FACT SHEET FOR NPDES PERMIT WA 0039039

Washington State Department of Transportation

310 Maple Park Ave SE

P.O. Box 47331

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May 6, 2009

PURPOSE of this Fact Sheet

This fact sheet explains and documents the decisions Ecology made in drafting the proposed National Pollutant Discharge Elimination System (NPDES) permit for Washington Department of Transportation (WSDOT).

The Environmental Protection Agency (EPA) developed the NPDES permitting program as a tool to "restore and maintain the chemical, physical, and biological integrity of the Nation's waters." EPA delegated to Ecology the power and duty to write, issue, and enforce NPDES permits within Washington State. Both state and federal laws require any entity to obtain a permit before discharging wastewater to a water body.

An NPDES permit limits the types and amounts of pollutants the facility may discharge. Those limits are based either on (1) the pollution control or wastewater treatment technology available entity, or on (2) the receiving water's customary beneficial uses. This fact sheet complies with Section 173-220-060 of the Washington Administrative Code (WAC), which requires Ecology to prepare a draft permit *and accompanying fact sheet* for public evaluation before issuing an NPDES permit.

PUBLIC ROLE in the Permit

Ecology makes the draft permit and fact sheet available for public review and comment at least thirty (30) days before issuing the final permit to the facility operator (WAC 173-220-050). Copies of the fact sheet and draft permit for Washington Department of Transportation, NPDES permit **WA-0039039** are available for public review and comment from May 6, 2009 until the close of business June 5, 2009. For more details on preparing and filing comments about these documents, please see **Appendix A - Public Involvement**.

Before publishing the draft NPDES permit, the Washington Department of Transportation reviewed it for factual accuracy. Ecology corrected any errors or omissions about the facility's location, product type or production rate, discharges or receiving water, or its history.

After the public comment period closes, Ecology will summarize substantive comments and our responses to them. Ecology will include our summary and responses to comments to this Fact Sheet as **Appendix D - Response to Comments**, and publish it when issuing the final NPDES

permit. Ecology will not revise the rest of the fact sheet, but the full document will become part of the legal history contained in the facility's permit file.

Penny Kelley & Gary Bailey prepared the permit and this fact sheet.

SUMMARY

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 (18 gallons/minute maximum for bridge washing and 12 gallons/minute maximum for ferries) and intermittent. Maintenance washing and Spot Cleaning on bridges occur in the winter or spring during high river flows. Preparatory Washing on bridges occurs mainly in the summer during low river flows. + Ferry maintenance and preparatory washing occurs during the spring, summer and fall months.

During the application process for the previous 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 treatment (AKART of Chapter 90.48 RCW, case-by-case of 40 CFR Part 125.3). The AKART determination is still valid for this permit.

WSDOT was required to conduct annual monitoring on maintenance washing and preparatory washing projects during the life of the permit. In addition, the 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 in this draft permit to make a determination of reasonable potential after allowance for a mixing zone. The resulting analysis was used to adjust the flow limitations developed in the previous permit ensuring that effluent discharged to surface waters would not cause a violation of water quality standards. This analysis is documented in multiple monitoring and data reports submitted to Ecology by WSDOT.

This draft permit contains conditions that are significant changes from the last permit, on the following:

- Adjusted flow limitations for bridges and ferry transfer spans & overwater metal structures washed in preparation for painting on the west side of the Cascades.
- A modified compliance schedule to allow WSDOT to complete their study for bridges located on the east side of the Cascades.
- A requirement to submit a plan, for review and approval by Ecology, for discharging to ground.
- Best management practices contained in the previous permit to prevent degradation of water quality.
- Annual Monitoring & Reporting of Maintenance Washing and Preparatory Washing projects.

WSDOT is not authorized to discharge effluent to surface waters listed on the 303(d) list for copper, lead, or zinc. 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. This permit contains General Conditions which come directly from law and regulation

TABLE OF CONTENTS

I. INTRODUCTION

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

Ecology adopted rules describing how it exercises its authority:

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

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

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

II. BACKGROUND INFORMATION

Table 1 - General Facility Information

Applicant:	Washington State Department of Transportation
Facility Name and Address:	P.O. Box 47331 Olympia, WA 98504-7991
Type of Discharge:	Bridge and Ferry Transfer Span & Overwater Metal Structures washing and pressure washing water.
SIC Code	NA
Discharge Location:	Multiple Locations Statewide
Water Body ID Number:	NA

A. Description of the Wastewater Discharge

The Washington Department of Transportation is responsible for maintaining steel bridges, steel components in concrete bridges, and ferry transfer spans & overwater metal structures statewide. Maintenance of these steel 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 & overwater metals structures maintenance generate discharges of wash water to waters of the state.

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.

Spot cleaning activities are performed during high river flows in late fall, winter, and early spring in order to reduce the potential impact on receiving water. All debris removed before washing is 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:

a. Bridges

Structures are washed on a 1-5 year 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:

- 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.

Maintenance washing activities are performed during high river flows in late fall, winter, and early spring in order to reduce the potential impact on receiving water. All debris removed before washing is disposed of in an upland location. Approximately 400 to 600 gallons of water is used to clean a typical bridge structure (625 tons of steel).

b. 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.

All debris removed before washing is disposed of in an upland location. Approximately 200-600 gallons of water are used to clean ferry transfer spans.

Phase 3 Preparatory Washing

a. 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. 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, it is added to the 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.

b. 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.

B. Permit Status

Washington Department of Transportation submitted an application for permit renewal on October 1, 2008. Ecology accepted it as complete on October 10, 2008.

Ecology issued the previous permit for this activity on April 3, 2004. The previous permit contained conditions that restricted the number of pressure washers operating simultaneously based on the amount of receiving water flow. These flow limitations were developed in place of the standard effluent limits to ensure the effluent would not cause a violation of water quality standards for copper, lead, or zinc.

On August 1, 2006, the permittee submitted a request to modify the permit adding coverage for spot cleaning conducted through their regional road maintenance program. In considering the request to modify the existing permit, Department of Ecology reviewed the *Regional Road Maintenance Engdangered Species Act Program Guidelines* and determined that the BMPs listed in the Guidelines applicable to Spot Cleaning were sufficient for this activity. Ecology approved the modification and issued a public notice on January 10, 2007.

C. Summary of Compliance with Previous Permit Issued

The Washington Department of Transportation has complied with the permit conditions for submittal of annual reports, annual project lists, monitoring, notification, and compliance schedule throughout the duration of the permit issued on April 3, 2004. Ecology assessed compliance based on its review of the following:

Annual Reports and Annual Project lists from January 2004 to January 2009.

Monitoring Reports for maintenance washing & preparatory washing:

- Interstate 5, Skookumchuck River/2004
- US 101, Hoquiam River/2006
- Interstate 5, Cowlitz River/2007
- US 12, Wiskah River/2008
- Colman Ferry Terminal/Elliot Bay in Puget Sound – 2005
- SR 433 Lewis & Clark Bridge/Columbia River - 2007

Waste Specific Translator Study from the Compliance Schedule:

- Quality Assurance Project Plan - WSDOT Bridge Washing Waste Translator Study, May 2006
- Western Bridge Data Report - WSDOT Bridge Washing Effluent Translator Study, October 2008
- Data Report - Johns River Bridge Washing Effluent Translator Study, November 2008

Groundwater Study from the Compliance Schedule:

- Technical Memorandum – Potential Impacts of Bridge Washing Activities on Groundwater, July 2007 draft
- Water Quality Impact Evaluation – Ground disposal of Effluent from WSDOT Preparatory Bridge Washing, January 2008

The permittee did not comply with the requirement to collect data on the volume of water used for spot cleaning.

The permittee did implement the Best management practices as was evidenced on a site inspection conducted at the Lewis and Clark Bridge painting project on SR 433 over the Columbia River and on the 1st Ave Bridge, also referred to as the SR 99 Duwamish River Bridge, over the Duwamish River.

D. Wastewater Characterization

The concentration of pollutants in the discharge was reported in monitoring reports from one representative maintenance washing and one preparatory washing project per year for bridges or ferries. The data represents the quality of the effluent discharged from April 2004 to April 2009. The effluent is characterized for the three primary pollutants as follows:

Table 2: Wastewater Characterization – Maintenance Washing

Parameter	Mean & Concentration Range - Dissolved µg/L	Mean & Concentration Range - Total µg/L
Copper	72.2 (3-240)	360 (130-1100)
Lead	109.2 (11-760)	3909.2 (120-20000)
Zinc	700 (120-3200)	7516.7 (2000-15000)

Table 3: Wastewater Characterization – Preparatory Washing

Parameter	**Mean & Concentration Range - Dissolved µg/L**	**Mean & Concentration Range - Total µg/L**
Copper	40.5 (16.178)	411 (45-2050)
Lead	410.7 (48.8-1670)	23659.4 (1220-96100)
Zinc	1826.8 (166-4610)	8505.6 (1650-31592)

E. Description of the Receiving Water

This activity occurs statewide on multiple waterbodies, both fresh and marine water state-wide. The ambient background data used in this permit was taken 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 4. 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

F. SEPA Compliance

The Department of Transportation has determined that 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...".

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 received in the application and from supporting reports (engineering, hydrogeology, etc.). Ecology evaluated the permit application and determined the limits needed to comply with the rules adopted by the State of Washington. Ecology does not develop effluent limits for all reported pollutants. Some pollutants are not treatable at the concentrations reported, are not controllable at the source, are not listed in regulation, and do not have a reasonable potential to cause a water quality violation.

Nor does Ecology usually develop 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. During the five-year permit term, the facility's effluent discharge conditions may change from those conditions reported in the permit application. The facility must notify Ecology, as described in 40 CFR 122.42(a), if significant changes occur in any constituent. Industries may be in violation of their permit until Ecology modifies the permit to reflect additional discharge of pollutants.

A. Technology-Based Effluent Limits

The applicant was required to produce an engineering report for the NPDES Waste Discharge Permit No. WA-0039039 which evaluated several possible treatment options for the pressure wash effluent. The treatment options included full containment, recycle, and the current practice of 100 mesh filter tarps. The current treatment was considered to be AKART based on cost of treatment in relation to project cost and cost per quantity of pollutant removed.

No technology-based effluent limits were developed because the preferred treatment has no operational controls. The preferred treatment is a best management practice, so the permit imposed conditions on the use of the tarps. The applicant continues to utilize the current treatment described in the engineering report and still considered to be AKART.

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.

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

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

This facility must meet Tier I requirements.

Dischargers must maintain and protect existing and designated uses. Ecology may not allow any degradation that will interfere with, or become injurious to, existing or designated uses, except as provided for in chapter 173-201A WAC.

- For waters that do not meet assigned criteria for copper, lead, or zinc, or protect existing or designated uses, the permittee is not authorized to discharge effluent from bridge washing activities.

- Whenever the natural conditions of a water body are of a lower quality than the assigned criteria, the natural conditions constitute the water quality criteria. Where water quality criteria are not met because of natural conditions, human actions are not allowed to further lower the water quality, except where explicitly allowed in this chapter.

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

Tier II requirements are not applicable because this permit does not authorize an increase of pollutant discharge from the previous permit.

Tier III requirements do not apply to this activity.
Tier III, Option 3(A) protection – Chapter 201A-330 (5a) - Ecology has not designated any waterbodies as Tier III (A) or Tier III(B).

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 allow Ecology to authorize mixing zones for the facility's permitted wastewater discharges only if those discharges already receive all known, available, and reasonable methods of prevention, control and treatment (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; 2006). 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 this activity 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 restricts spot cleaning and maintenance washing to winter time high flows for freshwater and maximum daily tidal exchange for marine waters.

