Washington State Department of Ecology

Environmental Assessment Program

Standard Operating Procedures for Obtaining Marine Sediment Samples

Version 1.3

Author - Sandra Weakland
Date - February, 2015

Reviewer - Carol Maloy, Marine Monitoring Unit Supervisor
Date -

Reviewer - Maggie Dutch, Marine Monitoring Unit Senior Benthic Ecologist
Date -

QA Approval - William R. Kammin, Ecology Quality Assurance Officer
Date -

EAP039

APPROVED: 10/31/2007

Signatures on File

Recertified: 01/27/2012
Recertified: 12/24/2015

Please note that the Washington State Department of Ecology's Standard Operating Procedures (SOPs) are adapted from published methods, or developed by in-house technical and administrative experts. Their primary purpose is for internal Ecology use, although sampling and administrative SOPs may have a wider utility. Our SOPs do not supplant official published methods. Distribution of these SOPs does not constitute an endorsement of a particular procedure or method.

Any reference to specific equipment, manufacturer, or supplies is for descriptive purposes only and does not constitute an endorsement of a particular product or service by the author or by the Department of Ecology.

Although Ecology follows the SOP in most instances, there may be instances in which Ecology uses an alternative methodology, procedure, or process.

SOP Revision History

Revision Date	Rev number	Summary of changes	Sections	Reviser(s)
1/27/12	1.0	Recertified	All	Kammin
2/20/15	1.3	Updated Materials Safety Sheets,	All	Weakland

Environmental Assessment Program

Standard Operating Procedure for Obtaining Marine Sediment Samples

1.0 Purpose and Scope

1.1 This document is the Environmental Assessment Program (EAP) Standard Operating Procedure (SOP) for obtaining marine sediment samples. This SOP covers station positioning, collection of sediment for infaunal, chemistry, and bioassay analyses, and sample handling. Sampling methods will, in general, follow those described in PSEP (1996a).

1.2 Personnel from Ecology's Marine Monitoring Unit will lead all sample collection and sample processing.

2.0 Applicability

2.1 This SOP should be followed for all Puget Sound Ecosystem Monitoring Program (PSEMP), formerly the Puget Sound Assessment and Monitoring Program, Marine Sediment Component collection activities performed by Ecology's Marine Monitoring Unit.

3.0 Definitions

3.1 Composite sample - collection of more than one sample from the same site, such that multiple samples can be analyzed as a single sample.

3.2 Grab Sample – surficial sediment sample obtained using a vanVeen sampler that has the jaws closed, no washout (sample leakage from side or bottom of grab), clear overlying water, undisturbed sediment surface, and sufficient depth of penetration into the seabed (Figure 1).

Figure 1. Grab Sample

3.3 Benthic invertebrate sample – The entire contents of one side of the grab sampler that is collected for identification and enumeration of macro invertebrates residing in the sediment.

3.4 MSDS – Material Safety Data Sheets provide both workers and emergency personnel with the proper procedures for handling or working with a particular substance. An MSDS includes information such as physical data (melting point, boiling point, flash

point, etc.), toxicity, health effects, first aid, reactivity, storage, disposal, protective equipment and spill/leak procedures.

3.5 VanVeen Sampler - a double 0.1-m^2, stainless steel sampler consisting of a set of jaws that shut when lowered into the surface of the seabed. It is used to collect surficial sediment samples with minimal disturbance to the sediment surface (Figure 2).

Figure 2. MMU staff landing a van Veen Sampler

4.0 Personnel Qualifications/Responsibilities

4.1 All field staff must comply with the requirements of the EA Safety Manual (EA Program, 2006). A full working knowledge of the procedures in Chapter 1 "General Field Work" and Chapter 2, especially the sections "Handling Formaldehyde and Formalin," is expected. Sampling from an Ecology boat requires one person onboard to be a qualified boat operator as described in Interim Ecology Policy 11-60; all persons onboard must be familiar with Chapter 3 of the EA Safety Manual, "Boating."

4.2 All field staff must be familiar with other standard procedures described for marine sediment collection and processing in this document. Several marine sediment parameters have special sample collection and post-treatment procedures applicable to this document.

