4.0 EQUIPMENT AND CONTAINERS CLEANING PROCEDURES

4.1 GENERAL

4.1.1 Introduction

The cleaning procedures outlined here are to be used by DEC BUREAU OF SPILL PREVENTION AND RESPONSE (DEC BSPR) personnel to guide or evaluate laboratory contractor performance and to clean sampling and other field equipment, as well as sample containers, prior to and after field use. Sufficient clean equipment and sample containers should be transported to the field so that an entire inspection or investigation can be conducted without having to clean sample containers and equipment in the field. However, this will not always be possible when using specialized field equipment. Field cleaning procedures are included to cover these special problem areas. Emergency field sample container cleaning procedures are also included; however, they should not be used unless absolutely necessary. Specific cleaning procedures are presented in the following sections.

These procedures are the operating procedures for the DEC BSPR; any deviation from them should be documented in field records and investigative reports.

4.1.2 Cleaning Materials

The cleaning materials referred to in these procedures are defined in the following paragraphs.

The laboratory detergent shall be a standard brand of phosphate-free laboratory detergent such as Alquinox or Liquinox. The use of any other detergent must be justified and documented in the field logbooks and inspection or investigative reports.

The nitric acid solution (10 percent) shall be made from reagent-grade nitric acid and deionized water.

The standard cleaning solvent shall be pesticide-grade isopropanol. However, solvents may be substituted for a particular investigation if needed. Pesticide-grade acetone or methanol are both acceptable. However, it should be noted that if pesticide-grade acetone is used, the detection of acetone in samples collected with acetone rinsed equipment is suspect. Pesticide-grade methanol is much more hazardous to use than either pesticide-grade isopropanol or acetone, and its use is discouraged. Pesticide-grade hexane and petroleum ether are not miscible with water; therefore, these two solvents are not effective rinsing agents unless equipment is dry. The use of any solvent other than pesticide-grade isopropanol for equipment cleaning purposes must be justified and its use must be documented in field logbooks and inspection or investigative reports.

Tap water may be used from any municipal water treatment system. The use of an untreated potable water supply is not an acceptable substitute for tap water.

Deionized water is defined as tap water that has been treated by passing through a standard deionizing resin column. The deionized water should contain no heavy metals or other inorganic compounds (i.e., at or above analytical detection limits) as defined by a standard Analytical Method inductively coupled Argon Plasma Spectrophotometer (ICP) scan or any justified equivalent method. Organic-free water is defined as tap water that has been treated with activated carbon and deionizing units. A set up of a 5-micron pre-filter, activated carbon unit, two mixed bed deionizing units (in series), a 0.2 micron post filter, and a post-carbon filter can produce organic-free water. The Milli-Q system also produces organic-free water. Organic-free water should contain no pesticides, herbicides, extractable organic compounds, and less than 50 ug/l of purgeable organic compounds as measured by a low level GC/MS scan.

Sections which need special attention from DEC BSPR personnel are: 4.3, 4.4, 4.7.7, 4.7.10, 4.8.2.

During cleaning operations, the substitution of a higher grade water (i.e., deionized or organic-free water for tap water) is permitted and need not be noted as a variation of these procedures. However, the deionized and organic-free water utilized must be subject to the specific quality control procedures as outlined in Section 4.2.2.

The brushes used to clean equipment as outlined in the various sections of this protocol shall not be of the wire-wrapped type.

The solvents, nitric acid solution, laboratory detergent, and rinse waters used to clean equipment shall not be reused, except as specifically permitted in the footnote for Step 3, Section 4.3.

4.1.3 Marking of Cleaned Sampling Equipment and Containers

All equipment and sample containers that are cleaned utilizing these procedures shall be tagged, labeled, or marked with the date that the equipment was cleaned. Also, if there was a deviation from the standard cleaning procedures outlined in this protocol, this fact should be noted on the label.

When sample containers are cleaned and prepared, they should be cleaned in standard sized lots of 100, if possible, to facilitate the quality control procedures outlined in Section 4.2.

4.1.4 Marking and Segregation of Used Field Equipment

Field or sampling equipment that needs to be repaired shall be identified with a red tag. Any problems encountered with the equipment and needed repairs shall be noted on this tag. Field equipment or reusable sample containers needing cleaning or repairs shall not be stored with clean equipment, sample tubing, or sample containers. Field equipment, reusable sample containers, disposable sample containers, and sample tubing that are not used during the course of an investigation may not be replaced in storage, without being recleaned, if these materials are transported to a facility or study site where herbicides, pesticides, organic compounds, or other toxic materials are present or suspected of being present, and/or, if, in the opinion of the field investigator, they may have become contaminated during the course of the field investigation.

