Fact Sheet Amendment

for

Modification of NPDES Permit No. WA0039039

On January 11, 2013, the Washington Department of Transportation (WSDOT) submitted a request to modify certain bridge washing procedures stipulated in National Pollutant Discharge Elimination System (NPDES) Permit No. WA0039039. Based on two submitted studies, WSDOT requested that Ecology modify the permit to allow maintenance washing of bridge structures on an annual basis without having to dry clean prior to washing. WSDOT also requested that Ecology remove the requirement to place tarps over riprap found underneath and around bridge abutments during the maintenance activity, due the lack of environmental protection the tarps provided and for reasons of safety for maintenance personnel. After reviewing the provided information, Ecology concurs with these requests.

Ecology proposes the following modifications to Permit No. WA0039039:

I. **Correction of Application for Permit Renewal date in the Summary of Report Submittals**

Basis: 180 days prior to the expiration date is 07-12-2014. The current date of March 1, 2013 is corrected to July 12, 2014.

II. **Condition S1.B.5 is modified to allow annual washing without prior dry cleaning steel truss bridges cleaned the previous year and to require bridges not cleaned the previous year to be dry cleaned prior to washing.**

Basis: WSDOT collected effluent samples from four different bridges over a period of two years. WSDOT had the samples analyzed at an accredited laboratory for total recoverable and dissolved metal concentrations of copper, lead, and zinc. WSDOT also voluntarily collected additional metals data on ambient conditions as well as hardness, and provided all the information needed to conduct an individual reasonable potential analysis on each bridge. The analysis done to determine flow limits for annual maintenance washing without prior dry cleaning supports modifying the permit to allow this activity.

WSDOT chose 4 different scenarios to test the necessity of dry cleaning prior to an annual washing. Two of the bridges were cleaned per the conditions of the NPDES permit in the first year of the study and then washed without prior dry cleaning in the second year.

The 4 different scenarios are as follows; WSDOT:

1. Washed a bridge that was entirely cleaned and painted within one year without using the BMPs of the current permit.
2. Washed a bridge that was entirely cleaned within one year without using the BMPs of the current permit.
3. Washed a bridge that was not cleaned in the past five years using the BMPs of the current permit. (Year 2 of the study, this bridge was cleaned without prior dry cleaning.)
4. Washed an eastside bridge that was not cleaned in the past five years using the BMPs of the current permit. (Year 2 of the study, WSDOT did have to remove bird guano but otherwise did not clean the entire bridge and simply washed the bridge).

WSDOT decided to continue the study and requested an extension which was approved by Ecology. WSDOT washed the same bridges from the initial study once again. The scenario for the 4 bridges in the 3rd year of the now extended study was the same as #2 from the above list. They then added 5 more bridges which also fall under scenario #2. The year 3 results were added to the initial study results and the analysis was redone to include Year 3 data.

The study and follow up analysis supports annual washing of bridges without prior dry cleaning when used in conjunction with timing windows. All of the bridges used in the study were over rivers that exceeded the required minimum CFS (cubic feet per second) needed to ensure that an adequate mixing zone existed at the time of washing. When comparing the 95th percentile values of bridges cleaned in the dry and bridges that were washed annually, the level of total recoverable metals for copper, lead and zinc were lower. These results indicate that annual flushing can reduce the amount of pollutants discharging into waters of the state during a given bridge washing project. Additionally, the more frequent washing (1 year or less) will minimize debris build up on a bridge being washed.

Analysis

Ecology used the previous analysis for authorizing a mixing zone and determining necessary flow limits for bridge preparatory washing under the current permit for this study. The intent was to determine the minimum amount of flow needed to meet water quality standards and if those flows were achievable or were of such volume (in CFS) that annual maintenance washing without dry cleaning would be prohibited. In the event that flow limits were too high, WSDOT would have to continue operating with the dry cleaning restriction.

To conduct the reasonable potential analysis, Ecology used the:

- Generalized hardness pulled from the translator study to represent state wide background conditions and obtain water quality criteria.
- Average background or ambient conditions from the translator study.
- Approved translators from the translator study.
- Effluent data from all 9 bridges*.
- Total number of hours spent washing a bridge.

- Total volume of water used to wash the bridge.

An average effluent flow for a washing event was calculated using the total number of hours and total volume of water used to wash a bridge.

Ecology calculated dilution factors for copper, lead and zinc using the 95th percentile of total recoverable metal concentrations in a reasonable potential analysis (see attached spreadsheets). The resulting dilution factors were then used to calculate the flow limits needed to meet water quality standards using a volume to volume relationship.

*Ecology ran the analysis using data from all 9 bridges for all three years and it was run again using data from all 9 bridges minus 2010 data on the Solduc #5 bridge and Naches River EB Bridge. The 2010 data from these two bridges was removed to determine if the resulting analysis was significantly affected by using data on bridges that were cleaned in the dry first before washing.

