

**FERRY TERMINAL PAINT-PREP WASHING  
AND  
PAINTING BELOW THE OHWL  
PROTOCOLS FOR NPDES PERMIT WA-0039039  
(MARCH, 2010)**

Cleaning of ferry terminal transfer spans in Washington State is done to allow for routine visual inspection, maintain structural integrity, and to prepare for painting. Washing and cleaning in preparation for painting is typically completed by contractors, while maintenance washing and cleaning of transfer spans is performed by WSDOT crews. The permit is only allows paint preparatory washing above the OHWM. This protocol is specific to washing and cleaning of transfer spans in preparation for painting and for painting of steel structures below the Ordinary High Water Line (OHWL).

The water generated during the washing process that comes into contact with paint and accumulated debris (dirt, moss, sediments, bird nests and associated fecal material, marine growth, etc.) on the structures can pick up contaminants that have the potential to affect the quality of receiving waters. WSDOT's NPDES Waste Discharge Permit (#0039039) stipulates that this water discharged (wash water) from paint prep washing (high pressure, low volume) must be tested to evaluate whether the discharge of wash water represents a reasonable potential to exceed water quality standards. The permit requires that this testing be done on one bridge or transfer span each year.

Painting below the Ordinary High Water Line (OHWL) does not include preparatory washing activities but has the potential of leaching chemicals into marine waters while the paint fully cures. The permit requires toxicity testing be done once a year on water samples taken in the vicinity of a structure component painted below the OHWL during the first tide cycle that covers the painted area.

The transfer span to be monitored is selected by WSDOT's Terminal Engineering Office. This office should submit a list of proposed monitoring projects to WSDOT's Environmental Services Office (ESO) at the beginning of each year. The ESO will add any planned monitoring or special studies and forward the list to the Department of Ecology (Ecology) per condition S3.B of the NPDES permit. The list must be submitted at least 30 days before projects are expected to begin.

## **1. FERRY TERMINAL PREPARATORY WASHING**

The basic procedure to re-paint a transfer span is to select a section of the transfer span and:

- Install a filter tarp underneath the area to be cleaned and painted,
- Use dry cleaning methods to remove debris and paint chips,

- Wash transfer span structures with high pressure-low volume water during the maximum daily tidal flow,
- On occasions sandblasting may be performed to remove additional rust and requires full containment. The structure then may be washed to remove blasting dust.
- Apply primer and paint.

Once completed, the tarp is moved to a different section of the transfer span and the procedure is repeated. Wash water is generated when the transfer span is pressure washed after the dry cleaning. Wash water falls on and filters through the tarp, eventually discharging to the area under the transfer span. As will be described below, the samples finally collected will be used to characterize this filtered discharge water resulting from the cleaning process.

The time to clean and paint each section is mainly a function of the size of the area that is being worked on. However, pressure washing a section of a transfer span typically is completed in a single day. Therefore, this sampling protocol is designed to be completed in one day (or night).

The methods used to collect samples of wash water will be somewhat specific to the transfer span being cleaned in preparation for painting. The basic procedure is to collect samples from three different locations under the filter tarp.

Wash water will usually discharge in a single stream through low or depressed areas in the filter tarp under the section of transfer span being cleaned. It is in these areas where wash water will be collected. It is recommended that the sample container used has a large opening (e.g., a five-gallon bucket) for ease of sample collection, and that the sampling areas are located under areas of the transfer span likely to be pressure washed with a significant amount of water. Water from the sample containers will be used to fill sample bottles.

One potential difficulty related to this sampling method is that a boat or temporary work platform may be necessary to collect samples of wash water and/or grab samples of the receiving water. If a boat or work platform is needed, additional project coordination will be necessary. For instance, if a boat is used, additional logistics such as procuring a boat, finding a place to launch it, navigating the boat to the desired location, and securing the boat in one spot long enough to collect a composite sample will have to be considered.

Grab samples of the receiving water (background) should also be collected 100 to 200 feet “up current” of the project area to assess for background concentrations. Care should be taken not take background samples in areas where there are discharges from culverts or drains as these areas may have high concentrations of metals. If taking the sample ‘up current’ is not possible, the sample may be taken off to the sides of where the structure was painted as long as this location is outside the area of influence from washing activities. The location where the background sample is collected should be documented and included in the report.

