel.
- Blow down surfaces to remove residual dust and debris from the steel. All material from spot blasting activity is contained and stored on site.
- Apply zinc-based primer coat to spot blasted areas.
- Apply an intermediate coat and top coat of moisture cured urethane to all steel surfaces.

Due to varied bridge settings and environmental conditions, the frequency of bridge painting varies and is typically greater than 15 years. Bridges are painted during the summer months when conditions are conducive to using the moisture-cured urethane paint systems. The volume of water used to clean a bridge for painting varies based on the size of the bridge structure.

ii. Ferry Transfer Spans & Overwater Metal Structures

Ferry Transfer Spans & Overwater Metal Structures are painted at a frequency of 15 or more years. The steps listed above for bridges are the same steps used for painting ferry transfer spans & overwater metal structures. Filtration tarps are also currently used during preparatory washing of transfer spans. The volume of water used varies based on the size of the transfer span.

WSDOT conducts annual and housekeeping washing of ferry terminals. These cleaning and washing activities are intended to prevent paint degradation and to protect the health and safety of ferry patrons and workers by preventing the buildup of moss, algae, and other pollutants. Annual washing is typically conducted once per year (sometimes biannually for some terminals), while housekeeping washing is conducted on a weekly basis or as often as needed. Annual washing is conducted during the spring to prepare ferry terminals for the tourist season. Housekeeping washing activities are conducted to proactively minimize and prevent water pollution and protect public health and safety at ferry terminals. The requirements in the permit apply to the activities that discharge material into state waters.

B. Wastewater Characterization

WSDOT conducted 17 maintenance washing pilot studies over a period of 3 years. Table 1 contains mean total concentrations for copper, lead, and zinc measured in effluents from the pilot

maintenance washing studies. Table 1 also shows values for dissolved metals concentrations. The dissolved metal values are the highest concentration measured from each bridge washing activity using data WSDOT submitted for the pilot studies and the annual monitoring reports.

Since there are large variability in the measured metals concentration and wide range of values, the general permit requires WSDOT to continue conducting more metals monitoring on representative samples of wash water from maintenance and preparatory washing activities using Ecology approved sampling and analysis protocols. The permit requires WSDOT to compile all the available wash water monitoring results in a bridge and ferry terminal wash water characterization report and submit the report to Ecology. In this report, WSDOT is to perform statistical analysis of the monitored data, discuss the range of observed metals concentration, type and age of the paint if known, and explain the potential site specific factors that could cause the observed variability in the results.

Table 1: Wastewater Characterization – Maintenance Washing

Parameter	Mean & Concentration Range - Dissolved µg/L	Mean & Concentration Range - Total µg/L
Copper	16 (1.1 - 140)	129 (2.2 - 960)
Lead	24 (0.2 - 140)	1631 (7.2 – 14,000)
Zinc	692 (3 – 3,500)	3146 (7.7 – 43,000)

Preparatory washing occurs relatively infrequently and WSDOT monitored and reported data on a relatively fewer number of preparatory washing discharges. Table 2 shows the metal concentration measured in effluent from these operations.

Table 2: Wastewater Characterization – Preparatory Washing

Parameter	Mean & Concentration Range - Dissolved µg/L	Mean & Concentration Range - Total µg/L
Copper	40.5 (16 - 178)	411 (45 - 2,050)
Lead	410.7 (48.8 - 1,670)	23,659.4 (1,220 - 96,100)
Zinc	1826.8 (166 - 4,610)	8,505.6 (1,650 - 31,592)

C. Description of the Receiving Water

This activity occurs statewide on multiple waterbodies, in both fresh and marine water. The ambient background data shown in Table 3 were used for reasonable potential analysis in this permit. They are taken from the fact sheet of the 2009 WSDOT bridge permit (no. WA-0039039) and are originally from the *Water and Sediment Quality Impact Engineering Analysis, Treatment Evaluation for WSDOT Bridge Washing Effluent,* dated October 2003, and the *Water Quality Risk Evaluation for proposed Benchmarks/Action Levels in the Industrial Stormwater Permit,* dated February 9, 2009.

Table 3: Ambient Background Data

Parameter	Value used
Hardness	18 mg/L CaCO3 Western WA 35 mg/L CaCO3 Eastern WA
Copper	1.19 µg/L Western WA 0.96 µg/L Eastern WA
Lead	0.06 µg/L Western WA 0.11 µg/L Eastern WA
Zinc	3.27 µg/L Western WA 9.63 µg/L Eastern WA

D. SEPA Compliance

Based on an earlier determination made in WSDOT individual bridge washing permit (No. WA-0039039), the activities covered by this permit are exempt from SEPA under WAC 468-12-800(1)(u) which exempts "all repair, maintenance, and minor alteration of …physical features and structures within the jurisdiction of the transportation department" and under WAC 197-11-800(3) which exempts "the repair, remodeling, maintenance, or minor alteration of existing private or public structures. Ecology has also completed the SEPA review process for the bridge and ferry terminal washing general permit and made a determination of non-significance for the issuance of this general permit.

III. PROPOSED PERMIT CONDITIONS

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 from WSDOT's monitoring reports and studies including information in supporting engineering and hydrogeology reports submitted to Ecology. Ecology evaluated this information 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, or do not have a reasonable potential to cause a water quality violation.

Nor does Ecology usually develop permit 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 it is determined that an activity covered under this permit is discharging pollutants that are not typical of the bridge and ferry terminal washing activities discharge and at quantities of environmental concern, an individual permit may be required to address the issue.