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 show that both acute and chronic criteria concentrations are reached within minutes of being discharged.

This permit contains requirements for ongoing monitoring and whole effluent toxicity testing.

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 preparatory washing. For maintenance washing Ecology has determined that more data is needed for analysis.

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 95^{th} percentile pollutant concentration, the 90^{th} 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.

- **Comply with size restrictions.**
  The mixing zone authorized for this discharge complies with the size and volume restrictions published in chapter 173-201A WAC.

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

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 5.

Table 5 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 use**s are domestic, agricultural, industrial, and stock watering.

The **miscellaneous fresh water use**s 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.

Pollutant concentrations in the proposed discharge 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.

The dilution factors of effluent to receiving water that occur within the mixing zone have been determined by the use of a volume to volume relationship based on statewide data for river flow and monitoring data collected at the time of washing for the following projects:

- Interstate 5 – Skookumchuck River; maintenance wash
- US 101 – Hoquiam River; maintenance wash
- Interstate 5 – Cowlitz River; maintenance wash
- US 12 – Wiskah River; maintenance wash
- Colman Ferry Terminal – Elliot Bay; preparatory wash
- SR 433 Lewis & Clark Bridge – Columbia River; preparatory wash/translator study
- SR 105 St. Johns River Bridge – Johns River; translator study

A report was written for each project and submitted to Ecology summarizing the monitoring and laboratory analysis/results.

The projects were grouped together based on the type of washing that was being done and evaluated for presence of pollutants and potential to violate water quality standards based on amount of flow present at the time of washing. For maintenance washing, three of the four reports contained sufficient information to conduct an individual reasonable potential analysis. The results from this analysis showed there was no violation of water quality standards with a mixing allowance.

For preparatory washing, two reports were submitted, one on the Lewis and Clark Bridge and one from the Colman Ferry Terminal project. Neither report contained sufficient information to conduct an individual analysis. However, the information provided to date on the Coleman Ferry Terminal indicates that no discharges should be allowed due to the ambient levels of copper at this location exceeding water quality criteria. Where water quality criteria are not met because of natural conditions, human actions are not allowed to further lower the water quality.

To address the lack of data, the permit requires ongoing monitoring of preparatory wash projects and contains updated permit language regarding what data is needed for reasonable potential analysis. In the current permit, some of the data or information needed for this type of analysis was not included in the permit conditions. Ongoing monitoring is also a federal requirement in an NPDES permit. A complete discussion along with the analysis on the maintenance and preparatory wash projects is included in Appendix E.

Two of the projects identified above were used to collect information for a waste specific translator study. A waste translator used to predict the amount of metal that will transition from total to dissolved in the receiving water. The default translators used by Ecology predicted that almost all of the copper and zinc present in the effluent transitions to a dissolved state and half the amount of lead will transition to a dissolved state. During pre-application meetings with Ecology, Washington Department of Transportation proposed conducting a study to develop specific waste translators for copper, lead, and zinc. They believed that the default translators used by Ecology (as documented in the Permit Writers Manual) were inappropriate because the particulate fraction of metals was not likely to convert out of the paint particles to a dissolved form in the receiving water. Ecology authorized the proposal by including a compliance schedule in the existing permit that contains conditions for developing and conducting a translator study.

The Permittee developed a Quality Assurance Project Plan (QAPP) that was reviewed and approved by Ecology in 2006. Two preparatory wash projects were scheduled for painting and were used in the study; SR 433 Lewis & Clark Bridge and SR 105 St. Johns River Bridge. Herrera Environmental Consultants, Inc. was hired to develop the QAPP, conduct the monitoring on both projects, and write the follow up reports. The results from the study showed that amount of total metals in the effluent transitioning to a dissolved form was low. A comparison of these translators to the Ecology default translators is provided below.

Waste Specific Translators calculated from the Lewis & Clark Bridge: the 90th and 95th percentile were calculated from the monitoring results.

Waste Translator	**90th Percentile Experimental Lewis & Clark**	**95th Percentile Experimental Lewis & Clark**	**90th Percentile Ecology Default**	**95th Percentile Ecology Default**
Copper	0.289	0.313	0.968	0.996
Lead	0.054	0.059	0.340	0.466
Zinc	0.466	0.531	0.965	0.996

Waste Specific Translators calculated from the Johns River Bridge: the 90th and 95th percentile were calculated from the monitoring results.

Waste Translator	**90th Percentile Experimental Johns River**	**95th Percentile Experimental Johns River**	**90th Percentile Ecology Default**	**95th Percentile Ecology Default**
Copper	0.091	0.104	0.968	0.996
Lead	0.103	0.114	0.340	0.466
Zinc	0.267	0.282	0.965	0.996

Based on the results of the translator study, Ecology approves the following translators for this activity in Western WA and assumed they were representative for Eastern WA; Copper - 0.313, Lead – 0.114, Zinc – 0.531. The highest value was chosen to account for worst case scenario. Ecology used the 95th percentile rather than geometric mean for consistency with Ecology established policies/methods.

A final analysis was done evaluating the potential that discharges from preparatory washing have to violate water quality standards. This step was necessary to re-evaluate the flow limitations for the next permit. A separate, final analysis will be conducted for the maintenance washing at the end of the next permit cycle after the permittee has collected a sufficient amount of data.

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.

All of the monitoring reports for the projects listed in the previous section showed that copper, lead and zinc were present in the effluent. From that information, Ecology determined the monitoring data from the translator study and three preparatory washing projects conducted prior to the current permit could be used, making a total of 5 projects, for the final analysis. The 5 projects provided a data set of 9 samples.

The ambient background data for the final, reasonable potential analysis is from a state-wide data base of ambient water quality and is listed in Table 6 along with the water quality criteria.

Table 6. General ambient concentrations and water quality criteria (µg/L)

	Copper*	Lead*	Zinc*
Ambient concentration (average)W. WA	1.19	0.06	3.27
Ambient concentration (average) E. WA	0.96	0.11	9.63
WQ Standards Criteria W. WA [II]	3.4	9.6	26.8
WQ Standards Criteria E. WA[II]	6.3	20.3	47.0

*units used for metals concentrations ug/L
[II]hardness for E. WA 35 mg/L CaCO3 and 18 mg/L CaCO3 for W. WA

Based on the final analysis, Ecology determined these toxic pollutants to have a reasonable potential to cause a violation of the water quality standards at certain flows. Ecology calculated effluent limits as minimum receiving water and effluent flows using methods from EPA, 1991 as shown in **Appendix** C

Although the data from the translator study showed the amount of metal transitioning to a dissolved state was low, the amount of total metals was high. WSDOT provided information identifying the potential sources for the high concentrations of zinc on the Lewis and Clark Bridge and lead on the Johns River Bridge and this information was taken into account for the final analysis. However, the high total metals concentrations resulted in dissolved amounts that exceeded water quality standards at certain flows. See Appendix E for more information.
The size of the data set dictated the options considered for the final analysis. Ecology looked at three options. The information provided by WSDOT regarding the high total metals concentrations were taken into account when evaluating the different options for analyzing the data.

Option 1: remove the high zinc and lead results from the data set and treat them as outliers

Option 2: treat the highest results for zinc and lead as the 95th percentile and add 10% of the total concentration for each metal to account for slight variation.

Option 3: use the existing data set as given to Ecology.

With each option, the flow limits will change but the degree of change will vary between options. After evaluating all the options, it was determined to use option 2 for the following reasons:

- Maximizes the amount of data
- Accounts for statistical uncertainty associated with treating some of the data as outliers
- Accounts for situations where site specific factors were identified as potential cause for high metal concentrations (Lewis & Clark Bridge)
- Accounts for unforeseen conditions, such as type of paint system used in the past, that increases potential for violations (Johns River Bridge)

- Acknowledges that future paint systems are different and moving away from lead based systems of the past.

Below is a table summarizing the data, as defined by Option 2, that was used in the final analysis.

TABLE 7 – Bridge Wash Effluent (µg/L)

	Copper*	Lead*	Zinc*	# of Samples
Skykomish River**	2050	6480	3630	1
Nooksack River**	81.5	1220	1650	1
Cowlitz River**	128	10500	4470	1
Lewis & Clark Bridge/Columbia River	110	16810	11480	3
	181	19260	14718	
	328	23050	31592	
Johns River	620	59600	9450	3
	667	94600	9350	
	1290	96100	11700	
Highest Value (+ 10% of HV for Pb, Zn)	**2050**	**105710**	**34751.2**	
Translators 95th Percentile	0.313	0.114	0.531	
WQ Standards Criteria W. WA	3.4	9.6	26.8	
WQ Standards Criteria E. WA	6.3	20.3	47.0	
Ambient concentrations W. WA	1.19	0.06	3.27	
Ambient Concentrations E. WA	0.96	0.11	9.63	
W. WA hardness as CaCO3 mg/L 18				
E. WA hardness as CaCO3 mg/L 35				

*units used for total metals concentrations ug/L
** Refers to one of the four bridge projects monitored prior to the NPDES permit.

The 10% has been added to the highest values because Ecology believes these values to be characteristic of the effluent, taking into consideration the information provided by the permittee as discussed above and in Appendix E.

The analysis resulted in the following changes to the existing flow limits for preparatory washing for western WA. The number of pressures refers to the how many washers are operating at one time.

Table 8 – Receiving Water Flow Limits (as minimum CFS) for different number of pressure washers (3 gallon/minute discharge per washer)

Flow Limits – Existing Permit		Flow Limits – Proposed Permit	
# of Pressure Washers	Range of CFS	# of Pressure Washers	Minimum CFS
No discharge	89 or less	1 washer	502
Less than 6 washers	90 – 532	2 washers	932
Max 6 washers	533 - 7930	3 washers	1434
Max of 6 washers	7931 or greater	4/5 washers	2151
		6 washers	2868

During the 5 year cycle of the existing permit, Ecology discussed the flow limitations with the Permittee. These discussions pointed out that the conditions for preparatory washing, as written, were confusing for field personnel. Ecology agreed to rewrite the conditions to clarify that the flow limitations were based on the number of pressures operating at one time. The flow limits apply to preparatory wash projects conducted in western Washington. The conditions for the east side remain unchanged. The translator study has been modified in order to allow the permitted to complete the study and meet the requirement to include a project from eastern WA. This decision was based on scheduling restrictions for these types of projects. A full discussion is provided in Appendix E.

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.

Ecology-accredited WET testing laboratories use the proper WET testing protocols, fulfill the data requirements, and submit results in the correct reporting format. Accredited laboratory staff know how to calculate an NOEC, LC_{50}, EC_{50}, IC_{25}, etc. Ecology gives all accredited labs the most recent version of Ecology Publication # WQ-R-95-80, *Laboratory Guidance and Whole Effluent Toxicity Test Review Criteria* (http://www.ecy.wa.gov/biblio/9580.html), which is referenced in the permit. Ecology recommends that each regulated facility send a copy of the acute or chronic toxicity sections(s) of its NPDES permit to the laboratory.

Acute toxicity tests measure mortality as the significant response to the toxicity of the effluent. Dischargers who monitor their wastewater using acute toxicity tests find early indications of any potential lethal effect of the effluent on organisms in the receiving water.

The amount of data from WET testing samples collected during the previous permit term were insufficient to conduct an analysis accurately characterizing effluent toxicity. The permit contains conditions requiring the permittee to continue with WET testing and collection of data in order to perform the necessary analysis measuring acute toxicity of the effluent.