Results

In this type of analysis involving dissolved concentrations for 3 metals, one metal will be the limiting factor i.e. requiring the highest minimum flow. For this study, zinc was the limiting metal requiring a minimum of 412 cubic feet per second. The following table provides the results of the analysis from the initial study (2 years of data) and the extended study (3 years of data).

Initial Study (2 years)	Copper	Lead	Zinc
25 samples	DF 33 = 52 CFS River flow	DF 127 = 202 CFS River Flow	DF 97 = 154 CFS River flow
33 samples	DF 32 = 50 CFS River flow	DF 118 = 188 CFS River Flow	DF 92 = 146 CFS River flow

Extend Study (3 years)	Copper	Lead	Zinc
61 samples	DF 68 = 102 CFS River Flow	DF 52 = 78 CFS River Flow	DF 272 = 412 CFS River flow
69 samples	DF 56 = 84 CFS River Flow	DF 50 = 75 CFS River Flow	DF 232 = 352 CFS River flow

Conclusion

Ecology modified Special Condition S1.B.5 to allow annual washing without a prior dry cleaning provided no nesting colonies of birds are present and provided the river flow is greater than or equal to 412 CFS.

III. Condition B.2 a-c modified to allow the Ecology approved groundwater protocol. This protocol was updated on February 8, 2013 removing the requirements for tarping riprap under bridge structures during maintenance washing.

When the permit was reissued on December 12, 2009, WSDOT was authorized to discharge wastewaters to ground provided they submitted a plan or protocol to Ecology for review and approval describing methods that will be used to determine if the discharge was appropriate. WSDOT did submit a plan to Ecology for review in February of 2010. Ecology approved the protocol on March 9. 2010. The protocol was based on a groundwater study, *Water Quality Impact Evaluation – Ground Disposal of Effluent from WSDOT Preparatory Bridge Washing,* dated January 2008. WSDOT hired John Lenth of Herrera Environmental Consultants, Inc. to conduct the study. The WSDOT protocol was added to the permit as an Appendix (Appendix C).

Basis for removing tarping requirements: The requirement to cover riprap is a BMP designed to reduce levels of residual pollutants that could be deposited onto riprap during bridge washing. Currently the permit does not allow the discharge of wash water to dry stream beds or to upland areas where the wash water cannot be infiltrated to ground without resulting in impacts to groundwater. The wash water must be infiltrated in areas where depth to groundwater is deep enough to provide soil treatment through infiltration or the wash water must be directed to flowing water where adequate mixing can occur.

The concern is based on the unknown amount residual pollutants that can collect on impervious surfaces such as riprap and whether or not there is an initial flush with potential to violate WQ standards, when the riprap becomes inundated during higher flows. The initial approach addressing this concern is to require WSDOT to cover the riprap with tarps and direct the wash to the wetted/flowing channel. The current request to remove this requirement is based on worker safety concerns and the questionable effectiveness of the BMP.

In evaluating WSDOT's request, Ecology considered the following points:

1. Existing levels of pollutants on riprap – the riprap may already have existing residual pollutants from stormwater runoff and dust from the roadway.
2. Pollutant loading – the actual amount of pollutant loading from any given washing event may be very low and not discernible over existing levels of pollutants already present.
3. As observed during site inspections, wash water is not evenly spread out over rock surfaces. Some surfaces may be thoroughly wetted and others may only get partially wetted and some not all. This condition also makes it difficult to analyze the amount of residual pollutants left behind on rock surfaces after a wash event.
4. Levels of metal concentrations – a higher volume of water is used for maintenance washing, providing more dilution than preparatory washing, and metal concentration levels are generally lower when the bridges are annually washed.
5. Washing window – WSDOT is conducting this activity during the higher winter flows so rocks closest to the water during low flow are typically inundated during the wash event. It is assumed that the rocks not inundated during a wash event would need a much higher flow to actually be inundated and the higher the flow, the lower the potential for violating WQ standards from the initial flush of pollutants coming off riprap.

6. The volume of water falling between individual pieces of riprap and infiltrating into soil is assumed to be minimal as the delivery of wash water is infrequent and similar to rainfall and not a concentrated stream of effluent directed the ground. Even if depth to groundwater is less than required when there is intentional discharge of wash water for the purpose of infiltrating, the volume of water is considered so minimal as to not constitute a concern for impacting groundwater.

Ecology has concluded that it can remove the requirement for tarping riprap during maintenance washing. The activity is conducted at higher flows when the near shore environment is more likely to be covered with flowing water and the volume of water actually reaching exposed riprap is minimal. Ecology will continue documenting maintenance washing procedures through ongoing site inspections of wash events.