A. Technology-Based Effluent Limits

The requirements in this permit are based on the NPDES Waste Discharge Permit No. WA-0039039 issued to WSDOT, which evaluated several possible treatment options for the preparatory washing effluent using pressure washers in an engineering report. The treatment options included full containment, recycle, and the current practice of #100 mesh filter tarps for preparatory washing. The technology-based effluent limits were based on the wash water discharge rates in relation to the stream flows after applying BMPs in the permit. Ecology has determined that critical discharge condition for the activities under this permit occurs during summer low flows (freshwater) and slack tide (marine) when there is low current velocity. To account for the critical discharge conditions, the permit establishes minimum stream flows for spot cleaning and maintenance washing. Where stream flows are less than the specified minimum stream flows, spot cleaning and maintenance washing must occur on bridges during high river flows, typically occurring in fall, winter, or spring. Discharges of preparatory wash water are not allowed during periods of slack tide over marine waters.

B. Surface Water Quality-Based Effluent Limits

The Washington State Surface Water Quality Standards (chapter 173-201A WAC) were 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 established 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 loading study (TMDL).

Numerical Criteria for the Protection of Aquatic Life and Recreation

Numerical water quality criteria are published in the Water Quality Standards for Surface Waters (chapter 173-201A WAC). They specify the 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 (40 CFR 131.36). These criteria are designed to protect humans from exposure to pollutants linked to cancer and other diseases, 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.

Ecology considered Tier I and Tier II in this permit and determined there are no discharges under this permit to “outstanding resource waters.”

Ecology always considers Tier I when it issues a permit. Applying both technology based permit limits and water quality-based limits to point source discharges meets Tier 1 requirements and the fact sheet describes how this permit meets those requirements.

Tier II requirements for general permits are given in 173-201A-320(6) as follows:

(a) Individual activities covered under these general permits or programs will not require a Tier II analysis.

(b) The department will describe in writing how the general permit or control program meets the antidegradation requirements of this section.
(c) The department recognizes that many water quality protection programs and their associated control technologies are in a continual state of improvement and development. As a result, information regarding the existence, effectiveness, or costs of control practices for reducing pollution and meeting the water quality standards may be incomplete. In these instances, the antidegradation requirements of this section can be considered met for general permits and programs that have a formal process to select, develop, adopt, and refine control practices for protecting water quality and meeting the intent of this section. This adaptive process must:

(i) Ensure that information is developed and used expeditiously to revise permit or program requirements;
(ii) Review and refine management and control programs in cycles not to exceed five years or the period of permit reissuance; and
(iii) Include a plan that describes how information will be obtained and used to ensure full compliance with this chapter. The plan must be developed and documented in advance of permit or program approval under this section.
(7) All authorizations under this section must still comply with the provisions of Tier I (WAC 173-201A-310).

This fact sheet describes how the permit and control program meets the antidegradation requirement.

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 criteria, so long as the diluting wastewater doesn't interfere with designated uses of the receiving water body (e.g., recreation, water supply, and aquatic life and wildlife habitat, etc.). The pollutant concentrations outside of the mixing zones must meet water quality numeric criteria.

State and federal rules allow mixing zones because the concentrations and effects of most pollutants diminish rapidly after discharge, due to dilution. Ecology defines mixing zone sizes to limit the amount of time any exposure to the end-of-pipe discharge could harm water quality, plants, or fish.

The state's water quality standards (WAC 173-201A-400) allow Ecology to authorize mixing zones for the facility's permitted wastewater discharges only if those discharges already meet AKART. Mixing zones typically require compliance with water quality criteria within a specified distance from the point of discharge; and use no more than 25% of the available width and flow of the water body for dilution. Ecology uses modeling to estimate the amount of mixing within the mixing zone and determine the potential for violating the water quality standards at the edge of the mixing zone and derive any necessary effluent limits. Steady-state models are the most frequently used tools for conducting mixing zone analyses.

Ecology chooses values for each effluent and for receiving water variables that correspond to the time period when the most critical condition is likely to occur (see Ecology's Permit Writer's Manual). Each critical condition parameter (by itself) has a low probability of

occurrence and the resulting dilution factor is conservative. The term "reasonable worst-case" applies to these values.

The mixing zone analysis produces a numerical value called a dilution factor (DF). A dilution factor represents the amount of mixing of effluent and receiving water that occurs at the boundary of the mixing zone. For example, a dilution factor of 16 means the effluent comprises 6.25% by volume and the receiving water comprises 93.75% of the total volume at the boundary of the mixing zone. Ecology uses dilution factors with the water quality criteria to calculate reasonable potentials and effluent limits. Water quality standards include both aquatic life-based criteria and human health-based criteria. The former are applied at both the acute and chronic mixing zone boundaries; the latter are applied only at the chronic boundary. The concentration of pollutants at the boundaries of any of these mixing zones may not exceed the numerical criteria for that zone.

Each aquatic life **acute** criterion is based on the assumption that organisms are not exposed to that concentration for more than one-hour and more often than one exposure in three years. Each aquatic life **chronic** criterion is based on the assumption that organisms are not exposed to that concentration for more than four consecutive days and more often than once in three years.