F. Human Health

Washington's water quality standards include 91 numeric human health-based criteria that Ecology must consider when writing NPDES permits. These criteria were established in 1992 by the U.S. EPA in its National Toxics Rule (40 CFR 131.36). The National Toxics Rule allows states to use mixing zones to evaluate whether discharges comply with human health criteria.

Ecology determined the applicant's discharge does not contain chemicals of concern based on existing data or knowledge. Ecology will reevaluate the discharge for impacts to human health at the next permit reissuance.

G. Sediment Quality

The aquatic sediment standards (WAC 173-204) protect aquatic biota and human health. Under these standards Ecology may require a facility to evaluate the potential for its discharge to cause a violation of sediment standards (WAC 173-204-400). You can obtain additional information about sediments at the Aquatic Lands Cleanup Unit website.
http://www.ecy.wa.gov/programs/tcp/smu/sediment.html

Through a review of the discharger characteristics and of the effluent characteristics, Ecology determined that this discharge has no reasonable potential to violate the Sediment Management Standards.

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 permittee 's discharge has the potential to cause a violation of the ground water quality standards if pressure wash water is discharged to ground. The permittee has conducted an analysis of conditions necessary to prevent violations of ground water standards. Therefore, the proposed permit requires the permittee to follow the recommended discharge conditions given in the *Ground Disposal of Effluent from WSDOT Preparatory Bridge Washington,* dated January 2008 and to verify the recommendations 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 is detailed in the draft permit under Condition S.2. Specified monitoring frequencies take into account the quantity and variability of the discharge, the treatment method, past compliance, significance of pollutants, and cost of monitoring.

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 all monitoring data (with the exception of certain parameters).

V. OTHER PERMIT CONDITIONS

A. Reporting and Recordkeeping

Ecology based permit condition S3 on our authority to specify any appropriate reporting and recordkeeping requirements to prevent and control waste discharges (WAC 173-220-210). The permit requires an annual Proposed Preparatory Wash Project List Report to be submitted 30 days before projects are expected to begin. The permit also requires an annual Project Completion Report which summarizes preparation-washing activities for that season and the number of completed maintenance washing projects.

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

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

VII. REFERENCES FOR TEXT AND APPENDICES

Environmental Protection Agency (EPA)

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.

1994. 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)

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

APPENDIX A--PUBLIC INVOLVEMENT INFORMATION

Ecology proposes to reissue a permit to the Washington Department of Transportation. The permit prescribes operating conditions and wastewater discharge limits. This fact sheet describes the facility and Ecology's reasons for requiring permit conditions.

The Permittee placed a Public Notice of Application on May 15th in the Tacoma News Tribune and on May 16th in the Tri-City Herald to inform the public about the submitted application and to invite comment on the reissuance of this permit.

The Notice –

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

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

You may obtain further information from Ecology by telephone, 360-407-7298, or by writing to the permit writer at the address listed below.

Water Quality Permit Coordinator
Department of Ecology
P.O. Box 47600
Olympia, WA 98506-7600

The primary author of this permit and fact sheet is Penny Kelley.

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).

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

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.

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

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

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

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

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

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

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

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

Continuous Monitoring –Uninterrupted, unless otherwise noted in the permit.

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

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.

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

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

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

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.

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

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

APPENDIX C--TECHNICAL CALCULATIONS

Several of the Excel® spreadsheet tools used to evaluate a discharger's ability to meet Washington State water quality standards can be found on Ecology's homepage at http://www.ecy.wa.gov/programs/eap/pwspread/pwspread.html.

WESTERN WASHINTON – 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--RESPONSE TO WSDOT COMMENTS

THE FOLLOWING ARE THE WASHINGTON DEPARTMENT OF TRANSPORTATION'S COMMENTS TO THE DRAFT NPDES PERMIT # WA-0039039 CURRENTLY OUT FOR PUBLIC REVIEW – THE ECOLOGY RESPONSES ARE INCLUDED WITH EACH COMMENT:

(1) WSDOT suggests that the pertinent definitions found in the Fact Sheet be included as an appendix to the NPDES permit so user of the permit has them for easy reference.

Definitions have been placed in the permit as well as the fact sheet.

(2) Page 5 S1.A. 1st paragraph:

High pressure wash water needs to defined here so the permit user knows the requirements. See definition in FACT SHEET Appendix B.

High pressure wash water is defined in the definition section of the permit.

(3) The WSDOT comment and Ecology response has been moved to the section labeled Comments & Response regarding work below the OHWM for maintenance washing and preparatory washing:

(4) The WSDOT comment and Ecology response has been moved to the section labeled Comments & Response regarding work below the OHWM for maintenance washing and preparatory washing:

(5) The WSDOT comment and Ecology response has been moved to the section labeled Comments & Response regarding work below the OHWM for maintenance washing and preparatory washing:

(6) The WSDOT comment and Ecology response has been moved to the section labeled Comments & Response regarding work below the OHWM for maintenance washing and preparatory washing:

(7) Page 7. S1.B.5.

Does Ecology expect DOT to clean every piece of debris from the structure prior to washing? There are many places where this would be unrealistic, put workers in unsafe situations, and be extremely time consuming/costly.

Ecology expects that WSDOT will clean the bridge to maximum extent practicable without jeopardizing worker safety. The intent of the condition is to reduce the amount of material, considered to be a potential source of metals, discharging to the receiving water or contributing dissolved metals to the washwater.

(8) The WSDOT comment and Ecology response has been moved to the section labeled Comments & Response regarding work below the OHWM for maintenance washing and preparatory washing:

(9) Comment (9) Page 8. S1.C.4
See comment (7) above.
See response (7) above

(10) Page 9. S1.D.1. 3rd sentence of 3rd paragraph:
The phrase "prior to conducting any projects under this permit where waste water....." should be revised to read "prior to conducting any projects under this section where waste water....."

This requirement is not included in the stated conditions for Spot Cleaning or for Bridge Maintenance Washing and would be a significant change (and impact to WSDOT maintenance) if required.

The permit authorized a discharge to ground for pressure wash water in situations where there was not authorization to discharge to surface waters. However, because WSDOT has not evaluated the effluent passing through a #100 sieve tarp prior to issuance of this permit, Ecology developed a compliance schedule that required WSDOT to evaluate effluent passing through a #100 sieve tarp and to evaluate ground attenuation at these concentrations.

All of the information in the permit file to date indicates that discussions surrounding discharging to ground focused on preparatory washing because it was assumed that preparatory washing effluent would have higher concentrations of metals due to the high pressure, low volume washing and there was very little to no data available to prove or disprove that assumption. Ecology also assumed that maintenance washing would have low or lower metal concentrations due to the high volume low pressure washing and for that particular activity, there was no data to prove or disprove the assumption. There was not much in the file that indicates there was any discussion about discharging to ground for maintenance washing where the water is not filtered through a tarp.

Since permit issuance, WSDOT has collected effluent data on both preparatory washing and maintenance washing and conducted the ground water study. The information in this groundwater study states what conditions are needed in order to avoid violating groundwater standards. If the effluent data from maintenance washing indicates that metal concentrations are high enough to potentially violate groundwater standards where conditions are not appropriate to attenuate the impacts, then Ecology will not allow discharge to ground. The groundwater standards remain the same whether WSDOT is conducting a maintenance wash or a preparatory wash for a bridge.

WSDOT is required to develop a protocol for evaluating if a particular project has suitable conditions for discharging to ground. WSDOT should look at the data collected

to date on maintenance washing and assess whether these concentrations have the potential to cause a violation. Also, WSDOT will collect additional information during the next 5 year cycle of the permit so it will have additional data to evaluate ground water impacts. WSDOT can develop the protocol such that it can use new information to revise and update the document.

Ecology is willing to meet with WSDOT and discuss the data compiled to date as a groundwater discharge protocol is developed.

Ecology also added language to the condition to clarify that WSDOT is required to develop a protocol before discharging prior to conducting any preparatory washing but is required to assess maintenance washing based on information collected to date and after additional data has been collected.

(11) Page 9. S1.D.2 2nd & 3rd sentence of the 2nd paragraph:
What if the pressure washers have a discharge of 4 gallons per minute? Could four (4) pressures washers be used per this permit if each pressure washer discharged 4 gpm? On page 2 of the FACT SHEET (under the *Summary)* it states the low volume for preparatory washing is 18 gpm maximum.

If the contractor wants to use a pressure washer that has a discharge of 4 gpm, the number of pressure washers operating simultaneously should be reduced accordingly such that the maximum discharge does not exceed what is specified in the permit conditions.

For clarification the condition S1.D3 is changed to read as follows:

The number of pressure washers operating simultaneously shall not exceed 6 pressure washers:
If operating 6 pressure washers (18 gpm), minimum CFS needed = 2030
If operating 4/5 pressure washers (15 gpm), minimum CFS needed = 1522
If operating 3 pressures washers (9 gpm), minimum CFS needed = 1015
If operating 2 pressure washers (6 gpm), minimum CFS needed = 660
If operating 1 pressure washer (3 gpm), minimum CFS needed = 356

Regarding the comment about page 2 of the factsheet, this sentence simply means that this activity overall generates a low volume of wastewater as compared to other activities where there is ongoing discharges of waste water associated with industrial activities.

The gpm restrictions and allowed number of pressures washers is for discharges to waters of the U.S. Is WSDOT limited to the 18 gpm discharge and 6 maximum pressures washers if the paint prep work is being performed on the bridge structure outside the OHWL (over an upland area)?

No, the number of pressure washers over upland areas should be guided by the results from the WSDOT groundwater study. The permit requires WSDOT to develop a protocol for Ecology review and approval prior to conducting any projects where they are discharging to ground.

(12) The WSDOT comment and Ecology response has been moved to the section labeled Comments & Response regarding work below the OHWM for maintenance washing and preparatory washing:

(13) Page 11. S1.D. 9

See comment (7) above.

See response to (7) above

(14) Page 12. S1.D.18.

Does this provision preclude the storage of materials on a floating work platform (barge)? Suggest removing "over the water or". We assume the intent is that there is no chance of the material entering the water. Containment systems on a barge would prevent this from happening.

The intent of this condition is to prevent spills or discharges of paint, petroleum products, etc. Spills of this nature can happen under a variety of conditions throughout the painting process so language was drafted to try and minimize the risk as much as possible. Hence we restricted the mixing, cleaning and storing of paint and equipment over water. Storage does not mean that quantity of material necessary for the day's activities. Storage means periods when WSDOT personnel are not observing or controlling the barge .

(15) Page 13. S1.E.5:

Why can only four (4) washers be used for Ferry Transfer Spans? Weren't all the studies based on 6 pressures washers at 3 gpm? Page 2 of the Fact Sheet states Ferry Terminal paint preparatory wash is based on 18 gal/minute.

In the October 2003 Engineering report prepared for this permit, Herrera Environmental Inc. assessed the water quality impacts to marine systems. The analysis looked at various scenarios using both total and dissolved concentrations for metals and the results suggested that there was potential for a violation of water quality standards and that velocity was a key factor in mitigating that impact. The limit on the number of pressure washers was set accordingly based on that analysis.

Herrera Environmental Inc conducted a second analysis on the water quality impacts to marine systems that essentially confirmed the first analysis but provided Ecology with enough specific information to modify the permit condition regarding tidal exchange. The information to date does not support increasing the number of pressure washers operating any one time.

The reference to 18 gal/minute is incorrect.

(16) The WSDOT comment and Ecology response has been moved to the section labeled Comments & Response regarding work below the OHWM for maintenance washing and preparatory washing:

(17) Page 13. S1.E.11:

See comment (7) above.