4.1.5 Decontamination of Equipment Used to Collect Samples of Toxic or Hazardous Waste

Equipment that is used to collect samples of hazardous materials or toxic wastes or materials from hazardous waste sites, RCRA facilities, or in-process waste streams shall be decontaminated before it is returned from the field. At a minimum, this decontamination procedure shall consist of washing with laboratory detergent and rinsing with tap water. More stringent decontamination procedures may be required, depending on the waste sampled.

4.1.6 Proper Disposal of Cleaning Materials

The solvent used to rinse sampling equipment and containers shall be collected and disposed of by allowing it to evaporate under a fume hood or be containerized and disposed of through an approved hazardous waste disposal contract. Similarly, spent nitric acid shall be collected and disposed of through the same disposal contract. These procedures apply whether the cleaning operations take place in the equipment washroom or in the field.

4.1.7 Safety Procedures to be Utilized During Cleaning Operations

The materials used to implement the cleaning procedures outlined in this protocol can be dangerous if improperly handled. Due caution must be exercised by all operating personnel and all applicable safety procedures shall be followed. At a minimum, the following precautions shall be taken in the washroom and in the field during these cleaning operations:

1. Safety glasses with splash shields or goggles, neoprene gloves, and a neoprene laboratory apron will

be worn during all cleaning operations.

2. All solvent rinsing operations will be conducted under a fume hood or in the open (never in a closed room).

3. No eating, smoking, drinking, chewing, or any hand to mouth contact shall be permitted during cleaning operations.

4.1.8 Storage of Field Equipment and Sample Containers

All field equipment and sample containers shall be stored in a contaminant free environment after being cleaned using the procedures outlined in this protocol.

4.2 SPECIFIC QUALITY CONTROL PROCEDURES FOR CLEANING OPERATIONS

4.2.1 General

This section establishes guidelines for specific quality control procedures to monitor the effectiveness of the sampling equipment and sample container cleaning procedures outlined in this protocol. These procedures shall be carried out by appropriate personnel and the results monitored by the Quality Assurance Officer. All quality control procedures shall be recorded in a logbook maintained in the appropriate washroom(s). All quality control data shall be maintained in a separate quality assurance file. Upon receipt of quality control data, the Quality Assurance Officer shall review these data to identify any abnormalities or contamination of sampling equipment or sample containers. If problems are detected, the Quality Assurance Officer shall immediately initiate an investigation to determine the cause of the problem(s) and institute an immediate, corrective action.

4.2.2 Rinse Water

The quality of the deionized and organic-free water used shall be monitored by collecting samples once per quarter in standard precleaned, sample containers and submitting them to a certified laboratory for a standard ICP scan. Organic-free water will also be submitted for low level pesticide, herbicide, extractable and purgeable compounds analyses. When field deionizing and/or organic-free water units are utilized, more frequent quality control samples will be collected. An initial sample and samples at weekly intervals are the minimum number considered acceptable.

4.2.3. Sampling Equipment Cleaned in Washroom

The effectiveness of the equipment cleaning procedures used in the washroom shall be monitored by rinsing cleaned equipment (equipment used to collect samples for trace organics and metals analyses) with organic-free or Milli-Q water and submitting the rinse water to a certified laboratory for low level analysis of extractable organic compounds including pesticides and a standard ICP scan. At least one piece of field equipment shall be selected for this procedure each time equipment is washed. An attempt should be made to select different pieces of equipment for this procedure, each time equipment is washed, so that a representative sampling of all equipment is obtained over a 12-month period.

4.2.4 Sampling Equipment Cleaned in the Field

The effectiveness of field cleaning procedures shall be monitored by rinsing field cleaned equipment with organic-free water and submitting the rinse water in standard sample containers to a certified laboratory for analysis as outlined in Section 4.2.3. Any time equipment is cleaned in the field at least one such quality control sample shall be collected. No more than five percent of the equipment cleaned during large field studies shall be subjected to these procedures.

Additional samples may be required to document quality assurance of field cleaning procedures. Any time a source of cleaning materials or rinse water is used other than that specified in Section 4.1.2, a sample of that cleaning material or rinse water shall be submitted in standard sample containers as specified in Section 4.2.2.