The two types of human health-based water quality criteria distinguish between those pollutants linked to non-cancer effects (non-carcinogenic) and those linked to cancer effects (carcinogenic). The human health-based water quality criteria incorporate several exposure and risk assumptions. These assumptions include:

- A 70-year lifetime of daily exposures.
- An ingestion rate for fish or shellfish measured in kg/day.
- An ingestion rate of two liters/day for drinking water
- A one-in-one-million cancer risk for carcinogenic chemicals.

This permit authorizes a small acute mixing zone around the point of discharge (WAC 173-201A-400). This discharge is a short term intermittent discharge and therefore was only evaluated for acute criteria and toxicity. An acute mixing zone of 2.5% of receiving water flow was authorized for flowing fresh waters. An acute mixing zone of 20 feet around the point of discharge was authorized for marine waters. Because mixing zones are areas of dilution, no mixing zone may be authorized for receiving waters already exceeding the water quality criteria.

1. Ecology must specify both the allowed size and location in a permit.
The allowed mixing zone will vary based on the location of the bridge being washed and the amount of river flow at the time of the project. The permit provides conditions indicating the minimum of amount flow needed based on the number of pressure washers operating simultaneously to protect water quality.

2. The facility must fully apply "all known available and reasonable methods of prevention, control and treatment" (AKART) to its discharge.
Ecology has determined that the treatment provided and the pollution prevention activities practiced Washington Department of Transportation meet the requirements of AKART (see "Technology based Limits").

3. Ecology must consider critical discharge conditions.
Surface water quality-based limits are derived for the water body's critical condition, (the receiving water and waste discharge condition with the highest potential for adverse impact on the aquatic biota, human health, and existing or designated water body uses). The critical discharge condition is often pollutant-specific or water body-specific.

Ecology has determined that critical discharge condition for the activities under this permit occurs during summer low flows (freshwater) and slack tide (marine) when there is low current velocity. To account for the critical discharge conditions, the permit requires minimum stream flows for spot cleaning and maintenance washing. Where stream flows are less than the specified minimum stream flows, the permit restricts spot cleaning and maintenance washing to winter time high flows for freshwater.

The preparatory washing prepares a structure for painting and must occur during the summer months. To account for this situation, the ambient data used in the reasonable potential analysis was taken from a State-wide data base for data around the time of low flow to derive flow limitations that are protective of water quality.

4. Supporting information must clearly indicate the mixing zone would not:
- Have a reasonable potential to cause the loss of sensitive or important habitat,
- Substantially interfere with the existing or characteristic uses,
- Result in damage to the ecosystem, or
- Adversely affect public health.

Ecology established Washington State water quality criteria for toxic chemicals using EPA criteria. EPA developed the criteria using toxicity tests with numerous organisms, and set the criteria to protect all aquatic species.

EPA sets acute criteria for toxic chemicals assuming organisms are exposed to the pollutant at the criteria concentration for 1-hour. They set chronic criteria assuming organisms are exposed to the pollutant at the criteria concentration for 4 days. Dilution modeling under critical conditions shows that both acute and chronic criteria concentrations are reached within minutes of being discharged.

5. The discharge/receiving water mixture must not exceed water quality criteria outside the boundary of a mixing zone.
Ecology conducted a reasonable potential analysis, using procedures established by the EPA and by Ecology, for pollutants of concern, copper, lead and zinc, determined to be present in the effluent discharge through monitoring and laboratory testing. Ecology concluded the discharge/receiving water mixture will not violate water quality criteria outside the boundary of the mixing zone if minimum flow limits are met for bridge and ferry terminal washing activities covered by this permit.

6. The size of the mixing zone and the concentrations of the pollutants must be minimized.
Ecology minimizes the size of the mixing zone (in the form of the dilution factor) using design criteria with a low probability of occurrence. For example, Ecology uses the

expected 95th percentile pollutant concentration, the 90th percentile background concentration, the centerline dilution factor and the lowest flow occurring once in every 10 years to perform the reasonable potential analysis.

Because of the above reasons, Ecology has effectively minimized the size of the mixing zone authorized in the proposed permit.

7. Maximum size of mixing zone
The authorized mixing zone does not exceed the maximum size restriction.

8. Acute Mixing Zone

- The discharge/receiving water mixture must comply with acute criteria as near to the point of discharge as practicably attainable.

- The pollutant concentration, duration and frequency of exposure to the discharge, will not create a barrier to migration or translocation of indigenous organisms to a degree that has the potential to cause damage to the ecosystem.

- As described above the toxicity of any pollutant depends upon the exposure, the pollutant concentration and the time the organism is exposed to that concentration. Authorizing a limited acute mixing zone for this discharge assures that it will not create a barrier to migration.

9. Overlap of Mixing Zones.
These mixing zones are not expected to overlap other mixing zones.

10. Short-term Extended Mixing Zones.
A short-term extended mixing zone is authorized for bridge maintenance washing conducted in accordance with the restrictions in permit conditions S4.B and S4.C during the periods November 1st - May 30th in Western Washington and December 31st through June 30th in Eastern Washington, and for maintenance washing of ferry terminal structures in marine water conducted in accordance with the restrictions in permit condition S4.E.

C. 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 (40 CFR 131.36).

Freshwater
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 are identified below in Table 4.

Table 4: Aquatic Life Uses

Char Spawning and Rearing
Char Spawning (Applies seasonally as described in Ecology Publication 06-10-038)
Salmon and Trout Spawning (Applies seasonally as described in Ecology Publication 06-10-038)

Core Summer Salmonid Habitat
Salmonid Spawning, Rearing, And Migration
Salmonid Rearing And Migration Only
Non-Anadromous Interior Redband Trout
Indigenous Warm Water Species

The recreational uses are extraordinary primary contact recreation, primary contact recreation, and secondary contact recreation.