The grab samples can be collected directly from the receiving water using a “dip-and-take” method (see Sample Collection Section below) from the terminal or from a boat. If using a

motorized boat, care should be taken that the sample is not collected down current of the boat motor.

The labeled sample bottles should be delivered to an accredited laboratory for analysis.

The wash water composite samples will be analyzed for total and dissolved copper, lead, and zinc. One composite sample of the wash water from preparatory washing will also be analyzed for acute toxicity to zooplankton (*Ceriodaphnia dubia*, *Daphnia pulex*, or *Daphnia magna*) and to Fathead minnow (*Pimephales promelas*).

## FIELD PREPARATION

It is critical to coordinate with the lab that will perform the testing to insure the amount of volume required is collected and whether or not the samples need to be preserved or filtered in the field.

- Order supplies from laboratory. The order should include (assumes three sample locations under the filter tarp, one from the receiving water, and one extra bottle for backup/field duplicate):
  - ▲ Five (5) - 500 ml bottles preserved with HNO<sub>3</sub> (preservative only necessary if lab requires for testing).
  - ▲ Five (5) - 500 ml bottles without any preservative.
  - ▲ One (1) – 10 L (2.5 gallon) container.
  - ▲ Labels for bottles
  - ▲ Chain of custody form.
  - ▲ Dilute (10%) HCl in a squirt bottle for container washing.
  - ▲ Deionized distilled water in a squirt bottle for container rinsing.
  - ▲ Filtering system, if lab requires certain samples filtered in the field.
- Collect the following equipment:
  - ▲ Four (4) cleaned five-gallon buckets with lids and handles
  - ▲ Field notebook and monitoring form (See attached example)
  - ▲ Camera
  - ▲ Sharpie/pencils
  - ▲ Pre-labeled sample bottles
  - ▲ Small funnel for filling containers and sample bottles
  - ▲ Three (3) large cooler(s) with ice
  - ▲ Bubble wrap
  - ▲ Safety equipment (gloves, goggles, reflective raingear, hardhat, earplugs, work boots, flashlight, personal flotation device if applicable)
- Put on safety goggle and gloves, and rinse sample buckets with a 10% HCl solution and then rinse with deionized water, and cover with plastic lids to prevent contamination.

(Note: Use new buckets or clean and scrub the buckets with soap and hot water before rinsing with 10% HCl solution). The rinsate may be disposed of in a sink.

- Sample bottles should be organized and labeled (for example, Lewis and Clark Bridge, Site #1, date, analytes). Sample bottles should also be labeled as to the timing and location of the sample.
- Call the contracted laboratory and coordinate sample pick-up or delivery. Samples should be received by the laboratory within 36 hours of collection.

## Sample Collection

The following procedure should be implemented during transfer span paint prep activities:

- Select three sampling locations under the filter tarp along the section of the transfer span being pressure washed. They should be in areas likely to receive a significant amount of wash water (e.g. directly under vertical support structures or in areas with heavy buildup of debris), and where water would be expected to flow through the tarp (e.g., “low” spots where water will collect and flow through). Depending on where pressure washing is being conducted, it may be necessary to use a boat or temporary work platform to collect samples.
- Use a bucket to collect discharge under the filter tarp. This is done by placing or holding the bucket under the discharge stream. Once the bucket is approximately  $\frac{3}{4}$  full, use a funnel to fill a 10-L pre-labeled container. This water will be analyzed for acute toxicity to waterfleas (*Daphnia*) and Fathead minnows, and should be placed on ice (i.e., maintained at 4°C) immediately after collection. If necessary, fill the bucket again with effluent discharge to fill the sample bottles to test for the other analytes.
- Use buckets to collect discharge from two additional locations of the preparatory washing activity and follow the process outlined above.
- Collect a grab sample from the receiving water from an “up current” location. Select a location 100 to 200 feet “up current” of the transfer span, and away from the shoreline where any culverts or outfalls may be located for collecting samples from the receiving water. The sample should be taken on the same day that the wash water collection is being performed.
- If a boat is used or the receiving water is “wadeable”, use a “dip-and-take” method to directly fill each sample bottle. Using this method, simply submerge the sample bottle below the surface of the water until the bottle is full. Place lid on bucket to prevent contamination. If in a boat with a motor, do not collect your sample downstream of the motor.
- Complete all fields on chain of custody.