4.2.5 Glass Disposable Sample Containers for Organic Compounds and Plastic Containers for Metals Analyses and Other Specified Organic Compounds

The sample containers will be submitted to a certified laboratory for analysis utilizing the same standard low level analytical techniques as outlined in Section 4.2.3. The sample containers will be supplied to the certified laboratory at the rate of one percent of each kind of container used.

4.2.6 Plastic Disposable Sample Containers for Oxygen Demand, Nutrients, and General Inorganics

These containers will be filled with deionized or organic-free water, preserved as required, and submitted to be checked up for the designated parameters for each sample container. These sample containers will be selected at random from the stock at the rate of approximately one percent of each kind of container of the total used.

4.2.7 Reusable Composite Sample and Organic-Free Water Containers

These containers will be rinsed with organic-free water and the rinse water will be submitted to the check up procedures as outlined in Section 4.2.3. Approximately one percent of all such containers cleaned will be subjected to this procedure.

4.3 CLEANING PROCEDURES FOR TEFLON OR GLASS FIELD SAMPLING EQUIPMENT USED FOR THE COLLECTION OF SAMPLES FOR TRACE ORGANIC COMPOUNDS AND/OR METALS ANALYSES*

1. Equipment will be washed thoroughly with laboratory detergent and hot water using a brush to remove any particulate matter or surface film.
2. The equipment will be rinsed thoroughly with hot tap water.
3. Rinse equipment with at least a 10 percent nitric acid solution.**
4. Rinse equipment thoroughly with tap water.
5. Rinse equipment thoroughly with deionized water.
6. Rinse equipment twice with solvent and allow to air dry for at least 24 hours.
7. Wrap equipment completely with aluminum foil or equivalent to prevent contamination during storage and/or transport to the field.

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* - When this sampling equipment is used to collect samples that contain oil, grease or other hard to remove materials, it may be necessary to rinse the equipment several times with pesticide-grade acetone or hexane to remove the materials before proceeding with Step 1. In extreme cases, it may be necessary to steam clean the field equipment before proceeding with Step 1. If the field equipment cannot be cleaned utilizing these procedures, it should be discarded.

** - Small and awkward equipment such as vacuum bottle inserts and well bailers may be soaked in the nitric acid solution instead of being rinsed with it. Fresh nitric acid solution should be prepared for each cleaning session.

8. Rinse the Teflon or glass sampling equipment thoroughly with tap water in the field as soon as possible after use.

4.4 CLEANING PROCEDURES FOR STAINLESS STEEL OR METAL SAMPLING EQUIPMENT USED FOR THE COLLECTION OF SAMPLES FOR TRACE ORGANIC COMPOUNDS AND/OR METALS ANALYSIS*

1. Wash equipment thoroughly with laboratory detergent and hot water using a brush to remove any particulate matter or surface film.

2. Rinse equipment thoroughly with hot tap water.

3. Rinse equipment thoroughly with deionized water.

4. Rinse equipment twice with solvent and allow to air dry for at least 24 hours.

5. Wrap equipment completely with aluminum foil to prevent contamination during storage and/or transport to the field.

6. Rinse the stainless steel or metal sampling equipment thoroughly with tap water in the field as soon as possible after use.

4.5 CLEANING PROCEDURES FOR AUTOMATIC WATER SAMPLING EQUIPMENT

4.5.1 General

All ISCO and other automatic samplers will be cleaned as follows:

- The exterior and accessible interior (excluding the waterproof timing mechanism) portions of automatic samplers will be washed with laboratory detergent and rinsed with tap water.
- The face of the timing case mechanism will be cleaned with a clean damp cloth.
- All tubing (sample intake and pump tubing) will be discarded after use.
- New precleaned, silastic pump tubing (see Section 4.6.1) will be installed.
- When utilizing the samplers for collecting samples for metals and/or organic compounds analyses, the metal distributor tubes should not be used; only glass or silastic pump tubing should be used for this purpose.

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* - When this sample equipment is used to collect samples that contain oil, grease or other hard to remove materials, it may be necessary to rinse the equipment several times with pesticide grade acetone or hexane to remove the materials before proceeding with Step 1. In extreme cases, when equipment is painted, badly rusted, or coated with materials that are difficult to remove, it may be necessary to steam clean, wire brush, or sandblast equipment before proceeding with Step 1. Any stainless steel sampling equipment that cannot be cleaned using these procedures should be discarded.

- The ISCO 1680 automatic samplers should not be used for collecting samples for organic compounds analyses in the individual bottle mode because there is no way to properly clean the distributor plate to remove any residual organic compounds. The sample tubing headers may not be used to collect samples for organic compounds analyses for the same reason. The ISCO 2100 automatic samplers may be used to collect samples for organic compounds analyses in the individual bottle mode, if the specific cleaning procedures for the ISCO 2100 glass sequential bottles are followed as outlined in Section 4.5.8.