The **water supply uses** are domestic, agricultural, industrial, and stock watering.

The **miscellaneous fresh water uses** are wildlife habitat, harvesting, commerce and navigation, boating, and aesthetics.

Marine Water
Aquatic life uses are designated using the following general categories. All indigenous fish and non-fish aquatic species must be protected in waters of the state.

(a) **Extraordinary quality** salmonid and other fish migration, rearing, and spawning; clam, oyster, and mussel rearing and spawning; crustaceans and other shellfish (crabs, shrimp, crayfish, scallops, etc.) rearing and spawning.
(b) **Excellent quality** salmonid and other fish migration, rearing, and spawning; clam, oyster, and mussel rearing and spawning; crustaceans and other shellfish (crabs, shrimp, crayfish, scallops, etc.) rearing and spawning.
(c) **Good quality** salmonid migration and rearing; other fish migration, rearing, and spawning; clam, oyster, and mussel rearing and spawning; crustaceans and other shellfish (crabs, shrimp, crayfish, scallops, etc.) rearing and spawning.
(d) **Fair quality** salmonid and other fish migration.

The **miscellaneous marine water uses** are wildlife habitat, harvesting, commerce and navigation, boating, and aesthetics.

Water quality criteria for copper, lead, and zinc, apply to this activity per WAC 173-201A-240 Toxic Substances.

D. Evaluation of Surface Water Quality-Based Effluent Limits for Numeric Criteria

Pollutants in an effluent may affect the aquatic environment near the point of discharge (near field) or at a considerable distance from the point of discharge (far field). Toxic pollutants, for example, are near-field pollutants--their adverse effects diminish rapidly with mixing in the receiving water. Conversely, a pollutant such as biological oxygen demand (BOD) is a far-field pollutant whose adverse effect occurs away from the discharge even after dilution has occurred. Thus, the method of calculating surface water quality-based effluent limits varies with the point at which the pollutant has its maximum effect.

Based on the analysis of bridge washing data collected by WSDOT per 2009 bridge permit requirements, pollutant concentrations in the proposed bridge and ferry terminal washing discharges exceed water quality criteria despite using technology-based controls which Ecology determined fulfills AKART. Ecology therefore authorizes a mixing zone in accordance with the

geometric configuration, flow restriction, and other restrictions imposed on mixing zones described in chapter 173-201A WAC.

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.

Per 2009 WSDOT bridge washing monitoring reports, copper, lead, and zinc were present in the effluents from bridge and ferry terminal washing discharges. The 2009 bridge permit used the general ambient concentration in Table 3 to determine the water quality criteria in Eastern and Western Washington streams and to conduct reasonable potential analyses for the violation of these criteria by bridge preparatory (pre-painting) wash water discharges.

Based on the 2009 analysis, Ecology determined the toxic pollutants in preparatory wash water discharges to have a reasonable potential to cause a violation of the water quality standards under certain effluent discharge flows and the flows in the receiving water/stream. For the preparatory washing, Ecology calculated effluent limits as minimum receiving water flows with associated wash water effluent flows using methods from EPA, 1991, as shown in Appendix C. This appendix is taken directly from the fact sheet to the 2009 WSDOT bridge permit.

Reasonable potential analyses were also conducted for maintenance washing discharges to Eastern and Western Washington streams. These analyses use WSDOT maintenance washing data reported per 2009 bridge permit requirements. Appendix D contains summary tables showing reasonable potential spreadsheets for wash water discharges to Eastern and Western Washington streams. The tables in Appendix D also include the wash water discharge flows, dilution factors, and the minimum stream flows required for wash water discharges to have no reasonable potential for violating water quality criteria.

The reasonable potential analyses for the maintenance washing discharges in Appendix D found the minimum stream flows of 221 cubic feet per second (CFS) for Eastern Washington and 351 CFS for Western Washington above which there is no exceedance of the water quality criteria. However, there would be a potential for the exceedance of the water quality criteria for maintenance washing of structures over streams with lower flows. The exceedance would occur infrequently, at yearly or longer intervals, with intermittent discharges to the receiving waters lasting for a few hours to a few days. This allows the stream a much longer recovery time.

Extended Mixing Zones

Since bridge and ferry terminal cleaning and washing operations are maintenance activities that lead to safer structures with longer service life, this permit includes a provision for exceedance of the numeric size criteria for the mixing zones on a short term basis as provided in WAC 173-201A-400(12)(d), where the exceedance is necessary to accommodate important economic and social development. In addition, the discharge from maintenance washing activity is intermittent and short term lasting for a period of few hours to a few days. When maintenance washing is conducted in accordance with the requirements and BMPs in Condition S4 of this permit, granting an extended mixing zone would not likely interfere with the existing uses of the water body or cause a permenant adverse impact to the water

body. The allowance for the extended mixing zones does not apply to preparatory washing activities.

E. Whole Effluent Toxicity

The water quality standards for surface waters forbid discharge of effluent that causes toxic effects in the receiving waters. Many toxic pollutants cannot be measured by commonly available detection methods. However, laboratory tests can measure toxicity directly by exposing living organisms to the wastewater and measuring their responses. These tests measure the aggregate toxicity of the whole effluent, so this approach is called whole effluent toxicity (WET) testing. Some WET tests measure acute toxicity and other WET tests measure chronic toxicity.