4.3 The Field Lead directing sample collection must be knowledgeable concerning all aspects of the project's Quality Assurance Project Plan (QAPP) to ensure that credible and usable data are collected. All field staff should be briefed by the Field Lead on the sampling goals and objectives prior to arriving at the site.

5.0 Equipment, Reagents, and Supplies

5.1	General Equipment	Number required
5.1.1	Double van Veen grab	
5.1.1.1	Heavy grab (8weights)	2
5.1.1.2	Light Grab (2 weights)	2
5.1.1.3	Weights for grab (with nuts and bolts)	2 in bucket
5.1.2	Hand dolly	1
5.1.3	Grab stand	1
5.1.4	4x4 for Grab stand	1
5.1.5	Tray insert for grab stand	1
5.1.6	Step stands (platforms)	2
5.1.7	1.0 mm sieve boxes	5
5.1.8	red sieve tables	2
5.1.9	Swivel	1
5.1.10	Hoses 5/8" with flow adjusters and nozzle adapters	3
5.1.11	Spray nozzles	2
5.1.12	Tools (yellow tool box)	1
5.1.12.1	Adjustable wrenches	1
5.1.12.2	Bent claw	1
5.1.12.3	Channel locks	1
5.1.12.4	Crimping pliers	1
5.1.12.5	Duct tape	1
5.1.12.6	Hammer	1
5.1.12.7	Knife	1
5.1.12.8	Nuts and bolts	1
5.1.12.9	Pliers	1
5.1.12.10	Rubber mallet	1
5.1.12.11	Screw drivers	1
5.1.12.12	Set of box end/open end wrenches	1
5.1.12.13	Tin Snips	1
5.1.12.14	V file (round metal file for grab hooks and rings)	1
5.1.12.15	Wire cable	4
5.1.13	Ice chests with extra ice	many as possible
5.1.14	Tarp to cover ice chests stored on upper deck	1
5.1.15	Deionized water	sm. wash bottle
5.1.16	Paper Towels	4 rolls
5.1.17	Office Tub	1
5.1.17.1	Black electrical tape	3 rolls
5.1.17.2	Bungee cords	10
5.1.17.3	Camera and batteries	1
5.1.17.4	Cellular phone and adapters	1
5.1.17.5	Clean rags (office in boat shed)	15
5.1.17.6	Clear mailing tape dispenser w/3 rolls	1 and 3
5.1.17.7	Clipboard with cover	1

5.1.17.8	Disposable latex gloves	20 pair
5.1.17.9	Drill, battery charger, and extra battery	1
5.1.17.10	Duct tape	2
5.1.17.11	Garbage bags	1 box
5.1.17.12	Hazardous material labels	1
5.1.17.13	hose dividers	1
5.1.17.14	Indelible ink pens (extra fine and regular sharpies)	1 box
5.1.17.15	Kimwipes	2 boxes
5.1.17.16	Pencils	1 box
5.1.17.17	Pipettes	10 disposable
5.1.17.18	Razor blades	new package of 5
5.1.17.19	Refractometer and screw driver	1
5.1.17.20	Rope 5/16" braided nylon (tie down for grab)	1
5.1.17.21	Scissors	1
5.1.17.22	Thermometers with extra batteries	2
5.1.18	Field notebook	1
5.1.18.1	Field logs (on Rite-in-Rain paper)	
5.1.18.2	Extra labels for sample containers, ice chest, and buckets	
5.1.18.3	Material Safety Data Sheets (MSDS) may be found at the links below	
5.1.18.3.1	37% Formalin - http://www.sciencelab.com/msds.php?msdsId=9924095	
5.1.18.3.2	Liquinox soap - http://www.alconox.com/resources/StandardDocuments/MSDS/msds_liquinox_english_ghs.pdf	
5.1.18.3.3	Acetone - http://www.sciencelab.com/msds.php?msdsId=9927062	
5.1.18.3.4	Borax - http://www.sciencelab.com/msds.php?msdsId=9924967	
5.1.18.4	Infaunal Chain of Custody forms	
5.1.18.5	Chemistry Chain of Custody forms	
5.1.18.6	Bioassay Chain of Custody forms (all types)	
5.1.18.7	Permits:	
5.1.18.7.1	WDFW: Scientific Collection Permit (SCP) Hydraulic Project Approval (HPA)	
5.1.18.7.2	DNR Right of Entry	
5.1.18.7.3	Shoreline Permit Exemption - applicable cities and counties	
5.1.18.7.4	San Juan Refuge (if applicable)	
5.1.18.7.5	Tribal lands	