See response to (7) above.

(18) Page 16 S2.A.1&2

To be consistent with the permit it should read "Ferry Transfer Span *& Overwater Metal Structure*".

Ecology has updated the permit accordingly

(18) Page 17. S3.A.1.d.

Since this permit covers Ferry Terminals it should read "Bridge location, including road number, milepost *or Ferry terminal name and location.*"

Ecology has updated the permit accordingly.

(19) Page 19. S3.F:

Is the Fact Sheet considered part of the official permit? Does it have to be on site? The phrase should be "ferry transfer span *& overwater metal structure* preparatory washing" to be consistent with the other sections of this permit.

The fact sheet explains and documents the decisions Ecology made in drafting the proposed National Pollutant Discharge Elimination System (NPDES) permit as is stated under the section Purpose of the Fact Sheet. A fact sheet does not contain any permit conditions and is not required to be kept on site.

Regarding the phrase ferry transfer span & overwater metal structure, Ecology has updated the permit and fact sheet accordingly to ensure this phrase is used consistently though out both documents.

Comments & Response regarding work below the OHWM for maintenance washing and preparatory washing:

In reading through the comments, it was clear that the permit was reviewed in the order it was written starting on page 1 and methodically reading through the document. In drafting our response, Ecology noted that several comments related to work below the OHWM that was incorporated into multiple locations throughout the permit. We decided to combine those comments here in order to make it easier for review of both the comments and our responses.

SUMMARY OF THE ISSUES OR COMMENTS ARE:
The permit does not allow WSDOT to place tarps or other BMPs on the adjacent shoreline/upland areas below the OHWM or OHWL to contain and direct wash water into the flowing surface waters where shoreline/upland conditions are not suitable for a direct discharge to ground.

The permit does not allow any part of a bridge or structure to be washed if there is no flowing water within the creek channel (area below the OHWM).

The permit does not allow work to occur using whatever equipment is needed below the OHWM except for a temporary floating platform to remove marine growth. This restriction does not allow WSDOT to use equipment to place tarps or other BMPs in the area between the OHWM and the wetted perimeter where direct discharge of washwater is not allowed because this area is exposed stream channel (no flowing water).

SPECIFIC COMMENTS & RESPONSES:

Spot Cleaning - occurs over fresh/brackish/marine waters
Comment (3) Page 5. S1.A.2: Work resulting in wash water entering state waters shall be restricted to when the bed of the receiving water under the part of the structure to be washed is covered with water.

This does not allow for placing a tarp over the area below the OHWL and outside the wetted perimeter to sheet flow effluents into the receiving water. The section below that portion of the bridge would technically not be "covered with water". We assume the intent of this condition is that wash water not be allowed to discharge to the naturally dry portion of the river below the OHWL.

> WSDOT is correct – the intent of the condition is to prevent washwater containing dissolved metals from discharging to dry river/stream/creek beds. A dry stream bed (the area below the OHWL or OHWM) does not have a mixing zone because there is no flowing water. If a tarp or some other BMP was used to contain and prevent wash water from discharging to the dry stream bed then the activity would be in compliance with the permit.
>
> Ecology has rewritten the condition so it is more clear that work can be conducted over a dry stream bed if maintenance staff install the appropriate BMPs and that they are allowed to install BMPs (and the equipment to install

them) to ensure no wash water is discharged to a dry creek bed. We also put in language that clarifies BMPS can be used above the OHWM on adjacent shorelines where upland conditions are not sufficient to allow a direct discharge to ground. The BMPs could be used to direct wash water to flowing water within the stream/creek/river bed. The condition S1.A.2 reads as follows:

Work resulting in wash water entering state waters shall be restricted to when the bed of the receiving water under the part of the structure to be washed is covered with water or BMPs are used to achieve the following:

a. Full containment with no discharge to a dry river/steam/creek bed (the area of channel below the OHWM);
b. Discharge of wash water directly to the receiving waters if adjacent shoreline conditions are not sufficient to allow a direct discharge to ground.
c. Full containment with no discharge to a dry river/stream/creek bed (the area of channel below the OHWM) and no discharge to adjacent shorelines/upland areas where conditions are not sufficient to allow a direct discharge to ground.

Comment (4) Page 5. S1.A.4: No work or equipment use shall occur below the ordinary high water line (OHWL).

This condition precludes DOT from placing a tarp or some other type of BMP to cover the area between the wetted perimeter and OHWL if wash water could potentially enter this area.

Ecology has rewritten the condition to clarify that staff can install BMPs to cover the area between the wetted perimeter and OHWM if wash water could potentially enter this area. The condition would read as follows:

No work or equipment use shall occur below the ordinary high water mark (OHWM) except for the installation of BMPs to direct the discharge of wash water to flowing water if adjacent upland shoreline conditions are not sufficient to allow a direct discharge to ground or if any area below the OHWM is not covered with flowing water.

Maintenance Washing – occurs in fresh and brackish water

Comment (5) Page 7 S1.B.2. Work resulting in wash water entering state waters shall be restricted to when the bed of the receiving water under the part of the structure to be washed is covered with water.

See comment (3) above.

See response to (3) above

Comment (6) Page 7 S1.B.4. No work or equipment use shall occur below the ordinary high water line (OHWL).

See comment (4) above.

See response to (4) above

Ferry Terminal & Overwater Metal Structures Maintenance Washing occurs in marine waters
Comment (8) Page 8. S1.C.2. 2nd sentence: No work except marine growth removal shall occur below the ordinary high water line (OHWL). No equipment use, except a temporary work platform for marine growth removal shall occur below the OHWL.

Does this include the use a temporary floating work platform for maintenance washing?

WSDOT can use a temporary floating work platform for maintenance washing. We will add the word floating to temporary work platform.

Preparatory Washing (Painting) for bridges - occurs in fresh/brackish/marine waters.
Comment (12) Page 10. S1.D.7. No work or equipment use shall occur below the ordinary high water line (OHWL) except the use of a temporary floating work platform.

See comment (4) above.
See response to (4) above.

Preparatory Washing (Painting) for ferry terminals & overwater metal structures - occurs in marine waters
P13. S1.E.7. No work, except marine growth removal, shall occur below the ordinary high water line (OHWL). No equipment use, except a temporary floating work platform for marine growth removal shall occur below the OHWL.

This provision precludes the use of a temporary work platform to perform painting activities. Is this Ecology's intent?

See Ecology's response on Comment 14. Also, the comment implies that WSDOT would require the use of a temporary floating work platform or barge below the OHWL so they can paint structures below the OHWL. When WSDOT applied for the individual NPDES/State Waste Discharge permit, it told Ecology how it conducted preparatory washing and painting. Based on that information, it was our understanding that painting did not occur below the OHWL. We have concerns if painting is conducted below the OHWL and would agree that this condition would prevent that activity. However, it may be that we are not understanding your comment and are open to any clarification or additional information that you care to provide us.

On August 11, 2009, Washington State Ferries, a division of the Washington Department of Transportation, submitted a request to Department of Ecology to update the draft NPDES permit to allow or extend coverage for painting of steel piles, dolphins, wing walls and ladders, including those areas of the structures that extend below the OHWM. Ecology requested information regarding how the structures are painted and what type of paint systems are used.

Per the information supplied by the WSF staff, these structures are painted on a periodic basis as part of the ferry terminal maintenance and timing is similar the painting cycle for ferry transfer spans. The intent of maintaining the paint is to protect the structures and prevent physical degradation. The amount of time it takes to paint a structure or a series of structures at one terminal under one painting contract can vary but this activity does require more than one tidal cycle to complete, even if only one structure is being painted. The type of paint system that is used can vary but usually entails a 3 part system that involves a base coat or primer and two top coats. Depending on the system that is used and air temperature, a coating of paint can dry in 3 hours but the curing process can take up to three days. Additional applications of paint require the coating to be dry but not fully cured.

After reviewing the information supplied by WSF, Ecology determined there was a potential for discharge from these painting activities. Ecology updated the compliance schedule in the NPDES permit authorizing this work but requiring WSDOT to develop a sampling plan/protocol for collecting water quality samples during one ferry painting project per calendar year that entails painting these structures below the OHWM. The samples must be sent to an accredited laboratory for aquatic toxicity testing. This information will be used to assess whether or not this activity has a potential to violate water quality standards.

APPENDIX E – FINAL ANALYSIS REPORT
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM WASTE DISCHARGE PERMIT NO. WA-0039039
DECEMBER 2008

Brief Overview

The Washington Department of Transportation is responsible for maintaining steel bridges, steel components on concrete bridges, and ferry transfer spans & overwater metal structures statewide. Maintenance of these steel structures entails one or more of the following steps depending on maintenance needs: Phase 1- periodic inspections are performed that includes assessing the condition of protective paint coatings, Phase 2- washing to remove dirt and other material from the structure, Phase 3 -repainting as needed to protect structural integrity. All three phases of bridge and ferry maintenance generate discharges of wash water to waters of the state.

Phase 1 Periodic Inspections:
Structures are periodically inspected and may be spot cleaned with water to prepare the structure for inspection.

Phase 2 Washing:
Structures are washed on a 1-5 year 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.

Phase 3 Painting or Repainting:
Structures 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.

The wash water generated from all three phases of maintenance/painting activities is considered waste water. In order to discharge waste water to waters of the state, an NPDES permit is required from the Department of Ecology. The Department of Transportation applied for an NPDES permit to cover bridge and ferry transfer span & overwater metal structure washing and painting activities on October 6, 2003 and accepted by Ecology on November 6, 2003. Department of Ecology did issue permit WA-0093039. This permit authorizes discharges from maintenance washing and preparation for painting of bridges and ferry transfer spans in Washington State. The permit contains conditions requiring WSDOT to:
Monitor one representative maintenance washing of a bridge or ferry transfer span
Monitor one representative preparatory washing of a bridge or ferry transfer span

The permit also authorizes WSDOT to develop a waste-specific translator study plan for preparatory bridge washing for painting with the intent of developing specific waste translators.

This report describes the requirements, results, analysis, and conclusions for the monitoring of maintenance washing & painting activities and the waste specific translator study.

WATER QUALITY MONITORING
MAINTENANCE WASHING & PREPARATORY WASHING

PERMIT CONDITIONS FOR MONITORING

S.2 Monitoring Requirements: A. Wash Water and Pressure Wash Water Monitoring
The permittee shall monitor wash and pressure wash water as follows:
1. Bridge and Ferry Transfer Span Maintenance Routine Washing – The permittee shall monitor one representative project (bridge or ferry transfer span) per year. The permittee shall collect a composite sample of effluent and analyze for total hardness, dissolved and total recoverable copper, dissolved and total recoverable lead, and dissolved and total recoverable zinc.

2. Bridge and Ferry Transfer Span Preparatory Washing – The permittee shall sample one representative project (bridge or ferry transfer span) per year. The permittee shall collect a composite sample of effluent after passing through the filter tarp. The sample shall be analyzed for dissolved and total recoverable copper, dissolved and total recoverable lead, dissolved and total recoverable zinc, total hardness, and acute toxicity to Ceriodaphnia dubia, Daphnia pulex, or Daphnia magna (48 hour static test, method: EPA/600/4-90/027F). The permittee shall also collect samples of the receiving water "upstream" of the project bridge or transfer span and analyze the water for dissolved and total recoverable copper, dissolved and total recoverable lead, dissolved and total recoverable zinc, and total hardness.

The monitoring is required in order to characterize the pollutants and to determine if maintenance washing results in, or has the potential to result in, a violation of water quality standards. This determination is made by performing a reasonable potential analysis based on monitoring results from data collected during maintenance washing activities.