WET testing was conducted by WSDOT for preparatory (pre-painting) washing and painting of ferry terminal structures below the ordinary high water mark. WET test results from one of the two preparatory washings showed toxicity to *Ceriodaphnia dubia*. Lead and zinc concentrations in the wash water effluent were at or above known toxic thresholds for *Ceriodaphnia dubia*. Wash water WET results appeared to also show toxicity to fathead minnows but copper, lead, and zinc concentrations were not clearly above known toxic thresholds. The testing lab reported that fathead minnows in the highest concentration could not be seen due to high turbidity. Suspended solids may have been the cause of the fathead minnow deaths. Results from WET testing of the other preparatory washing sample didn't indicate toxicity.

Based on the results, Ecology concluded monitoring for metals predicted toxicity to *Ceriodaphnia dubia* and would be more useful in guiding pollution controls than WET testing. WAC 173-205-040 allows WET testing to be excluded from permits if all known pollutants have water quality criteria for aquatic life protection. This permit does not require WET testing for the activities covered under the permit because water quality criteria provide the needed protection without the complications of WET testing.

F. Human Health

Washington's water quality standards include 91 numeric criteria for the protection of human health that are applicable to dischargers in Washington State. 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.

Based on existing information, Ecology determined discharges from washing activities covered by this permit do not have a reasonable potential for violating the numeric human health-based criteria.

G. Sediment Quality

Ecology has promulgated Sediment Management Standards (Chapter 173-204 WAC) to protect aquatic biota and human health. These standards state that Ecology may require Permittees to evaluate the potential for the discharge to cause a violation of applicable standards (WAC 173-204-400). The permit requires BMPs to limit contamination of wash water discharges. Source control BMPs can reduce or eliminate contamination of wash water and help comply with the sediment management standards. However, if Ecology determines that BMPs are ineffective in protecting sediment quality, Ecology may require the Permittee to implement additional measures to assure compliance with the sediment standards or to apply for an individual permit.

The permit also provides additional protection to sediment quality by not allowing discharges over lakes and river listed as Category 4 or 5 on the 2012 WQ Assessment for copper, zinc, or lead for both water column and sediment medium.

H. 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).

Ecology determined the preparatory washing discharge has the potential to cause a violation of the ground water quality standards if pressure wash water is discharged to ground. WSDOT has conducted an analysis of conditions necessary to prevent violations of ground water standards. Based on this analysis, the proposed permit requires Permittees to follow the discharge conditions given in the *Ground Disposal of Effluent from WSDOT Preparatory Bridge Washington*, dated January 2008, and to verify the requirements are placed in a manual for field use.

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 for spot cleaning, routine maintenance, and preparatory cleaning and washing are detailed in the draft permit under Condition S5.A and S5.B. The monitoring for ferry terminal structure painting is detailed in S5.C. Ecology has approved monitoring protocols that WSDOT will use for collecting and analyzing representative samples of wash water effluent and receiveing water (background).

A. 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 required monitoring data (with the exception of certain parameters).

V. OTHER PERMIT CONDITIONS

A. Reporting and Notification and Recordkeeping

Ecology based permit condition S8 on our authority to specify any appropriate reporting and recordkeeping requirements to prevent and control waste discharges (WAC 173-220-210). The permit requires WSDOT to provide an annual report for the completed activities by February 28th of each year. The annual report must provide the information in S8.A, which includes status of the activities and the expected completion date of the activities. An annual report is not required if no work was conducted in that year.

Permittees covered for a singular project, the permit requires a Project Completion Report by February 28th of the year following the completion of the activity or before submittal of the notice of termination (NOT), whichever is sooner.

In addition to the annual reporting of the activities, Condition S8.B of the permit requires WSDOT to provide a list of activities planned for the next twelve months on its website by February 28th of each year of coverage. The list must be kept current and accessible to the

public. The list must provide information about each activity including type of activity, its location, approximate starting schedule and the expected length of the operation, and contact information.

The permit requires applicants to contact the Washington Department of Fish and Wildlife (WDFW) prior to conducting the project and comply with any restrictions related to fish habitat protection. Applicants who have a Hydraulic Project Approval (HPA) that covers work under this NPDES Bridge and Ferry Terminal Washing General Permit meet this requirement.

B. General Conditions

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

VI. PERMIT ISSUANCE PROCEDURES

Ecology plans to issue the Permit for a period of 5 years, starting on the effective date of the permit (WAC 173-226-330). Coverage under the Permit will last from the date of coverage to the date of permit expiration, which will be up to 5 years.

Prior to the issuance of this NPDES general permit, Ecology covered WSDOT bridge and ferry terminal washing operations under an individual NPDES permit state-wide. In compliance with its individual NPDES permit under General Condition G17 (Duty To Reapply), WSDOT has submitted permit renewal application 180 days prior to the expiration date of the individual permit (1/12/2015). Therefore, for WSDOT, coverage under this general permit is automatic and begins on the effective date of this permit. Ecology will issue a coverage letter that includes WSDOT's new general permit number.

A. 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, after obtaining 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.

B. Proposed Permit Issuance

This draft permit meets all statutory requirements for authorizing a wastewater discharge, including those limitations and conditions believed necessary to control toxics, protect human health, aquatic life, and the beneficial uses of waters of the State of Washington. Ecology proposes that this draft permit be issued for five (5) years.