## Sample Preparation

Verify with the lab performing the analysis the actual quantities of effluent needed to perform each of the tests. Also verify whether any samples need to be filtered in the field, or placed in containers with preservatives. These requirements are typically dependent on how long it will take to deliver the samples to the lab for processing.

The following procedures can be completed on-site or at a more convenient location (Note: The 10-L container for toxicity testing has already been filled on-site, placed in a cooler with ice, and simply needs to be shipped to the laboratory with the rest of the samples once they are prepared unless you are using different laboratories for metals analysis and toxicity testing):

- Select the 1<sup>st</sup> sample bucket collected from the wash water (after passing through the #100 sieve tarp) and swirl gently to ensure sample is well-mixed
- Using a small funnel, carefully pour water from the bucket into the sample bottles. Fill to approximately the “shoulder” of the sample bottle. Fill pre-labeled sample bottles as follows:
  1. One (1) 500 ml bottle with no preservative (for dissolved copper, lead, and zinc)
  2. One (1) 500 ml bottle preserved with HNO<sub>3</sub>, if required by lab for total copper, lead, and zinc.
- Repeat above steps for the remaining samples, including water collected from the receiving water at a location 100’ to 200’ from the painting location.
- An additional set of sample bottles are filled from one of the composite samples. These will serve as a field duplicates.
- Wrap samples in bubble wrap and place in cooler(s) with ice (i.e., maintained at 4°C).
- Fill out a chain-of-custody form (see example attached to this appendix)
- Ship or deliver cooler(s) with 10-L container and sample bottles to the laboratory. Include chain-of-custody form with cooler(s). Select appropriate shipping option to ensure that the cooler(s) arrive at the laboratory no later than 36 hours after sample collection (see Laboratory Procedures below)

## 2. PAINTING BELOW THE OHWL

The basic procedure for painting below the OHWL is to select the area and:

- Install a full containment system around the area to be cleaned and painted,
- Use dry cleaning methods to remove debris and paint chips,
- Apply primer and/or paint.

Preparatory wash water is not used for this procedure. The sample of receiving water taken within 3 feet and down current to the freshly painted structure below the OHWL will be for acute toxicity to Opossum shrimp (*Americamysis bahia*) and Topsmelt fish (*Atherinops affinis*).

The permit does not require metals analysis on the samples collected for Below the OHWM painting.

## Field Preparation

Order supplies from laboratory for performing toxicity testing using EPA Method 1669, Clean Hands/Dirty Hands, to collect samples. It is critical to coordinate with the lab that will perform the testing to insure the amount of volume required is collected and to insure the sampling equipment is properly prepared (cleaned and sealed) for this testing procedure.

Collect the following supplies:

- ▲ Field notebook
- ▲ Thermometer for collecting water and air temperature
- ▲ Camera
- ▲ Sharpie/pencils
- ▲ Peristaltic pump or Plastic Sampling Rod –
- ▲ (1) large cooler with ice Bubble wrap
- ▲ Safety equipment (gloves, goggles, reflective raingear, hardhat, earplugs, work boots, flashlight, personal flotation device if applicable)
- ▲ Chain of Custody forms

NOTE: All other sampling equipment should be provided by the lab in sealed containers.