Specific cleaning procedures for components of the ISCO automatic samplers follow.

4.5.2 ISCO 1680 Automatic Sampler Rotary Funnel and Distributor

1. Use only for non-organic compounds sample collection using individual sequential bottles.
2. Clean with hot water, laboratory detergent and a brush.
3. Rinse thoroughly with deionized water.
4. Replace in sampler.

4.5.3 ISCO 1680 Automatic Sampler Metal Tube

Clean as outlined in 4.5.2.

4.5.4 All Automatic Sampler Heads

1. Disassemble header and using a bottle brush, wash with hot water and phosphate free laboratory detergent.
2. Rinse thoroughly with deionized water.
3. Reassemble header, let dry thoroughly and wrap with aluminum foil.

4.5.5 Reusable Glass Composite Sample Containers*

1. Wash containers thoroughly with hot tap water and laboratory detergent, using a bottle brush to remove particulate matter and surface film.
2. Rinse containers thoroughly with hot tap water.
3. Rinse containers with at least 10 percent nitric acid.
4. Rinse containers thoroughly with tap water.

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* - When these containers are used to collect samples that contain oil, grease or other hard to remove materials, it may be necessary to rinse the container several times with pesticide grade acetone before proceeding with Step 1. If these materials cannot be removed with acetone, the container should be discarded. Glass reusable composite containers used to collect samples at pesticide, herbicide, or other chemical manufacturing facilities that produce toxic or noxious compounds shall be disposed of "properly" (preferably at the facility) at the conclusion of sampling activities and shall not be returned for cleaning. Also, glass composite containers used to collect in-process wastewater samples at industrial facilities shall be discarded after sampling. Any bottles that have a visible film, scale, or discoloration remaining after this cleaning procedure shall also be discarded.

5. Rinse containers thoroughly with deionized water.

6. Rinse twice with solvent and allow to air dry for at least 24 hours.

7. Cap with aluminum foil or Teflon film.

8. After using, rinse with tap water in the field, seal with aluminum foil to keep the interior of the container wet, and return to the laboratory.

4.5.6 **Plastic Reusable Composite Sample Containers***

Proceed with the cleaning procedures as outlined in 4.5.5 but omit the solvent rinse.

4.5.7 **ISCO 1680 and 2100 Glass Sequential Sample Bottles Automatic Sampler Base for Sequential Mode****

1. Rinse with 10 percent nitric acid.

2. Rinse thoroughly with tap water.

3. Dishwasher, wash cycle, using laboratory detergent cycle, followed by tap and deionized water rinse cycles.

4. Replace bottles in covered, automatic sampler base, and cover with aluminum foil for storage.

5. Rinse bottles in the field as soon as possible after using tap water.

4.5.8 **ISCO 2100 Glass Sequential Sample Bottles (Automatic Sampler Base for Sequential Mode) to be Used for Collecting Samples for Organic Compounds Analyses**

1. Proceed as outlined in Steps 1-4 in Section 4.5.7.

2. Rinse twice with solvent and allow to air dry for at least 24 hours.

3. Replace in covered, automatic sampler base, cover with aluminum foil for storage, and mark the base as follows: "Cleaned for organic analyses."

4.5.9 **Bottle Siphons Used to Transfer Sample From Composite Container**

1. Use a new siphon for each sampling location.

2. Use 3/8-inch Teflon tubing for samples collected for organic compounds analyses. The tubing should be rinsed with solvent and dried in the contaminant-free drying oven overnight before use. The ends

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* - Plastic reusable sample containers used to collect samples from facilities that produce toxic or noxious compounds or are used to collect in-process waste stream samples at industrial facilities will be disposed of properly (preferably at the facility) at the conclusion of the sampling activities and will not be returned for cleaning. Any plastic composite sample containers that have a visible film, scale, or other discoloration remaining after this cleaning procedure will be discarded.

** - These ISCO 1680 glass sequential sample bottles are not to be used for collecting samples for organic compounds analyses. The ISCO 2100 bottles also are not to be used for collecting samples for organic compounds analyses unless the cleaning procedures outlined in 4.5.8 are used.

of the siphon should be capped with aluminum foil and/or Teflon film for storage. The siphon should be flushed with sample thoroughly before use.