VII. REFERENCES FOR TEXT AND APPENDICES

Ecology must identify the sources of information that were reviewed and relied upon by the agency in the course of preparing to take a significant agency action (RCW 34.05.272). The information must be categorized per the following citation categories:

1. Independent peer review. Review is overseen by an independent third party.
2. Internal peer review. Review by staff internal to the Department of Ecology.
3. External peer review. Review by persons that are external to and selected by the Department of Ecology.
4. Open review. Documented open public review process that is not limited to invited organizations or individuals.
5. Legal and policy document. Federal and state statutes.
6. Legal and policy document. Court and hearings board decisions.
7. Legal and policy document. Federal and state administrative rules and regulations.
8. Legal and policy document. Policy and regulatory documents adopted by local governments.
9. Data from primary research, monitoring activities, or other sources, but that has not been incorporated as part of documents reviewed under other processes.
10. Records of the best professional judgment of Department of Ecology employees or other individuals.
11. Other. Sources of information that do not fit into one of the categories listed.

Categorization per RCW 34.05.272 was adopted on June 12, 2014; therefore, only new citations included in the Fact Sheet have been categorized. Citations used and presented in the 2009 Fact Sheet for WSDOT individual NPDES permit # WA 0039039 were brought forward and not categorized.

Environmental Protection Agency (EPA)

1991. *Technical Support Document for Water Quality-based Toxics Control*. EPA/505/2-90-001.

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.)

Herrera Environmental Consultants

2003. *Treatment Evaluation for WSDOT Bridge Washing Effluent.*

2009. *Water Quality Risk Evaluation for Proposed Benchmarks/Action Levels in the Industrial Stormwater Permit.*

2008. *WSDOT Bridge Washing Effluent Translator Study.*

2008. *Johns River Bridge Washing Effluent Translator Study.*

2008. *Ground Disposal of Effluent from WSDOT Preparatory Bridge Washing*.

Washington State Department of Ecology

Permit Writer's Manual. Publication Number 92-109

Washington State Department of Ecology

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

WAC 173-201A-410 (http://app.leg.wa.gov/WAC/default.aspx?cite=173-201A-410)

WAC 173-205-040 (http://app.leg.wa.gov/WAC/default.aspx?cite=173-205-040)

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

APPENDIX A--PUBLIC INVOLVEMENT INFORMATION

Ecology proposes to issue the Bridge and Ferry Terminal Washing General Permit to state and local government agencies responsible for maintaining bridge and/or ferry terminal structures in Washington State. The permit prescribes operating conditions and wastewater discharge limits. This fact sheet describes the types of activities and discharges authorized by the permit and Ecology's rationale for permit conditions.

Ecology publishes a Public Notice of Draft (PNOD) to inform the public that the draft permit and fact sheet are available for review and comment. Ecology will publish the PNOD on October 19, 2016 in the Washington State Register and on the Ecology web site.

Requesting Copies of the Permit
You may download copies of the draft permit, fact sheet, and application from the website: http://www.ecy.wa.gov/programs/wq/permits/bridgewashing/index.html. Or you may request copies from Dena Jaskar at dena.jaskar@ecy.wa.gov or (360) 407-6401.

Submitting Public Comments
Ecology will accept public comments on the draft Bridge and Ferry Terminal Washing General Permit, Fact Sheet, and related documents from October 19, 2016 to December 2, 2016. Written comments must be postmarked or e-mailed no later than December 2, 2016. Comments should reference specific permit conditions or text or when possible, and may address the following topics:

- Technical issues
- Accuracy and completeness of information
- The scope of proposed coverage
- Adequacy of environmental protection and permit conditions or
- Any other concern that would result from issuance of the draft permit

Comments may be submitted by email to: foroozan.labib@ecy.wa.gov. Written comments must be postmarked or received via email no later than ***5 pm, December 2, 2016***. Submit written, hard copy comments to:

Foroozan Labib
Department of Ecology
P.O. Box 47600
Olympia, WA 98504-7600

Interested parties may also provide oral comments by testifying at the public hearing.

Public Hearing and Workshop
A public hearing and workshop on the draft general permit will be held at the location below. The hearing provides an opportunity for interested parties to give formal oral testimony and comments on the draft permit. The workshop held immediately prior to the public hearing will explain the conditions of the Permit.

Hearing and Workshop

November 22, 2017 – 1:00 pm
Washington State Department of Ecology
300 Desmond Drive
Lacey, WA 98503-1274

Issuing the Final Permit

The final decision on permit issuance will be made after Ecology receives and considers all public comments. If public comments cause a substantial change in the permit conditions from the original draft permit, another public notice of draft and comment period may ensure. Ecology expects to issue the general permit in Winter 2017.

For further information, contact Foroozan Labib by email at foroozan.labib@ecy.wa.gov or by phone at (360) 407-6439, or by writing to Ecology at the address listed above.

APPENDIX B--GLOSSARY

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).

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.

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.

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.

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.

Detection Limit – See Method Detection Level.

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 e.g., a dilution factor of 16 means the effluent comprises 6.25% by volume and the receiving water comprises 93.75% (DF = 1/0.0625)

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.

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.

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

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.

OHWM – Ordinary high water mark on all lakes, streams, and tidal water is that mark that will be found by examining the bed and banks and ascertaining where the presence and action of waters are so common and usual, and so long continued in all ordinary years, as to mark upon the soil a character distinct from that of the abutting upland, in respect to vegetation as that condition exists on June 1, 1971, as it may naturally change thereafter, or as it may change thereafter in accordance with permits issued by a local government or the department: PROVIDED, That in any area where the ordinary high water mark cannot be found, the ordinary high water mark adjoining salt water shall be the line of mean higher high tide and the ordinary high water mark adjoining fresh water shall be the line of mean high water;

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.