5.2	**Chemistry Sampling Equipment**	**Number required**
5.2.1	Siphon tubing (5 ft. long)	2
5.2.2	Clip to hold grab doors open during sample collection	4
5.2.3	Stainless steel paddles for drill	2

5.2.4	Stainless steel spatulas	2
5.2.5	Stainless steel spoons	2
5.2.6	Aluminum foil	1 roll
5.2.7	Stainless steel pots with lids	3
5.2.8	Sediment Sample Container: size, type, and number of containers is project-specific and outlined in project QAPP. Extra containers are required to account for breakage or contamination.	
5.2.9	Ice scoops	2
5.2.10	Sample container rack	1

5.3	**Decontamination Equipment**	**Number required**
5.3.1	Wash bottles lg. and labeled for acetone	2
5.3.2	Pesticide grade acetone - Acetone is not known to be carcinogenic or teratogenic, but it can cause defatting of skin tissues on contact. The MSDS may be found at http://www.sciencelab.com/msds.php?msdsId=9927062	2 gal.
5.3.3	Alconox or Liquinox soap	4 oz.
5.3.4	Scrub brushes sm. (for grab)	2
5.3.5	Wash bottles lg. and labeled for Alconox soap	2
5.3.6	Gloves	
5.3.7	Small funnel to pour acetone into wash bottle	

5.4	**Infaunal Sample Equipment**	**Number required**
5.4.1	Scrub brushes lg. (for screen boxes)	2
5.4.2	Plastic dust pans	1
5.4.3	Stainless steel metric rulers	3
5.4.4	5-gallon buckets with matching air-tight lids (labeled with hazardous material stickers)	35
5.4.5	Plastic sample containers – various sizes	100
5.4.6	Pint zip-lock sample bags	250
5.4.7	Internal infaunal labels (Rite-in-the-Rain paper)	1 Bx.
5.4.8	Squirt bottles lg.	3
5.4.9	Metal spoons	3
5.4.10	Forceps	3 pairs
5.4.11	37% Formalin - Formalin is known to be carcinogenic. Formalin is harmful if inhaled or absorbed through skin. It causes irritation to skin, eyes and respiratory tract. Formalin may be fatal or cause blindness if swallowed. Formalin cannot be made nonpoisonous. It is flammable as a liquid and a vapor. The MSDS may be found at http://www.sciencelab.com/msds.php?msdsId=9924095	5 (1-gallon jugs)
5.4.12	5-gallon formalin carboy w/spigot	1

5.4.13	Carboy stand	1
5.4.14	Carboy travel container	1
5.4.15	Sodium borate buffer	2 boxes
5.4.16	Rectangular blue tub for sample collection	4
5.4.17	Formalin stirring stick	1

5.5	**Safety Equipment**	**Number required**
5.5.1	Life-vests	5
5.5.2	Survival suits (float suits)	5
5.5.3	Safety Goggles (in good condition)	2
5.5.4	Eye-wash stand (lg. whaler)	1
5.5.5	Formaldehyde monitoring badges - STEL	6
5.5.6	Formaldehyde monitoring badges - TWA	6
5.5.7	First Aid kit	1
5.5.8	Personal gear for volunteers (various sizes):	
5.5.9	Duffel bags	2
5.5.10	Steel toed Boots	4 pairs
5.5.11	Rubber Gloves	4 pairs
5.5.12	Leather work Gloves	4 pairs
5.5.13	Hard hats w/chin straps or hat liners	2
5.5.14	Rain gear	3

6.0 Summary of Procedure

6.1 Pre-sampling Trip Preparation

6.1.1 Throughout the year:

6.1.1.1 Fix any equipment that needs repairs.

6.1.1.2 Order and assemble all supplies (above) needed for next cruise.

6.1.1.3 Apply for collection permits.

6.1.1.4 Contract a marine research vessel of adequate size and speed which is suitably equipped for deployment of sample collection equipment and shipboard sample processing.