## Sampling Collection

- Sampling will be done using EPA 1669 (commonly referred to as the ‘clean hands/dirty hands’ method’). This includes (but not limited to):
  - All sampling equipment and sample containers are cleaned and bagged at the laboratory.
  - Sampling personnel are required to wear clean, nontalc gloves at all time.
  - In addition to processing field blanks at the site, a field duplicate must be collected at each sampling site.
  - Using two people to take samples
- Samples shall be taken within three (3) feet of painted surface on the “down current” side of the structure. This may be done with peristaltic pump or with a sample bottle on the end of a plastic rod. If it is the done with the rod, the sample bottle may need a closable lid to sample water in the vicinity of the painting, depending on the distance down in the water column. The samples should be placed on ice immediately after collection and maintained at 4°C until delivered to the lab.
- Samples shall be taken during the first tidal inundation when at least ½ of the painted structure is covered with water – do not take samples at slack tide. You must have flowing water when you take the sample and be down current of the structure.

- Toxicity testing shall be done with the samples using marine species as outlined in Ecology’s publication no. WQ-R-95-80 *Laboratory Guidance and Whole Effluent Toxicity Test Review Criteria* (WET Test).
- Although not required under the permit, it is recommended that toxicity testing be performed on a sample from the receiving water taken 100’-200’ ‘up current’ of project.

In addition the following data needs to be collected:

- Temperature of the receiving water at the time sampling is performed.
- Temperature of the air at the time painting is performed.
- Temperature of the air at the time sampling is performed.

### Sample Preparation

The sample containers provided by the laboratory for toxicity testing have been filled on-site and placed in a cooler with ice. The samples simply need to be shipped to the laboratory performing the test – don’t forget the chain of custody forms.

### 3. Laboratory Procedures For All Testing

Analytical parameters and methods, detection limits, preservation methods, and holding times for samples collected during monitoring are summarized in Table 1. The laboratory selected must be registered or accredited under the provisions of, Accreditation of Environmental Laboratories, Chapter 173-50 WAC. Any toxicity testing will be done in accordance with Ecology’s Publication no. WA-R-95-80 (Revised December 2008) *Laboratory Guidance and Whole Effluent Toxicity Test Review Criteria*, also known as Ecology’s WET testing. The laboratory will also be responsible for internal QA checks.

TABLE 1. PARAMETERS AND SAMPLE ANALYTICAL METHODS.				
Parameter	Method Type	Method Number	Detection Limit <sup>(1)</sup>	Holding Time
<b>Total and Dissolved Copper</b> Wash Water & Receiving Water	ICP/Mass Spectrometry	200.8 <sup>(3)</sup>	0.4 µg/L	6 months
<b>Total and Dissolved Lead</b> Wash water & Receiving Water			0.1 µg/L	
<b>Total and Dissolved Zinc</b> Wash Water & Receiving Water			0.5 µg/L	

<b>Acute Toxicity – Freshwater</b> <i>Ceriodaphnia dubia</i> , <i>Daphnia pulex</i> , or <i>Daphnia magna</i> Wash Water	48-hour static test	EPA 821-R-02-012& Ecology WET Test <sup>(5)</sup>	Not applicable	36 hours
<b>Acute Toxicity – Freshwater</b> <i>Pimephales promelas</i> Wash Water	96-hour static-renewal test	EPA 821-R-02-012& Ecology WET Test <sup>(5)</sup>		
<b>Acute Toxicity – Marine Water</b> <i>Americamysis bahia</i> <sup>(4)</sup> Receiving Water	48-hour static test	EPA 821-R-02-012& Ecology WET Test <sup>(5)</sup>	Not applicable	36 hours
<b>Acute Toxicity – Marine Water</b> <i>Atherinops affinis</i> Receiving Water	96-hour static-renewal test	EPA 821-R-02-012 & Ecology WET Test <sup>(5)</sup>		
<p>(1) mg/L = milligrams/liter µg/L = micrograms/liter</p> <p>(2) APHA Standard Methods, 1992.</p> <p>(3) U.S. Environmental Protection Agency (EPA) Publication EPA/600/R-94-111.</p> <p>(4) <i>Menidia beryllina</i> may be used in lieu of <i>Americamysis bahia</i> with written permission from Ecology.</p> <p>(5) Ecology’s Publication no. WA-R-95-80 (Revised December 2008) <i>Laboratory Guidance and Whole Effluent Toxicity Test Review Criteria</i></p>				

#### 4. Final Report for All Sampling Projects

Submit monitoring report, including test results, to the Statewide Permit Coordinator at ESO upon completion of the monitoring effort. The Statewide Permit Coordinator will be responsible for submitting the report to the Department of Ecology.