Pressure Washer – a mechanical device that uses high pressure water at 3000 psi (discharge of 3 gallons/minute).

Quantitation Level (QL) – The smallest detectable concentration of analyte greater than the Detection Limit (DL) where the accuracy (precision &bias) achieves the objectives of the intended purpose. This may also be called Minimum Level or Reporting Level.

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

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.

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—REASONABLE POTENTIAL ANALYSIS CALCULATIONS FOR PREPARATORY WASHING

Several of the Excel® spreadsheet tools used to evaluate a discharger's ability to meet Washington State water quality standards can be found within the PermitCalc Workbook, available from Ecology's permit guidance webpage at: http://www.ecy.wa.gov/programs/wq/permits/guidance.html.

WESTERN WASHINGTON – ANALYSIS SUMMARY
REASONABLE POTENTIAL ANALYSIS – DATA

Effluent Characteristics				
	Copper	Lead	Zinc	
Sample Size	9	9 (58[2])	9 (58[2])	
Highest values - µg/L	2050	105710[1]	34751.2[1]	
Translators 95th Percentile	0.313	0.114	0.531	
Multiplier	2.44	1	1	
Estimated 95% Effluent Dissolved Metal Concentration µg/L	1565.6	178.5	18453	
Stream Characteristics & Water Quality Standards				
Ambient concentrations µg/L	1.19	0.06	3.27	
Hardness as CaCO3 mg/L	18	18	18	
WQ Standards Criteria µg/L	3.38	9.58	26.77	

[1]added 10% of Pb & Zn Highest Values [2] artificial sample #

REASONABLE POTENTIAL ANALYSIS - RESULTS

Metal	Dilution* Factor	Metal Concentration µg/L	Water Quality Criteria µg/L
Copper	714	3.38	3.38
Copper	715	3.38	3.38
Lead	1268	9.58	9.58
Lead	1269	9.57	9.58
Zinc	786	26.79	26.77
Zinc	787	26.76	26.77
Lead is the limiting factor – highest dilution factor requiring the most stream flow to prevent violation of water quality standards			

*Minimum dilution factor required to meet Water Quality Standards

IMPACT ANALYSIS	No. of pressure washers in operation with effluent discharge in CFS*				
	1 washer = 0.007 CFS	2 washers = 0.013 CFS	3 washers = 0.02 CFS	4/5 washers = 0.03 CFS	6 washers = 0.04 CFS
Copper – Dilution Factor	715	715	715	715	715
Stream Flow needed (CFS)	200	372	572	857	1143
Lead – Dilution Factor	**1269**	**1269**	**1269**	**1269**	**1269**
Stream Flow needed (CFS)	**356**	**660**	**1015**	**1522**	**2030**
Zinc – Dilution Factor	787	787	787	787	787
Stream Flow needed (CFS)	221	409	629	944	1258

*for the effluent discharge, assumed a 3 gallon/minute discharge per washer & using conversion factor of 0.133681 CF/gallon

EASTERN WASINGTON – ANALYSIS SUMMARY
REASONABLE POTENTIAL ANALYSIS – DATA

Effluent Characteristics				
	Copper*	Lead*	Zinc*	
Sample Size	9	9 (58[2])	9 (58[2])	
Highest Value – ug/L	2050	105710[1]	34751.2[1]	
Translators 95th Percentile	0.313	0.114	0.531	
Multiplier	2.44	1	1	
Stream Characteristics & Water quality Standards				
E. WA Ambient Concentrations	0.96	0.11	9.63	
E. WA Hardness as CaCO3 mg/L	35	35	35	
E. WA WQ Standards Criteria	6.33	20.25	47.02	

[1]added 10% of Pb & Zn Highest Values [2] artificial sample #

REASONABLE POTENTIAL ANALYSIS - RESULTS

Metal	Dilution* Factor	Metal Concentration µg/L	Water Quality Criteria µg/L
Copper	291	6.34	6.33
Copper	292	6.32	6.33
Lead	599	20.27	20.25
Lead	600	20.23	20.25
Zinc	494	47.04	47.02
Zinc	495	46.96	47.02
Lead is the limiting factor – highest dilution factor requiring the most stream flow to prevent violation of water quality standards			

*Minimum dilution factor required to meet Water Quality Standards

IMPACT ANALYSIS	No. of pressure washers in operation with effluent discharge in CFS*				
	1 washer = 0.007 CFS	2 washers = 0.013 CFS	3 washers = 0.02 CFS	4/5 washers = 0.03 CFS	6 washers = 0.04 CFS
Copper – Dilution Factor	292	292	292	292	292
Stream Flow needed (CFS)	82	152	233	350	466
Lead – Dilution Factor	**600**	**600**	**600**	**600**	**600**
Stream Flow needed (CFS)	**157**	**312**	**480**	**719**	**959**
Zinc – Dilution Factor	495	495	495	495	495
Stream Flow needed (CFS)	139	257	395	593	791

*for the effluent discharge, assumed a 3 gallon/minute discharge per washer & using conversion factor of 0.133681 CF/gallon.