MONITORING RESULTS - ANALYSIS & DISCUSSION

WSDOT has completed and submitted monitoring reports on 4 maintenance bridge washing projects, 1 bridge preparatory washing and painting project and 1 ferry terminal transfer span preparatory washing and painting project.

Bridge Maintenance:
4 Maintenance Bridge Washing Projects:

- Interstate 5, Skookumchuck River/2004
- US 101, Hoquiam River/2006
- Interstate 5, Cowlitz River/2007
- US 12, Wiskah River/2008

Four reports were submitted to Department of Ecology containing total and dissolved data on effluent metals concentrations – copper, lead, and zinc. All four reports complied with Condition S.2.1 (see above). There are only four reports because WSDOT did not conduct any maintenance washing during 2005.

Of the four monitoring reports submitted, only three reports could be used to perform an individual reasonable potential analysis. In order to perform this type of analysis, the following information is needed:

- Effluent metals concentrations (in total micrograms per liter)
- Background metals concentrations – total and dissolved (in micrograms per liter)
- Background hardness (CaCO3 in mg/L)
- River Flow at the time of washing (in CFS)
- The total volume of water discharged during washing
- The total amount of time spent in actual washing of the bridge (not including setup/breakdown, lunch, travel time, etc.)

It was noted that the permit conditions did not require WSDOT to collect and submit all of the information needed for a reasonable potential analysis.

Discussion:
All four reports had some missing information needed for reasonable potential analysis. None of the reports contained flow data for the waterbody at the bridge location. Regarding the other necessary information, the reports varied considerably. Some reports had some of the information on background conditions, metals and hardness, and some did not. One report contained information on volume of water discharged to the river but did not list the number of hours spent actually washing the bridge. In some cases, the detection limits were insufficient (concentrations were reported as no detect) or measurements were inexact (reported as < or >). In one case, the incorrect method was used for the lab analysis.

To compensate for the lack of information and errors found in the reports, WSDOT pulled maintenance records and was able to obtain the volume of water and hours spent washing on three of the four bridges. Flow data was pulled from the USGS website or the Environmental Information Management database if available. If flow data was not available on the waterbody in question, then a comparable waterbody was used for the analysis. Generalized background hardness and metals concentrations were pulled from the October 2003 engineering report prepared by John Lenth with Herrera Environmental Inc. The EIM database was also used to obtain background metals and water hardness. In some cases, assumptions had to be made about the number of hours spent washing a particular bridge. In all cases, each assumption made was listed in the individual report/reasonable potential analysis. All calculations/work is shown and filed with the respective report.

Results:
Each report shows that there is copper, lead and zinc in the wash water coming off the bridge being washed. The results from the analysis on all three projects showed there was no violation of water quality standards given the allowable dilution. However, the three projects do not contain enough data to estimate 95th percentile pollutant concentration and whether or not that concentration results in the potential to violate water quality standards. More data is needed to complete this analysis.

Bridge Painting

One Bridge Painting Project and One Ferry Transfer Span Painting project:
Colman Ferry Terminal/Elliot Bay in Puget Sound – 2005
SR 433 Lewis & Clark Bridge/Columbia River - 2007

Two reports were submitted to Department of Ecology containing the results of monitoring on these two projects. Both reports contained total and dissolved metals concentrations for the effluent – copper lead, and zinc. One report contained some background concentrations and hardness as well as toxicity testing results. The other report did not contain background concentrations, hardness or toxicity testing. Only one reports complies with Condition S.2.2

Of the two monitoring reports submitted, none could be used to perform an individual reasonable potential analysis. In order to perform this type of analysis, the following information is needed:

- Effluent metals concentrations (in micrograms per liter)
- Background metals concentrations – total and dissolved (in micrograms per liter)
- Background hardness (CaCO3 in mg/L)
- River Flow at the time of washing (in CFS)
- Tidal Current/Flow at the time of washing (marine water specific)
- The total volume of water discharged during washing
- The total amount of time spent in actual washing of the bridge (do not include setup/breakdown, lunch, travel time, etc.)

It was noted that the permit conditions did not require WSDOT to collect and submit all of the information needed for a reasonable potential analysis.

Discussion:
Of the two reports submitted, neither one could be used to perform an individual reasonable potential analysis. A dilution factor could not be calculated for the Colman dock. The report states that the contactor was required to collect a sample of receiving waters 100 feet upstream of the project/washing activities. The field notes/records indicate the background sample was collected close to shore from one of the ferry terminal transfer spans or slips. The data for background conditions showed metals concentrations that exceeded water quality standards (acute criteria) for marine waters. Based on this data there is no mixing zone available for washing activities and full containment would be required at the Coleman ferry transfer spans in future permits. Because the contactor took the sample close to shore, it is possible the runoff from the adjacent landscape would affect test results and would not be reflective of true background conditions. Additional monitoring and sampling would be required to establish ambient or background conditions in this location.

Calculating a dilution factor for the Colman dock, or any other ferry terminal site, may require a dye test and modeling to determine the amount of mixing that is occurring on site. These tests are site specific and were not required in the conditions of the NPDES permit.

The Lewis and Clark Bridge project is a 3 year project that is ongoing. The report that was submitted contained sampling results for the months of January, May, June, and July of 2007. Information in this report included effluent metals concentrations, effluent hardness, and volume

of water discharged to the Columbia River. There is no information on background metals concentrations or hardness, amount of time spent washing the bridge or flow data for the Columbia river in that location. Background conditions for metals concentrations and hardness can be found in the Western Bridge Data Report, WSDOT Bridge Washing Effluent Translator Study dated January 2008 and an estimate can be made on the amount of time spent washing the bridge. However there is no flow data available on the USGS website or EIM for this section of the river. Therefore an individual reasonable potential analysis could not be performed on this project because a dilution factor could not be calculated.

Ecology discussed the missing background data with WSDOT and determined that there was an unforeseen complication that was not identified during early discussions. When the bridge was first identified as a 3 year project, Ecology and WSDOT agreed that WSDOT could use this project to meet the requirements to monitor one representative project a year for preparatory washing. The two agencies also agreed that work over land would not require collecting background conditions. WSDOT should collect samples for background conditions when overwater portions of the bridge were being washed. During the course of the actual project, neither agency foresaw that no overwater portions would be washed within the 1 year monitoring time frame.

Results:
Without being able to perform individual reasonable potential analysis for either project, no conclusions can be drawn at this time.

COMPLIANCE SCHEDULE - SPECIFIC WASTE TRANSLATOR STUDY AND GROUNDWATER STUDY

PERMIT CONDITION COMPLIANCE SCHEDULE

S.6 A. Waste Specific Translator Study
The permittee is allowed to discharge filtered waste water resulting from pressure washing to rivers with flows between 55 CFS and 4200 CFS (7900 CFS in Western Washington) only if the permittee is in compliance with the following condition to develop a waste-specific translator or a comparable assessment that further defines the effluent characteristics or mixing zone effects:

By Spring of 2005, the permittee shall submit to Ecology for review and approval a study plan to develop a waste-specific translator or comparable assessment. The plan shall identify the University contractor, contain the quality assurance plan for the chemical analysis, and the time schedule for completing the study within the period of this permit. The objective of the study is to determine the dynamics of conversion of total recoverable metal in the effluent to dissolved metal in the receiving water.

B. Ground Discharge Study.
An evaluation of the impacts of discharge to ground is required. The evaluation report is due one year after three pressure wash projects using #100 filter tarp have been completed and evaluated. The report shall use the effluent analysis required elsewhere in this permit and evaluate the potential of this discharge for violation of ground water standards (Chapter 173-200).

During pre-application meetings with Ecology, Washington Department of Transportation proposed conducting a study to develop specific waste translators for copper, lead and zinc that would apply to their bridge and ferry preparatory washing activities. They believed that the translators Ecology used to develop the flow limitations for preparatory washing were inappropriate because they believed the total recoverable fraction of metals is not likely to convert to dissolved in the receiving water. Specific waste translators might result in lowering the flow limitations and increasing the number of bridges in which preparatory washing could be performed using filter tarps. However, it was also recognized that conducting this study might result in higher flow limitations and more restrictions on preparatory washing activities if WSDOT's supposition about the behavior of metals in the effluent was incorrect. Department of Ecology authorized the proposal to develop specific waste translators by including a compliance schedule in the NPDES permit (see conditions above). To date, WSDOT has completed the following:

- Submitted the 1st version of the QAPP in the spring of 2005
- Submitted a final draft in May of 2006 (approved on June 12, 2006)

Since that time, two painting projects on the west side have been selected for the translator study.

1. Lewis & Clark Bridge painting project selected for translator study
   Report with monitoring results submitted on January 30, 2008.
2. St John Rivers Bridge painting project selected for translator study
   Report with monitoring results submitted December 1, 2008.

The Department of Transportation has not scheduled any bridges for painting on the east side of the state due to funding and the painting schedule. Funding may be available during the next five year cycle of the permit and WSDOT has identified two bridges on the east side that are scheduled for painting.

Lewis & Clark Bridge Individual Reasonable Potential Analysis
Analysis & Results

An individual analysis was done using the data collected for the translator study to determine if the project resulted in, or had the potential to result in, a violation of water quality standards. Due to the flows at the time of washing, this project did not result in a violation. However, the monitoring results did show that WSDOT has the potential to violate water quality standards for zinc if flows were below 524 CFS. The summary starting on page 69 of this report and tables included in appendix C of the permit fact sheet show the analysis that was done using the data from the Western Bridge Data Report dated October 2008 (Table 1 and 2 under Tables & Figures). Table 1 contains the experimental design parameters and Table 2 contains the sample results for wash effluent coming off the bridge and the background conditions of the Columbia at the time the samples were collected. The individual analysis was done using 3 pressures to represent low effluent discharge and 6 pressure washers represent high effluent discharge (which is also the maximum number of washers allowed to operate simultaneously under the permit conditions). This step was taken to assess how changing the number of pressure washers affects the potential for violating water quality standards.

Summary of Final Results:
Copper – Acute (2.5% of river available for mixing zone)
3 pressures washers – minimum CFS needed = 22.4
6 pressure washers – minimum CFS needed = 44

Lead – Acute (2.5% of river available for mixing zone)
3 pressure washers – minimum CFS needed 83.2
6 pressure washers – minimum CFS needed 168

Zinc – Acute (2.5% of river available for mixing zone)
3 pressure washers – minimum CFS needed 524.8
6 pressure washers – minimum CFS 1057.60

Waste Specific Translators calculated from the Lewis & Clark Bridge: Based on the monitoring and sample analysis results, the following translators were calculated, both the 90 and 95th Percentile.

Waste Translator	90th Percentile Experimental Lewis & Clark	95th Percentile Experimental Lewis & Clark	90th Percentile default translator	95th Percentile default translator
Copper	0.289	0.313	0.968	0.996
Lead	0.054	0.059	0.340	0.466
Zinc	0.466	0.531	0.965	0.996

St. Johns River Bridge Individual Reasonable Potential Analysis
Analysis & Results:
An individual reasonable potential analysis was not done for the project. Through ESA consultation, it was determined that this project should use full containment. No effluent was discharged to the Johns River but effluent was collected and contained for sampling for the purpose of the translator study.

Waste Specific Translators: Based on the monitoring and sample analysis results, the following translators were calculated, both the 90th and 95th percentile.