6.1.2 At least one month prior to cruise:

6.1.2.1 Update all items in the Field Sampling and Shipping notebooks.

6.1.2.2 Complete and submit Preliminary Analysis and Bottle Request forms to Manchester Environmental Lab.

6.1.2.3 Get lab sample numbers from Manchester Environmental Lab.

6.1.2.4 Prepare all sample containers, ice chests, and buckets.

6.1.2.5 Preprint all labels for each station and sample with project name, sample number, analysis type, date, and laboratory sample number in written and barcode formats. A space will be left for filling in the sampling date.

6.1.2.6 Reserve a vehicle for personnel and sample transport during crew shifts (i.e., to and from marina, restaurants, hotels).

6.1.2.7 Solicit volunteer crew members, if necessary.

6.1.2.8 Prepare rescreening schedule.

6.1.2.9 Get road maps for marinas to be used.

6.1.2.10 Hazardous materials (formalin) training for those needing it.

6.1.2.11 Respirator fit tests for anyone wishing to use respirator during rescreening.

6.1.2.12 File a 'Field Work Plan and Contact Person Form'.

6.1.2.13 File an 'Ecology Float Plan'.

6.2 Station Location, Positioning and Choosing Alternate Sites

6.2.1 The locations of individual sampling stations within a region are chosen as outlined in the Quality Assurance Project Plan (QAPP). Alternate locations are also provided for each station in a numbered sequence.

6.2.2 Positioning will rely on Differential Global Positioning System (DGPS) in NAD 1983 with expected accuracy of better than 5 meters.

6.2.3 If the coordinates provided prove to be inaccessible or there are only rocks and cobbles present at the location the site will be moved 100m seaward and tried again. Sites may be moved up to three times (total 300m). In some cases the location will be rejected and an alternate set of coordinates sampled.

6.2.4 Alternate locations within each region and strata type are provided in a numbered sequence for sites that are inaccessible or are composed of materials that cannot be sampled, i.e., have a substrate composed of rock, hard clay, cobble, shell and/or large wood waste chunks.

6.3 Formalin Mixing Procedures

6.3.1 Splash goggles and chemical proof gloves must be worn when handling formalin.

6.3.2 Pour ½ gallon of 37% (1.85 liters) formalin into the 20-liter formalin carboy.

6.3.3 Fill carboy to the 20-liter mark with seawater.

6.3.4 Add Borax buffer to form a super-saturated solution.

6.3.5 Stir thoroughly with stir stick until most of the Borax is dissolved.

6.4 Decontamination Procedures

6.4.1 Prior to deployment of the sampler at each new location, scrub the sampler, stainless steel pot and lid, and utensils with site water and Liquinox; rinse with a small quantity

of pesticide-grade acetone; then rinse the stainless steel pot, lid, and utensils with site water. The sampler will be rinsed while traveling through the water when deployed.

6.4.2 After the sediment scoop has been used the first time at a station, place it in the homogenization pot with the sample, between grabs.

6.4.3 Cover homogenization pot(s) with the lid between sampler deployments.

6.4.4 Between deployments at a station, rinse the van Veen sampler with site water only.

6.5 Deploying and Retrieving the van Veen Grab Sampler

6.5.1 Personnel deploying the grab will wear life vests, protective helmets, and steel-toed shoes any time the grab is suspended from the deck or at the water's surface.

6.5.2 The grab sampler is deployed and retrieved with a hydraulic winch to control rate of descent and ascent. All samples are collected in depths of 6 feet or more (mean lower low water), the operating limit of the sampling vessel.

6.5.3 When retrieved from the water, the grab is immediately placed upon the grab stand and properly secured.

6.5.4 Once secured, the sampler and the contents are visually inspected to determine if the sample is acceptable. The following acceptability criteria, as described in PSEP (1987), should be satisfied:

6.5.4.1 Sediment is not extruded from the upper face of the sampler such that organisms may have been lost.

6.5.4.2 Overlying water is present (indicates minimal leakage).

6.5.4.3 The sediment surface is relatively flat (indicates minimal disturbance).

6.5.4.4 The entire surface of the sample is included in the sampler.

6.5.4.5 A sufficient depth of penetration was achieved. Acceptable minimum depth of penetration varies with sediment type, as follows:

6.5.4.5.1 4 – 5 cm for medium-coarse sand

6.5.4.5.2 6 – 7 cm for fine sand

6.5.4.5.3 > 10 cm for muddy sediment

6.5.5 Unacceptable samples will be dumped overboard at a location away from the station.

6.5.6 Acceptable samples will have station information and a number of visually descriptive assessments and measurements made (salinity, sediment temperature, odor, etc.) and recorded on the field logs.