APPENDIX D—REASONABLE POTENTIAL ANALYSIS CALCULATIONS FOR MAINTENANCE WASHING

Washington State Department of Transportation (WSDOT) conducted monitoring studies on maintenance washing of a number of bridges per requirements in their NPDES permit number WA-0039039. The monitoring studies measured the wash water volume used and the duration of activity to estimate the average discharge flow rate. WSDOT also collected wash water discharge samples and measured the total concentrations of copper, lead, and zinc in the discharge. Tables 1 and 2 show the wash water flow rates and the total metals concentration in the discharge.

Table 1: Maintenance Wash Water Flows at Various Project Sites

Bridge/Waterbody	**Wash Water Average Flows (cfs)**
Black River	0.0619
	0.0619
	0.0372
Sol Duc #4	0.041
	0.032
	0.035
Sol Duc #5	0.041
	0.032
	0.0384
Naches River	0.041
	0.017
	0.0247
Calawah	0.0421
Sol Duc #3	0.0395
Wynoochee	0.0341
Satsop North	0.0372
Satsop South	0.0325
Average Effluent (cfs) =	**0.03815**
Average Effluent (Gal/hr) =	**1027**

Table 2: Total Metals in Maintenance Washing

Pilot Study Data – Maintenance Washing Total Recoverable			
	Copper	**Lead**	**Zinc**
Initial Study Data	8.5	17	100
	8.7	16	100
	480	300	410
	37	44	230
	84	120	1500
	25	120	160
	18	93	130
	150	130	920
	140	150	1200
	180	160	2400
	180	260	2300
	16	370	300
	240	1900	7600
	56	940	1500
	54	1000	1600
	73	1100	2100
	130	2000	4400
	100	450	1600
	120	530	1800
	140	1400	1600
	220	630	3700
	160	2700	2700
	160	2800	2800
	57	1400	1000
	210	2800	3800
	77	1400	1000
	53	1600	970
	29	810	510
	25	960	630
	110	9000	1500
	37	2400	560
	91	11000	1700
	99	14000	2000
Year 3 Extend Data (added on)	91	170	370
	61	120	300
	85	50	550
	52	52	480
	19	130	170
	39	1200	980
	35	1100	880
	160	4300	3600
	2.2	7.2	8.1
	2.2	7.3	7.7
	3.9	76	31
	4.3	85	55
	76	2500	1000
	120	3800	1400
	200	3200	1300
	170	2800	1600
	27	1300	880
	64	2500	2200
	110	950	5800
	93	770	5300
	55	630	1300
	48	500	1200
	270	1800	3300
	140	1900	2700
	960	2500	43000
	960	2500	43000
	620	3600	16000
	270	1000	12000
	67	410	1000
	150	2900	2800
	110	2500	2600
	150	3400	3100
	43	680	330
	23	160	1600
	22	220	770
	17	150	620
95th Percentile	**396**	**4100**	**10240**

Reasonable potential analyses on the maintenance wash water shown in Tables 3 and 4 determined the dilution factor needed for the wash water discharge to not violate water quality criteria in Eastern and Western Washington. Table 5 shows the calculations for estimating the minimum flows required in Eastern (221 cfs) and Western (351 cfs) Washington streams to provide the needed dilution factors.

Table 3: Maintenance Washing Acute Dilution Factor Determination – Eastern WA

Parameter	Metal Criteria Translator as decimal Acute	Ambient Concentration (metals as dissolved) ug/L	State Water Quality Standard Acute ug/L	Max concentration at edge of... Acute Mixing Zone ug/L	LIMIT REQ'D?	Effluent percentile value	Pn	Max effluent conc. measured (metals as total recoverable) ug/L	Coeff Variation CV	s	# of samples n	Multiplier	Acute Dil'n Factor
Copper	0.31	0.9600	6.3000	6.08	NO	0.95	0.958	396.00	0.60	0.55	69	1.00	24
Lead	0.11	0.1100	20.3000	19.58	NO	0.95	0.958	4100.00	0.60	0.55	69	1.00	24
Zinc	0.53	9.6300	47.0000	46.81	NO	0.95	0.958	10240.00	0.60	0.55	69	1.00	146

Table 4: Maintenance Washing Acute Dilution Factor Determination – Western WA

Parameter	Metal Criteria Translator as decimal Acute	Ambient Concentration (metals as dissolved) ug/L	State Water Quality Standard Acute ug/L	Max concentration at edge of... Acute Mixing Zone ug/L	LIMIT REQ'D?	Effluent percentile value	Pn	Max effluent conc. measured (metals as total recoverable) ug/L	Coeff Variation CV	s	# of samples n	Multiplier	Acute Dil'n Factor
Copper	0.31	1.1900	3.4000	3.38	NO	0.95	0.958	396.00	0.60	0.55	69	1.00	56
Lead	0.11	0.0600	9.6000	9.60	NO	0.95	0.958	4100.00	0.60	0.55	69	1.00	49
Zinc	0.53	3.2700	26.8000	26.79	NO	0.95	0.958	10240.00	0.60	0.55	69	1.00	231

Table 5: Maintenance Washing - River Flows Needed to Have No Reasonable Potential

Avg Eff Flow Rate over Wasing Time Period (cfs)	95% Total Zinc Conc (ug/L)	River Flow (cfs)	2.5% Dilution Factor	Comments (Based on Reasonable Potential Spreadsheet)
0.0382	10240.0	221	145.8	Zn is the Limiting Metal for **Eastern** WA Dilution Factor Needed = ***146***
0.0382	10240.0	351	231.0	Zn is the Limiting Metal for **Western** WA Dilution Factor Needed = ***231***