Waste Translator	90th Percentile Experimental Johns River	95th Percentile Experimental Johns River	90th Percentile Ecology Approved	95th Percentile Ecology Approved
Copper	0.091	0.104	0.968	0.996
Lead	0.103	0.114	0.340	0.466
Zinc	0.267	0.282	0.965	0.996

Estimating 95th percentile pollutant concentrations – Reasonable Potential Analysis:
The final analysis involves compiling the monitoring/sampling data collected to date and evaluating the potential that discharges from preparatory washing have to violate water quality standards. This step is necessary in order to reissue the permit with updated flow limitations.

The monitoring/sampling data and laboratory analysis was collected from a total of 5 bridge washing projects. Three of the projects used for this analysis were conducted prior to the NPDES permit being issued for bridge washing and painting. Department of Transportation collected data on four separate preparatory washing projects for bridge painting and of the four reports written up, only three could be used for any type of analysis for the NPDES permit. The remaining two projects were conducted under the NPDES permit. The information from these 5 projects that was used in the final reasonable potential analysis is provided in Table 1 below along with other information used in the analysis.

TABLE 1

	Copper*	Lead*	Zinc*	# of Samples
Skykomish River**	2050	6480	3630	1
Nooksack River**	81.5	1220	1650	1
Cowlitz River**	128	10500	4470	1
Lewis & Clark Bridge/Columbia River	110	16810	11480	3
	181	19260	14718	
	328	23050	31592	
Johns River	620	59600	9450	3
	667	94600	9350	
	1290	96100	11700	
Highest Value for TSDCALC	**2050**	**96100**	**31592**	
Highest Value (+ 10% of HV for Pb, Zn)	**2050**	**105710**	**34751.2**	
Translators 95th Percentile				
Lewis	**0.313**	0.059	**0.531**	
John	0.104	**0.114**	0.282	
Translators 95th Percentile	**0.313**	**0.114**	**0.531**	
Engineering Report Data				
WQ Standards Criteria	2.67	7.2	21.63	
ambient conc. (generalized numbers)	1.4	0.7	5.3	
E. WA CaCO3 mg/L 35				
W. Wa CaCO3 mg/L 18				

*units used for metals concentrations ug/L
** Refers to one of the four bridge projects monitored prior to the NPDES permit.

Summary of Final Analysis & Flow Limitations:

Pressure Washer - 3 gpm	**Min CFS W. WA**	**Min CFS E WA (Lenth Translators)**
1 pressure washer = 0.007 CFS	356	157
2 pressure washers = 0.013 CFS	660	312
3 pressure washers = 0.02 CFS	1015	480
4/5 pressure washers = 0.03 CFS (rounded)	1522	719
6 pressure washers = 0.04 CFS	2030	959

Lead is the limiting factor

Discussion:
The purpose of the translator study/compliance schedule was to provide WSDOT with an opportunity to show, through monitoring/sampling/laboratory analysis of actual bridge washing projects, that the effluent (wash water) coming off the bridges being prepared for painting was different from other types of effluent/waste water associated with industry. The compliance schedule also allowed Ecology to issue a permit to authorize the discharge from bridge washing activities, important for the maintenance of the state's transportation infrastructure, while requiring information, monitoring, and analysis to be conducted on an activity where little to no information previously existed. For the study, Ecology required WSDOT to monitor and analyze 2 bridge projects, one on the west side and one on the east side. During the 5 year cycle of the permit, WSDOT was able to secure funding for two bridges located on the west side of the Cascades. The next iteration of the permit will address the need for data on an east side bridge. The final number of bridge projects used to in the translator study will total 3 when complete.

In addition to the two projects that WSDOT did during the 5 year permit cycle, additional data was collected shortly before WSDOT approached Ecology about bridge washing and painting and the need for permits. As noted above, this data was used in the final analysis and is sometimes referred to as the Hammacher Data after the staff person who conducted the monitoring. Including data from these projects will increase the total number of bridges used in the data analysis to 9.

The two projects conducted on the west side, Lewis & Clark Bridge over the Columbia River and Johns River Bridge over the Johns River, show that a high proportion of the metals contained in the paint stay bound up within the paint chips and very little transitions out of the chips into a dissolved state over time (see time series in data reports). It is also acknowledged that other sources of metal may be accumulating on the bridge from traffic use and is picked up in the effluent when the bridge is washed. If there is a source on bridge structures for the metals of concern (zinc, copper, lead) and that metal is being discharged to waters of the state during wash events for painting, it indicates that cleaning the bridge in the dry prior to washing cannot completely remove all sources of metal. This information also indicates dry cleaning is a good best management practice to require as loose paint and possible other unknown sources of metal are being reduced, if not removed completely prior to washing and discharge.

It is also important to note that results from the two west side bridge projects showed some very high metal concentrations for zinc and lead and that these high concentrations in the effluent may have identifiable sources. In the Lewis and Clark results, there was a very high concentration of zinc in the sample labeled Effluent 2. The high level of zinc was most likely caused by effluent running across a galvanized metal platform being used as part of the structure supporting the containment system, workers, and equipment. John Lenth with Herrera Environmental Inc, the consultant hired by WSDOT to develop and conduct the translator study, noted that the platform was rusty and may have been a source of metal contributing to the high levels of zinc in Effluent 2. The high levels of lead found in all effluent samples collected from the Johns River Bridge project may be due to the specific paint system that was used for that bridge.

WSDOT provided documentation on the paint system used and stated this type of paint has a very high lead content and is not used on all bridges in the state. However, it was acknowledged

that paint systems of that time period contained lead, that the amount may vary, and that this type of paint system may have been used on some other bridges in the state of WA. Without extensive research it would be impossible to verify which bridges had what type of paint system. At the time of this report, it can only be stated that older paint systems contained lead as a base metal.

The data from the two bridge washing projects was combined with the Hammacher data resulting in a small data set of 9 samples. The size of the data set dictates the options considered for the final analysis needed to help predict whether or not future bridge washings will result in, or have the potential to result in, a violation of water quality standards. Each of these options are discussed below.

OPTION 1: The high zinc and lead results could be removed from the data set used for analysis as outliers. However, the size of the original data set is small and prevents a statistical determination that the high metals concentrations are truly outliers. The decision to remove these results would be based on the information provided by WSDOT and consultant regarding the paint system and metal platform and the results would be considered anomalies.

OPTION 2: This option looks at treating the highest results for zinc and lead as the 95th percentile. This decision would require manipulating existing tools (spreadsheets w/built in formulas) designed to analyze data sets with small numbers for waste water treatment plants in order to determine flow limitations for washing activities.

OPTION 3: Use the entire, existing data set as is and run the final analysis based on the results.

A fourth option could be considered where we approve a translator of zero showing that metals from the paint do not transition to dissolved state and require ongoing monitoring but that really does not account for other possible sources of metal accumulating on the bridge and discharging to waters of the state during a wash event or address possible violations of water quality standards. Based on the data provided to date, this option is not considered feasible.

With each option, the flow limits will change but the degree of change will vary between options. After evaluating all the options, it was determined that option 2 is the best choice. The benefits of using Option 2 are:

- Maximize the amount of data
- Removes the uncertainty associated with removing high metals concentrations from the data set (no statistical proof those values are outliers)
- Accounts for situations where site specific factors are associated/controlled by the contractor
- Acknowledges the possibility that future bridges may have unforeseen conditions, such as a special paint system, that increases potential for water quality violations.
- Acknowledges that future paint systems are different and moving away from lead based system.

The spreadsheets are designed to analyze a small data set for waste water treatment plants. In using these tools for our bridge permit, we have to acknowledge they are not the perfect fit for the job but can be manipulated sufficiently to provide us with the analysis we need. The really

high lead concentrations found in the effluent from the Johns river bridge project are probably a result of the paint system. If that paint system is a special system that does not get used on every bridge, then those numbers probably represent the highest concentrations contained in the effluent. The concentrations might go a little higher but they are not expected to go much higher.

If the data is used as is, the spreadsheet will calculate a value for the 95th percentile that is not reflective of what is happening on these projects. The spreadsheet reads the high concentration as typical value which results in an overly high estimated 95th percentile and that does not help predict what will happen on future bridge projects. By choosing to manipulate the existing spreadsheet with Option 2, the analysis is completed with the tools at hand and unrealistic numbers are eliminated from the final results.

It has been noted that we also do not have any information on what is coming off the bridges during washing with a new paint system in place – heavy metal base coat w/zinc and two top coats of moisture cured urethane. However federal regulations require ongoing monitoring with NPDES permits so there will be opportunities to gather information in the future if WSDOT is still using bridge washing techniques/methods 15 -20 years from now when these bridge will need repainting.

East vs. West:
Ecology has required that an east side bridge painting project must be included in the translator study design. The May 2006 QAPP that was approved by Ecology states that receiving water and effluent from one western Washington bridge and one eastern Washington bridge will be collected for the study. WSDOT did propose to take effluent from a west side bridge and mix it with receiving waters from an east side river if an east side bridge was not scheduled for painting before the NPDEs permit expires. Ecology did not approve the proposal because it does not address the question if different environmental conditions/pollutants that would be found on the east side of the state (wind, sun, salt spray, Average Daily Travel, de-icing chemicals or road salt) affect metal solubility in a paint coating. Further, WSDOT has not submitted enough information to support an argument that the painting schedules addresses problems early enough in the life of the paint such that the metal solubility in the coating would not be affected by different environmental conditions.

To address both the lack of information and the funding issues associated with scheduling an east side bridge for painting (or repainting), Ecology has proposed the following:

- Use the monitoring results/ data from the two bridges selected for the translator study from the west side.
- Adjust the flow rates that are the limitations in the permit to protect water quality
- Modify the compliance schedule so WSDOT can complete the translator study in the next cycle of the permit or add a condition that requires WSDOT to verify the translators for the east side – both scenarios would include monitoring/sampling and data analysis as was done for the west side bridges.

For this permit cycle we can assume the translators, derived from data collected on west side projects, are representative for east side projects and derive flow limitations accordingly. The completion of the translator study would be used to verify this assumption and will require the

compliance schedule to be modified. It is expected that the data will either show no significant difference in metal solubility or that more of the metals are transitioning from a bound state to a dissolved state as influenced by environmental factors hypothesized above. WSDOT could be allowed to conduct a literature search on lead based paint systems and submit that information to Ecology along with proposal to forego the monitoring and analysis as described in the translator study Quality Assurance Procedures Plan. However, it should be noted that NPDES permits do require on-going monitoring so WSDOT will still end up collecting information on bridges for the east side at some point in a permit cycle. This ongoing monitoring requirement is connected with a more general permit condition and not with the translator study which requires more extensive laboratory analysis and reporting.

MAINTENANCE WASHING MONITORING
REASONABLE POTENTIAL ANALYSIS

Memo to File – Cowlitz River, I-5 Bridge
RE: NPDES Waste Discharge Permit No. WA-0039039- Routine Maintenance Washing Monitoring Results
April 25, 2008

Condition S.2
A. Wash Water and Pressure Wash Water Monitoring:
The permittee shall monitor wash and pressure wash water as follows:
1. Bridge and Ferry Transfer Span Maintenance Routine Washing
The permittee shall monitor one representative project (bridge or ferry transfer span) per year. The permittee shall collect a composite sample of effluent and analyze for total hardness, dissolved and total recoverable copper, dissolved and total recoverable lead, and dissolved and total recoverable zinc.

WSDOT has submitted sampling/monitoring results from 5 different routine maintenance wash events. All 5 of the reports do contain effluent sample for total hardness, dissolved and total recoverable copper, lead, and zinc. However, 4 of the 5 reports do not contain the following needed information.

Total Volume of Water Discharged to the River
Total amount of time spent washing the bridge.