6.5.7 After the first acceptable grab is collected at a station, adhere appropriate pre-prepared container labels and secure all labels to containers with clear packing tape.

6.5.8 Determine which side of the grab will be used for the benthic macroinvertebrate sample and which for chemistry and toxicity

6.5.9 Measure and record temperature and salinity for each station from benthic macroinvertebrate side of the grab.

6.5.10 Complete the field log for each station sampled.

6.6 Collecting Sediment for Chemistry and Toxicity

6.6.1 From the **chemistry and toxicity side** of the sampler, the overlying water is siphoned off without disturbing the sediment.

6.6.2 Sediment from both sides of the double van Veen grab may be used for chemistry and toxicity after the benthic macroinvertebrate sample has been collected, usually from the first deployment.

6.6.3 The top two to three centimeters of sediment are scooped from the grab and immediately placed into a decontaminated stainless steel pot. After all of the surficial sediment is removed from the sampler, all utensils will be placed inside the pot and covered with a fitted lid to minimize oxidation, photo-activation, and contamination between grabs.

6.6.4 The grab sampler can now be opened to collect the benthic macroinvertebrate sample.

6.6.5 When the appropriate volume of sediment is obtained at a site, the sediment collected for chemistry and toxicity analysis will be composited and homogenized by stirring with a stainless steel spoon and/or a stainless steel paint stirrer until textural and color homogeneity is achieved.

6.6.6 After a homogenization the composite is ready to be placed in the appropriate sample jars.

6.6.7 Pour the homogenized sediment into sample containers.

6.6.8 Place filled sample containers in appropriate ice chest.

6.7 Collecting and Preserving the Infaunal Sample

6.7.1 The benthic macroinvertebrate sample will be collected from one side of the double van Veen grab, usually from the first deployment.

6.7.2 The grab sampler will be opened and the infaunal sample will be gently rinsed into a 1.0-mm mesh sieve or a plastic tub.

6.7.3 After the inside of the grab and the grab stand are clean, the 1.0-mm sieve is moved to the sieve stand, and the sample is gently rinsed through the sieve (sieving).

6.7.4 If the sample was rinsed into a tub, the tub will be covered with a fitted lid until it can be rinsed through the 1.0-mm sieve.

6.7.5 While sieving the sample, all large organisms are placed into a small plastic sample container with a small amount of seawater as soon as they are found. This prevents excessive damage to the organisms by water pressure from the wash hose.

6.7.6 Any large organisms that can be positively identified may be tossed back to sea and their abundance recorded on the field log.

6.7.7 Messy organisms, such as cerianthid anemones, should be removed from the sample immediately and placed in a separate sample container with a small amount of seawater, to prevent entanglement with other organisms.

6.7.8 After as much sediment as possible is washed from the sample, all material retained on the screen is carefully transferred to a plastic sample container.

6.7.9 Fix all benthic macroinvertebrate sample fractions with 10% borax-buffered formalin. The volume of fixative should be at least twice the volume occupied by the sample. Do not fill containers more than 1/2 full. Use more formalin for samples with large amounts of organic material (plant or woody debris).

6.7.10 After the formalin has been added and the lid tightly closed, the sample container should be gently inverted several times to ensure that all contents are properly preserved.

6.7.11 All fixed samples are placed into 5-gallon buckets with airtight lids for safe storage and transport.

6.7.12 Benthic macroinvertebrate samples must possess two labels per container:

6.7.11.1 An internal Rite-in-the-Rain label recorded with a HB graphite pencil.

6.7.13 An external label filled out with indelible ink and taped over with clear mailing tape.

6.7.14 Benthic macroinvertebrate sample labels must possess the following information: station number, replicate number, collection date, sieve size, and number of containers per sieve size (e.g., 13 Rep 2, 4/02/2105, 1.0-mm sieve, 1 of 3).