Reports for preparatory washing shall include the applicable items listed in the NPDES permit under Section S2.A.1 & 2 which include:

- The date, including year, and time of day samples were collected
- The location where sample was collected (both effluent and background samples)
- The total volume of water discharged to surface waters, reported in gallons
- The number of hours spent actually washing the structure
- The specific detection limits provided to the lab for analysis (provided in table above)
- Copies of any field notes

Reports for painting steel structures below the OHWL shall include those items listed in the NPDES permit under Section S6.C which includes:

- The name of the Ferry Terminal
- The location where the sample was collected
- The time of day or night the sample was collected and date/year
- The time the piling was, wing wall or ladder was painted
- Name and contact information of the person collecting the sample(s)
- The paint product that was used (include full paint system)
- The temperature of the receiving water
- The temperature of the air at the time the structure was painted
- The temperature of the air at the time the sample was collected
- Copies of the chain of custody forms
- A brief narrative describing the project/work that was completed
- Photos of the sampling location/work area

The attached monitoring forms can be used in the field to insure all the necessary information is collected and documented.

### **5. Consider For All Reports:**

Include an aerial photograph showing the location of the terminal, painting locations, and sampling locations if at all possible. Consider taking photographs of the work area, BMPs used including sieve tarp or full containment system, preparatory washing being performed, monitoring being performed, etc. These photographs are very beneficial when included in the report and will provide Ecology and ESO with a clear understanding of the work/monitoring performed under this permit.

## FERRY TERMINAL PREPORATORY WASHING –MONITORING FORM

Name of Terminal:
County & Tidal Reference Area:
Project Date (month and year):
Sampling Date(s) & Time of Day:
Number of pressure washer used:
Total number of hours spent prep washing the ferry transfer span:
Total volume of wash water discharged into the waterbody:
Receiving water (background) sample taken for: <input type="checkbox"/> Copper – total & dissolved: <input type="checkbox"/> Lead – total & dissolved: <input type="checkbox"/> Zinc – total & dissolved:
Location the receiving water sample taken:
Effluent samples taken for: <input type="checkbox"/> Copper – total recoverable & dissolved: <input type="checkbox"/> Lead – total recoverable & dissolved: <input type="checkbox"/> Zinc – total recoverable & dissolved: <input type="checkbox"/> Toxicity Testing (WET Test):
Locations the effluent samples were taken:
Field notes taken?
Is Lab(s) Accredited?
EPA Approved Methods for sample the Lab will use?
Detection limits requirements provided to lab?

NOTES:

# FERRY TERMINAL PAINTING BELOW OHWM –MONITORING FORM

Name of Terminal:
County & Tidal Reference Area:
Project Date (month and year):
Sampling Date(s) & Time of Day:
Name and contact information of person collecting the sample:
Names of paint products (record the full system) used below the OHWM:
Time of day or night structure was painted below the OHWM: <ul style="list-style-type: none"><li>• Air temperature at time of painting:</li></ul>
Sampling equipment received from lab in sealed bag(s):
Sampling location:
Temperature of: <ul style="list-style-type: none"><li>• Receiving water at time sample is taken:</li><li>• Air at time sample is taken:</li></ul>
Sampling parameters: <ul style="list-style-type: none"><li><input type="checkbox"/> Toxicity Testing (WET Test) put on ice immediately after collection</li><li><input type="checkbox"/> Sample taken within three (3) feet of painted surface:</li><li><input type="checkbox"/> Sample taken during first tidal inundation of structure:</li><li><input type="checkbox"/> Sample taken down current of painted surface (non-slack tide):</li><li><input type="checkbox"/> Sample taken when at least have the painted surface is covered with water:</li></ul>
Photo documentation of <ul style="list-style-type: none"><li><input type="checkbox"/> Work area</li><li><input type="checkbox"/> Sampling area</li></ul>
Field notes taken:
Is Lab Accredited for Toxicity Testing (WET Test)?
<b>Provide a brief description of the project and work that was completed:</b>