The most complete report is for Bridge No. 5/203E at MP 59.06 on Interstate 5. The maintenance crew spent 1 day washing the bridge and some assumptions have to be made about the actual number of hours they spent washing. A total of 900 gallons was used to clean the bridge, and of that 900 gallons, ~ 450 gallons was discharged to the river. All of the effluent sampling was completed for metals, both total and recoverable but the background sampling is incomplete. Instead of using specific measurements, the background concentrations are reported as < and >. This approach sets the background lead concentration at a level that is higher than the WQ standards criteria and it cannot be determined if bridge wash discharge resulted in a violation or had the potential to violate water quality standards.

Because the report was incomplete, data on Cowlitz river background concentrations for copper, lead, and zinc were pulled from the Environmental Information System located on the Ecology website. Data on hardness was also pulled from this system for the Cowlitz River. The most recent data was used (from 2007 and 2008) resulting in 3 measurements for each metal, both total recoverable and dissolved. I calculated the average concentration from these measurements and used those values in the reasonable potential analysis. With the data from EIM, it was determined that the bridge wash discharge did not violate water quality standards.

It was noted that Condition S.2.A did not specifically require WSDOT to collect background samples and analyze them. Both agencies also reviewed the monitoring protocols developed by

WSDOT in 2004, when the permit was issued, and there are no instructions directing monitoring staff to collect background samples. There is also nothing in any of the monitoring conditions in the permit that require WSDOT to record the total volume of water used, total volume discharged to the river, and total number of hours spent washing the bridge. This oversight could be due to earlier studies conducted by WSDOT where all needed information was recorded except for amount of water discharged to the river on three of the four bridges that were washed for painting.

Cowlitz River/I-5 Bridge Analysis Summary (April 2008):

DATA REPORT
Background sample results
Hardness - <0.2 – this reading considered incorrect and information on hardness was pulled from the Environmental Information Management System at the Department of Ecology – updated hardness is 23.1 mg/L CaCO3 Cowlitz River at Kelso
Dissolved Copper – <6 – take half, 3 ug/L
Dissolved Lead – <40 – take half, 20 ug/L
Dissolved Zinc – <6 – take half, 3 ug/L

Effluent Sample Results
Hardness – 790 (highest)
Total Recoverable Copper - 420 ug/L
Total Recoverable Lead - 11000 ug/L
Total Recoverable Zinc - 7900 ug/L

Maintenance Staff work a 10 hour work shift
Assume 2 hours total setup/breakdown, 1 hour for lunch, 7 hours of work

Total Amount to wash the Bridge – 900 gallons
Total Amount Discharged to the River – 450 gallons
1 day to wash the bridge – 7 hours

450 gal/7 hours = 64.3 gal/hour
Take this amount and convert from gal/hour to cubic feet/second

WQ SPREADSHEETS; MASS BALANCE, CRITERIA, REASONABLE POTENTIAL

1. Mass Balance Spreadsheet: used the following data to calculate dilution factor and water hardness:
   Effluent flow = 0.002 cfs
   2.5% of the river flow = 174.25 cfs
   23.1 mg/L CaCO3 background hardness, pulled from EIM
   110 mg/L CaCO3 effluent hardness (Bridge Sample location South)
   Dilution factor = 87126
   Hardness = 23.1 mg/L CaCO3

2. We plug the hardness value into the criteria spreadsheet and get the following acute criteria for the three metals of concern:
   Copper – 4.28 ug/L
   Lead – 12.70 ug/L
   Zinc – 33.07

These are dissolved concentrations, not total recoverable

3. Using the Reasonable Potential Spreadsheet (see attached) and the data from the bridge washing report, plus the translators from Permit Writer's Manual, evaluate whether or not the discharge of wash water from this project resulted in a violation of water quality standards. In this case, the results are inconclusive because the background concentrations are higher than the criteria. The ambient or background data is reported as <40. For data reported in this fashion, typically divide that number in half (<20) but the resulting number is not an exact measurement so we cannot draw any final conclusions or set any limits on flow rates for maintenance bridge washing.

4. Due to inconclusive data above, pulled data from the Environmental Information Management System for more specific measurements on all three metals. The monitoring location 26B070 – Cowlitz River at Kelso is the closest location where data was collected on copper, lead, zinc, and hardness. The most recent data was pulled (from 2007 and 2008), resulting in three measurements for each metal, both total recoverable and dissolved. For reasonable potential analysis, the average calculation from the three measurements for each metal was used. Time of year that measurements were taken was the fall/winter season (see attached spreadsheets). The analysis shows there is not a violation of water quality standards (no limits needed on the effluent).

COWLITZ RIVER - I-5 BRIDGE
ENVIRONMENTAL INFORMATION MANAGEMENT SYSTEM DATA

Parameter Measured - EIM data	Dissolved (ug/L)	Total Recoverable (ug/L)	EPA Method
Copper- Feb 2008	0.81	2.19	200.8
Copper - Dec 2007	1.2	5.98	200.8
Copper - Oct 2007	0.65	1.65	200.8
Lead - Feb 2008	0.02	0.12	200.8
Lead - Dec 2007	0.034	0.44	200.8
Lead - Oct 2007	0.02	0.1	200.8
Zinc - Feb 2008	1	5	200.8
Zinc - Dec 2007	1.6	5	200.8
Zinc - Oct 2007	1.3	5	200.8
Hardness - Dec 2007	23.1 CaCO3 mg/L		SM2340B
Hardness - Oct 2007	27.4 CaCO3 mg/L		SM2340B

4/30/2009 2:39 PM
tsdcalc1007PLK COW3.xls

REASONABLE POTENTIAL CALCULATION

NPDES Permit No.

This spreadsheet calculates the reasonable potential to exceed state water quality standards for a small number of samples. The procedure and calculations are done per the procedure in Technical Support Document for Water Quality-based Toxics Control, U.S. EPA, March, 1991 (EPA/505/2-90-001) on page 56. User input columns are shown with red headings. Corrected formulas in col G and H on 5/98 (GB)

CALCULATIONS

Parameter	Metal Criteria Translator as decimal	Ambient Concentration (metals as dissolved)	State Water Acute	Max concentrat Acute Mixing Zone	LIMIT REQ'D?	Effluent percentile value		Max effluent conc. measured (metals as total recoverable)	Coeff Variation		# of samples	Multiplier	Acute Dil'n Factor
	Acute	ug/L	ug/L	ug/L			Pn	ug/L	CV	s	n		
Copper	1.00	0.8700	4.2800	0.88	NO	0.95	0.368	420.00	0.60	0.55	3	3.00	87126
Lead	0.47	0.0250	12.7000	0.20	NO	0.95	0.368	11000.00	0.60	0.55	3	3.00	87126
Zinc	1.00	1.3000	33.0700	1.57	NO	0.95	0.368	7900.00	0.60	0.55	3	3.00	87126

Page 1

Memo to File – Hoquiam River, Simpson Bridge
RE: NPDES Waste Discharge Permit No. WA-0039039-Routine Maintenance Washing
Monitoring Results
September 4, 2008

Condition S.2
A. Wash Water and Pressure Wash Water Monitoring
The permittee shall monitor wash and pressure wash water as follows:
1. Bridge and Ferry Transfer Span Maintenance Routine Washing
The permittee shall monitor one representative project (bridge or ferry transfer span) per year. The permittee shall collect a composite sample of effluent and analyze for total hardness, dissolved and total recoverable copper, dissolved and totoal recoverable lead and dissolved and total recoverable zinc.

WSDOT submitted a report containing monitoring results from the Simpson River Bridge spanning the Hoquiam River in Grays Harbor. The bridge was washed in April 2006. This wash event was for maintenance of the existing structure/coating. The bridge was not being painted.

The report did not contain all the information needed to conduct a reasonable potential analysis. Information missing was total volume of water discharged to the river, number of hours spent washing the bridge, background concentrations for copper, lead, and zinc, and the river flow at the time the bridge was washed. Upon request, WSDOT supplied the total volume discharged and the number of hours spent washing the bridge. I contacted David Hallock in the EAP program and obtained the river flow data for April 2007 because I could not find any flow data on this river on the USGS website or in the EIM database. The information he gave was the most recent data he had. Background concentrations for all three metals were pulled from the October 2003 Engineering report prepared by John Lenth with Herrera Environmental Consultants, Inc.

Once I obtained all the missing information, I did an individual reasonable potential analysis on the Simpson Ave Bridge. The results showed that the discharge from washing activities did not result in a violation to water quality standards. However, it should be noted that this analysis relied on generalized data for on the Hoquiam River.

Hoquiam Analysis Summary
September 2008

DATA REPORT:
Background Sample Results – no data was collected on background conditions. Instead, river flow data on the Hoquiam River was pulled from 2007 data from the EIM database and metals concentrations were pulled from the October 2003 engineering report.
Hardness 14 mg/L CaCO3
Copper – dissolved: 1.4 ug/L dissolved
Lead – dissolved: 0.7 ug/L dissolved
Zinc – dissolved: 5.30 ug/L dissolved

Effluent Sample Results
Hardness 21 mg/L CaCO3
Copper – total recoverable & dissolved: 320 ug/L total, 3 ug/L dissolved
Lead – total recoverable & dissolved: 470 ug/L total, 20 ug/L dissolved
Zinc – total recoverable & dissolved: 15000 ug/L total 600 ug/L dissolved

Total number of hours spent washing the bridge – 24 hours
Total volume of water discharged to the river – 5080 gallons
Discharge in CFS – 0.008

WQ SPREADSHEETS:
1. Mass Balance Spreadsheet: used the following data to calculate a dilution factor and water hardness
Effluent flow – 0.008 CFS
Effluent hardness – 21 CaCO3 mg/L
River flow 1130 CFS
River Hardness – 14 CaCO3 mg/L

2.5% Dilution Factor – 3532.25
Actual Hardness – 14.001 CaCO3 mg/L

2. Using the actual hardness from the Mass Balance Spreadsheet, water quality criteria for copper, lead and zinc are:
Copper - 2.67 ug/L
Lead – 7.20 ug/L
Zinc – 21.63 ug/L
These are dissolved concentrations

3. Using the Reasonable potential spreadsheet (attached) and the translators from the Permit Writers Manual, analyzed the bridge washing data and determined that the discharge from this project did not result in a violation to water quality standards.

4/30/2009 2:42 PM
Hoquaim River Simpson tsdcalc1007.xls

REASONABLE POTENTIAL CALCULATION

NPDES Permit No.

This spreadsheet calculates the reasonable potential to exceed state water quality standards for a small number of samples. The procedure and calculations are done per the procedure in Technical Support Document for Water Quality-based Toxics Control, U.S. EPA, March, 1991 (EPA/505/2-90-001) on page 56. User input columns are shown with red headings. Corrected formulas in col G and H on 5/98 (GB)

CALCULATIONS

Parameter	Metal Criteria Translator as decimal	Ambient Concentration (metals as dissolved)	State Water Acute	Max concentrat Acute Mixing Zone	LIMIT REQ'D?	Effluent percentile value	Pn	Max effluent conc. measured (metals as total recoverable)	Coeff Variation	s	# of samples	Multiplier	Acute Dil'n Factor
	Acute	ug/L	ug/L	ug/L				ug/L	CV	s	n		
Copper	1.00	1.4000	2.6700	1.67	NO	0.95	0.368	320.00	0.60	0.55	3	3.00	3532
Lead	0.47	0.7000	7.2000	0.89	NO	0.95	0.368	470.00	0.60	0.55	3	3.00	3532
Zinc	1.00	5.3000	21.6300	17.99	NO	0.95	0.368	15000.00	0.60	0.55	3	3.00	3532

Page 1

Memo to File – Wiskah River, Heron Street Bridge
RE: NPDES Waste Discharge Permit No. WA-0039039 – Routine Maintenance Washing, Monitoring Results
July 28, 2008

Condition S.2

A. Wash Water and Pressure Wash Water Monitoring:
The permittee shall monitor wash and pressure wash water as follows:
1. Bridge and Ferry Transfer Span Maintenance Routine Washing
The permittee shall monitor one representative project (bridge or ferry transfer span) per year. The permittee shall collect a composite sample of effluent and analyze for total hardness, dissolved and total recoverable copper, dissolved and total recoverable lead, and dissolved and total recoverable zinc.