6.7.15 Splash goggles and chemical-proof gloves must be worn when preserving samples in formalin.

6.7.16 Ecology personnel will conduct further processing of the 1.0-mm sieve sample (i.e., rescreening, sorting, taxonomic identification, data compilation and analysis) in the lab.

6.8 Sample Handling

6.8.1 Recommended sample sizes, containers, preservation techniques, and holding times for all sediment samples are those listed in the Manchester Environmental Laboratory Lab User's Manual (Manchester Environmental Laboratory, 1994) and can be found in the field notebook.

6.8.2 Samples for chemical and toxicity analyses will be stored in appropriate containers and placed in insulated coolers filled with ice. Samples must remain chilled on ice while being stored on the boat.

6.8.3 Chemistry and toxicity samples will be off-loaded from the research vessel and transferred to the walk-in refrigerator at EAP Operations Center (OC) in Olympia.

6.8.3.1 Samples to be transported from the OC by MEL or private courier:

6.8.3.1.1 Pack samples in regular cubed or crushed ice. Deliver samples to walk-in cooler at OC and leave a copy of the appropriate chain of custody with lab analysis-required forms in the "Out" box near the walk-in cooler.

6.8.3.2 Samples shipped via air or ground freight service:

6.8.3.2.1 Samples must be contained in polypropylene containers, not glass. Pack samples using blue or dry ice (check with airline for restrictions on dry ice). Cool to 4°C and store in dark cooler. In warmer weather (80°F and above) use ten to twelve blue-ice packs per cooler. In cooler weather (below 80°F) use six to eight blue-ice packs, to avoid freezing samples. Tape a copy of the chain-of-custody form to the inside of the cooler and tape coolers shut after inspection.

6.8.3.2.2 Take the sealed cooler to the Ecology Mail room to be shipped to the appropriate analytical laboratories.

7.0 Records Management

7.1 Maintain all Field logs and review them for completeness throughout the sampling day.

7.2 Fill out Daily Cruise Log and review it for completeness throughout the sampling day.

7.3 Keep a running inventory list of supplies needed for the following day (including 1-gallon containers for amphipod and urchin bioassays).

7.4 Report, by telephone, by noon, to the Cruise Coordinator (or designated lab contact) any sample container and supply needs for the next day or the next crew shift.

7.5 Report, by telephone, after last sample is collected, to Cruise Coordinator, with details of sampling progress, any changes to itinerary, and if appropriate, rendezvous time with courier.

7.6 When arriving at the dock at the end of the day, close out the Float plan with the designated contact.

8.0 Quality Control and Quality Assurance Section

8.1 Chain-of-custody procedures will follow those recommended by the PSEP (1996b). They will be initiated when the first sample is collected and will be followed until all samples are relinquished to the analytical laboratory. Chemistry, bioassay, and benthic macroinvertebrate chain-of custody forms designed for this project will provide an unbroken trail of accountability that ensures the physical security of samples, data, and records. At the end of each day, all sample containers are checked against toxicity, chemistry, and benthic macroinvertebrate Chain-of-Custody forms. It is important to verify the station identification number, collection date, collection time, and if applicable, lab numbers as part of the QA/QC procedures.

9.0 Safety

9.1 Knowledge of the contents of this standard operating procedure is required.

9.2 The following forms must be completed to document field personnel, sampling locations, overnight lodging, itinerary, contact person(s), and emergency contacts:

9.2.1 Float plan

9.2.2 Contact person designation

9.2.3 Field Sampling Notification

10.0 Hazards

10.1 Never compromise your personal safety or that of a field partner to collect a sample. Always plan ahead to avoid falling and drowning hazards. Always wear appropriate safety gear such as life vests and steel-toed boots.

10.2 Formalin

10.2.1 Formalin is a colorless, highly reactive gas that is composed of hydrogen, carbon and oxygen. It combines readily with many other materials and can be dissolved in water, alcohol or ether, but not in most other organic solvents with a strong odor. Formalin is usually used in a liquid solution with water or methanol. Formalin is a common trade name for Formaldehyde, and usually refers to the diluted aqueous solution.