WSDOT has submitted a monitoring report for the Heron Street Bridge that spans the Wishkah River in Aberdeen. This report does meet the requirements in Condition S.2 of the NPDES permit for the year 2008 but it does not contain all information needed to do an individual reasonable potential analysis. Therefore, other sources were utilized to collect needed information.

The report contains the following information:
- Name of the River
- Bridge # and Road MP
- Total number of hours spent washing the bridge
- Total volume of water discharged into the river

The results from the lab testing are included in the report. The samples were submitted to an accredited lab and measured for copper, lead, and zinc content, total and dissolved, using approved EPA method 200.7*.

Problems with the report
- Detection Levels are too high
- The River flow was not measured during the wash event

The detection levels were set at 30 ug/L (Pb), 20 ug/L (Cu), 40 ug/L (Zn). These levels are higher than the water criteria and were not low enough to detect metal concentrations in the background samples taken from the Wishkah River. To address the lack of information from the lab results on the background samples, the estimated 90th percentile background concentrations from a statewide data base (at the time of low flow) was pulled from the Water and Sediment Quality Impact Engineering Analysis dated October 2003. This data was used to conduct an individual reasonable potential analysis on the Heron Street Bridge Washing project.

An effort was made to pull flow data on the Wishkah River from the USGS website and Environmental Information Management System on the Department of Ecology website. No information could be found on the Wishkah River at either site. Instead flow data was pulled on the Hoquiam River, which has a comparable drainage to the Wishkah River (Hoquiam River Drainage, 98 sq. miles; Wishkah River Drainage 102 sq. miles). To date, the only flow data available on the Hoquiam River is from 2007 so that data was used in the analysis.

The analysis shows that this project did not result in a violation of water quality standards. See attached analysis write up and spreadsheets. With this added information, WSDOT now has a total of 3 reports from 3 different maintenance washing events with usable data that has all assumptions and data sources documented.

Wishkah/Heron Street Bridge Analysis Summary
July 2008:

DATA REPORT
Background sample results
Hardness – 27 mg/L CaCO3
Dissolved Copper – ND
Dissolved Lead –ND
Dissolved Zinc – ND
Since lab results for background were ND, used the data on background (average) from the October 2003 Engineering Report in the individual reasonable potential analysis.

Effluent Sample Results
Hardness – 65 mg/L CaCO3
Total Recoverable Copper – 470.00 ug/L
Total Recoverable Lead - 230.00 ug/L
Total Recoverable Zinc – 6100.00 ug/L
Sample results were reported in mg/L – converted to ug/L

Maintenance Staff worked a total of 24 hours washing the bridge
Total Amount Discharged to the River – 400 gallons

400 gal/24 hours = 16.67 gal/hour
Take this amount and convert from gal/hour to cubic feet/second

WQ SPREADSHEETS; MASS BALANCE, CRITERIA, REASONABLE POTENTIAL

1. Mass Balance Spreadsheet: used the following data to calculate dilution factor and water hardness:
   Effluent flow = 0.001 cfs
   27 mg/L CaCO3 background hardness
   65 mg/L CaCO3 effluent hardness
   Dilution factor = 12851
   Hardness = 27 mg/L CaCO3
   (Mass Balance Spreadsheet attached)

2. We plug the hardness value into the criteria spreadsheet and get the following acute criteria for the three metals of concern:

Copper – 4.96 ug/L
Lead – 15.14 ug/L
Zinc – 37.74 ug/L

These are dissolved concentrations, not total recoverable

3. Using the Reasonable Potential Spreadsheet (see attached) and the data from the bridge washing report, plus the translators from Permit Writer's Manual, evaluate whether or not the discharge of wash water from this project resulted in a violation of water quality standards. Results from the analysis show the project did not result in a violation of water quality standards.

4. River flow was not measured for the Wishkah River at the time the Heron Street Bridge was washed. The USGS website and the Environmental Information Management Database on the Ecology website did not contain any flow data for Wishkah River. However, the Hoquiam River is comparable drainage basin and flow data from May 2007 was used for reasonable potential analysis.

REASONABLE POTENTIAL CALCULATION

NPDES Permit No.

This spreadsheet calculates the reasonable potential to exceed state water quality standards for a small number of samples. The procedure and calculations are done per the procedure in Technical Support Document for Water Quality-based Toxics Control, U.S. EPA, March, 1991 (EPA/505/2-90-001) on page 56. User input columns are shown with red headings. Corrected formulas in col G and H on 5/98 (GB)

CALCULATIONS

Parameter	Metal Criteria Translator as decimal	Ambient Concentration (metals as dissolved)	State Water Acute	Max concentra Acute Mixing Zone	LIMIT REQ'D?	Effluent percentile value		Max effluent conc. measured (metals as total recoverable)	Coeff Variation		# of samples	Multiplier	Acute Dil'n Factor
	Acute	ug/L	ug/L	ug/L			Pn	ug/L	CV	s	n		
Copper	1.00	2.7000	4.9600	2.81	NO	0.95	0.368	470.00	0.60	0.55	3	3.00	12851
Lead	0.47	7.2000	15.1400	7.22	NO	0.95	0.368	230.00	0.60	0.55	3	3.00	12851
Zinc	1.00	21.6000	37.7400	23.02	NO	0.95	0.368	6100.00	0.60	0.55	3	3.00	12851

used Hoquiam River Flow
from 2007 - Wishkah data
not available on the web

Page 1

PREPARATORY WASHING MONITORING
REASONABLE POTENTIAL ANALYSIS

Memo to File
RE: NPDES Waste Discharge Permit No. WA-0039039 – Waste Specific Translator Study Results
April 9, 2008

Condition S.6
A. Waste Specific Translator
The permittee is allowed to discharge filtered waste water resulting from pressure washing to rivers with flows between 55 cfs and 4200 cfs (7900 cfs in Westen Washington) only if the permittee is in compliance with the following condition to develop a waste-specific translator or a comparable assessment that further defines the effluent characteristics or mixing zone effects:

By Spring of 2005 the permittee shall submit to Ecology for review and approval a study plan to develop a waste-specific translator or comparable assessment. The plan shall identify the University contractor, contain the quality assurance plan for the chemical analysis, and the time schedule for completing the study within the period of this permit. The objective of the study is to determine the dynamics of conversion of total recoverable metal in the effluent to dissolved metal in the receiving water.

Quality Assurance Project Plan: WSDOT Bridge Washing Waste Translator Study – final draft approved May 2006
(First submittal was received at Ecology in June 2005)

BRIDGE WASHING PROJECT – DATA COLLECTION
Western Bridge Data Report dated January 2008
Lewis & Clark Bridge
Columbia River

Review and Conclusions to date:
The results from the samples collected at a washing event on the Lewis and Clark Bridge show that WSDOT has the potential to violate water quality standards for zinc at flows below 524 cfs. The attached spreadsheets and summary show the analysis that was done using the data from Tables 1 & 2 in the data report. Table 1 contains the experimental design parameters and Table 2 contains the sample results for wash effluent coming off the bridge and the background conditions of the Columbia at the time the samples were collected.

The results in Table 2 show the effluent concentrations for Zinc are very high. Further inquiry produced the following communication (e-mail dated March 27, 2008) from the consultant in charge of the data collection team, John Lenth with Herrera Environmental Consulting Inc.

In follow-up to our phone conversation, the high total zinc concentration in the second effluent sample from the Lewis and Clark Bridge was likely related to high flows that were generated when washwater from all the operating pressure washers concentrated in a relatively small area within the containment system. These high flows subsequently mobilized dirt and metal fragments from the corrugated metal support structure for the filter tarp containment system. As shown in the attached photo, there is rust

visible on the corrugated metal which suggests it was likely crumbling in places. Based on observations made by our field personnel, similar high flows were not observed during the collection of the first and third effluent sample. The attached e-mail from Gina Catarra documents these observations. I've also attached and e-mail from Linda Bingler of Battelle that verifies there were no anomalies in the laboratory analyses for the second effluent sample.

The communication indicates the results from the Lewis and Clark Bridge may be an anomaly. At this time, the translator study is not complete so no final conclusions can be made. The study requires that data be collected from two separate wash events. A second project is scheduled and WSDOT should submit a second data report from that project.

Analysis Summary
April 2008:

DATA REPORT
Background – measured hardness and dissolved metals concentration for Copper, Lead, and Zinc
Results for Lewis and Clark:

Hardness 62.8 mg/L as CaCO3
Dissolved Copper – 0.32 ug/L
Dissolved Lead – 0.021 ug/L
Dissolved Zinc – 0.819 ug/L

Effluent Sample Results – measured hardness and total recoverable metals for Copper, Lead and Zinc

Hardness 163 mg/L CaCO3
Total Copper – 328 ug/L
Total Lead – 23,050 ug/L
Total Zinc – 31,592 ug/L

Table 1 Experimental Design Parameters – see data report

WQ SPREADSHEETS; MASS BALANCE, CRITERIA, REASONABLE POTENTIAL
1. Using the Mass Balance Spreadsheet and Table 1 parameters, determined actual Hardness:

Low flow hardness of 63.7
High flow hardness of 63.1

These are the numbers that are plugged into the Criteria spreadsheet.

2. Using the hardness numbers above we get the following acute criteria for the three metals of concern in ug/L for low and high flows.
Acute Criteria:

Copper – 11.03L 11.13H
Lead – 38.99L 39.39H
Zinc - 77.48L 78.10H

These are dissolved concentrations, not total recoverable

3. Using the Reasonable Potential Spreadsheet (see attached) and the data from Tables 1&2, plus the translators that were developed and listed in the data report, we do the following:

a. Evaluate whether or not the discharge of wash water from this project resulted in a violation of water quality standards. In this case, there was no violation for discharges going into the Columbia River.

b. Find the flow rate where the discharge of effluent causes a violation of water quality standards. To do that, find the dilution factor where a limit is triggered in the reasonable potential spreadsheet

c. Use dilution factor and the effluent discharge rates from Table 1 in the data report in the mass balance spreadsheet to determine what 2.5% of the total flow will be.

d. Once we have that value (2.5% of total flow available for mixing), we can then set up an equation to find the missing total flow value. Do that for each metal, low and high flow scenarios. We end up with the following flows (in CFS) where there is potential to violate standards for each metal:

Final Results:

Copper – Acute (2.5% of river available for mixing zone)
22.4 CFS Low flow - 3 pressure washers
44 CFS High Flow – 6 pressure washers

Lead – Acute
83.2 CFS Low flow – 3 pressure washers
168 CFS High Flow – 6 pressure washers

Zinc – Acute
524.8 CFS Low Flow - 3 pressure washers
1057.60 CFS High Flow - 6 pressure washers

We take the metal with the highest low flow where there is a potential to violate standards and that becomes the lowest flow at which WSDOT can discharge wash water. However, these results are not final conclusion because the study is not complete – more data needed.