10.2.1.1 Employee's Responsibilities

10.2.1.1.1 Read this standard operating procedure and discuss any questions with her/his supervisor or task team leader.

10.2.1.1.2 Read the Formaldehyde Material Safety Data Sheets (MSDS) before beginning this procedure. The MSDS is available in the Ecology Headquarters benthic laboratory and in the field notebook.

10.2.1.1.3 Participate in DOE Formalin Safety Training.

10.2.1.1.4 Report to supervisor immediately any symptoms or reactions that might be related to Formalin exposure.

10.2.1.1.5 Properly use protective clothing and equipment.

10.2.1.1.6 Refrain from wearing contact lenses during this procedure.

10.2.1.1.7 Immediately flush with water any skin area that comes into contact with Formalin.

10.2.1.2 Protective Clothing and Equipment

10.2.1.2.1 Safety splash goggles.

10.2.1.2.2 Chemical resistant gloves.

10.2.1.2.3 Formalin monitoring badges.

10.2.1.2.4 Portable Eyewash/Safety station.

10.2.1.2.5 Formalin-spill cleanup kits.

10.2.1.3 Monitoring

10.2.1.3.1 Representative monitoring for airborne formalin shall be conducted at the inception of a new procedure involving handling of formalin or at the resumption of an established procedure after a long period of time has elapsed.

10.2.1.3.2 The exposure of each employee involved in sample processing will be determined, using appropriate short-term exposure or long-term exposure monitoring badges.

10.2.1.3.3 Complete records of the results of airborne formalin monitoring will be kept.

10.2.1.4 Clean-Up

10.2.1.4.1 If a large formalin spill occurs on the vessel, use an absorbent material to soak up the majority of the free liquid. Then rinse the area thoroughly with copious amounts of water. Scrub the area with Liqui-Nox and water if it is a large spill.

10.2.1.4.2 If formaldehyde or formalin has contaminated your clothing, you should change into clean clothing immediately.

10.2.1.4.3 Do not take contaminated work clothes home. An authorized individual should launder contaminated work clothes.

10.2.1.4.4 All protective clothing should be thoroughly scrubbed with Liqui-Nox and water.

10.2.1.4.5 If personal exposure to formaldehyde or formalin occurs, wash all body areas IMMEDIATELY and THOROUGHLY, with copious amounts of water.

10.2.1.5 Hazardous Waste Disposal

10.2.1.5.1 Any absorbent materials used to clean up a spill should be placed into a heavy duty plastic garbage bag, sealed and disposed of according to local ordinances.

11.0 References

11.1 Dutch, M., V. Partridge, S. Weakland, K. Welch, and E. Long. 2009. Quality Assurance Project Plan: The Puget Sound Assessment and Monitoring Program Sediment Monitoring Component. Washington State Department of Ecology Publication 09-03-121. 98 pp.

11.2 Environmental Assessment Program, 2006. Environmental Assessment Program Safety Manual. March 2006. Washington State Department of Ecology. Olympia, WA.

11.3 MEL, 2005. Manchester Environmental Laboratory Lab Users Manual Eighth Edition. Environmental Assessment Program. Washington State Department of Ecology. Manchester, WA.

11.4 PSEP (Puget Sound Estuary Program), 1987. Recommended Protocols for Sampling and Analyzing Subtidal Benthic Macroinvertebrate Assemblages in Puget Sound: Final Report. Prepared by Tetra Tech, Inc. for U. S. Environmental Protection Agency Region 10, Office of Puget Sound.

11.5 PSEP (Puget Sound Estuary Program), 1996a. Recommended Guidelines for Sampling Marine Sediment, Water Column, and Tissue in Puget Sound. Prepared by Tetra Tech, Inc. for U. S. Environmental Protection Agency Region 10, Office of Puget Sound.

11.6 PSEP (Puget Sound Estuary Program), 1996b. Recommended Quality Assurance and Quality Control Guidelines for the Collection of Environmental Data in Puget Sound. Prepared by Tetra Tech, Inc. for U. S. Environmental Protection Agency Region 10, Office of Puget Sound.