3. The 3/8-inch PVC tubing utilized for samples, other than those collected for organic compounds analyses, should be thoroughly flushed with sample before use.

4.5.10 Reusable Teflon Composite Mixer Rods

1. Follow procedure outlined in Section 4.3.

2. Wrap rod in aluminum foil for storage.

4.6 CLEANING PROCEDURES FOR SAMPLE TUBING

4.6.1 Silastic Rubber Pump Tubing Used In Automatic Samplers and Other Peristaltic Pumps

New Precleaned tubing must be used for each automatic sampler set-up. The silastic rubber tubing need not be replaced in peristaltic pumps where the sample does not contact the tubing or where the pump is being used for purging purposes (i.e., not being used to collect samples).

The silastic tubing shall be precleaned as follows:

1. Flush tubing with hot tap water and phosphate-free laboratory detergent.

2. Rinse tubing thoroughly with hot tap water.

3. Rinse tubing with deionized water.

4. Install tubing in automatic sampler or peristaltic pump.

5. Cap both ends of tubing with aluminum foil.

4.6.2 Teflon Sample Tubing

Use only new Teflon tubing precleaned as follows for collection of samples for organic compound analyses:

1. Teflon tubing shall be precut in convenient lengths before cleaning.

2. Rinse outside of tubing with solvent.

3. Flush interior of tubing with solvent.

4. Dry overnight in the contaminant-free drying oven.

5. Wrap tubing and cap ends with aluminum foil to prevent contamination during storage.

4.6.3 Polyvinyl Chloride (PVC) Sample Tubing (1/8, 1/4, or 3/8 inch)

1. Use only new tubing.

2. The tubing will be flushed with sample immediately before use to remove any residues from the

manufacturing or extruding process.

3. Polyvinyl chloride tubing will be used selectively where organic compounds are not of concern.

4. Tubing should be stored in original container and not removed from this container until needed.

4.6.4 Stainless Steel Tubing

1. Wash with laboratory detergent and hot water using a long, narrow, bottle brush.

2. Proceed with Steps 2-6 as outlined in Section 4.4 (footnote applies).

4.6.5 Glass Tubing

Use new glass tubing, precleaned as follows:

1. Rinse thoroughly with solvent.

2. Air dry for at least 24 hours.

3. Wrap tubing completely with aluminum foil to prevent contamination during storage.

4. Discard tubing after use.

4.7 MISCELLANEOUS EQUIPMENT CLEANING PROCEDURES

4.7.1 Well Sounders or Tapes Used to Measure Ground Water Levels*

1. Wash with laboratory detergent and tap water.

2. Rinse with tap water.

3. Rinse with deionized water.

4. Equipment should be placed in a polyethylene bag or wrapped with polyethylene film to prevent contamination during storage or transport.

4.7.2 Submersible Pumps and Hoses Used to Purge Ground Water Wells*

Proceed as outlined in Section 4.7.1.

4.7.3 Portable Power Augers Such as the Little Beaver

1. The engine and power head should be cleaned with a power washer, steam jenny, or hand washed with a brush using detergent (does not have to be laboratory detergent but should not be a degreaser) to

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* - The same procedure applies whether this equipment is cleaned in the laboratory or equipment washroom or in the field.

remove oil, grease, and hydraulic fluid from the exterior of the unit. These units should be rinsed thoroughly with tap water.

2. All auger flights and bits shall be cleaned utilizing the procedures outlined in Section 4.4 (including footnotes) or Section 4.8.3 (including footnotes if appropriate).

4.7.4 **Large Soil Boring and Drilling Rigs**

1. The rig should be cleaned before being mobilized and brought on-site as outlined in Step 1 of Section 4.7.3.

2. All auger flights, auger bits, drilling rods, drill bits, hollow stem augers, Split Spoon Samplers, Shelby Tubes, or other parts of the drilling equipment that will contact the soil or ground water should be cleaned as outlined in Section 4.4 (including footnotes) or Section 4.8.3 (including footnotes if appropriate).

4.7.5 **Miscellaneous Sampling and Flow Measuring Equipment**

Miscellaneous flow measuring and sampling equipment shall be washed with laboratory detergent, rinsed with hot tap water, followed by a thorough deionized water rinse, and dried before being stored. This procedure is not used for any equipment utilized for the collection of samples for trace organic compounds or metals analyses.

4.7.6 **ISCO Flow Meters, Field Analytical Equipment, and Other Field Instrumentation**

The exterior of sealed, watertight equipment such as ISCO flow meters should be washed with a mild detergent (for example, liquid dish washing detergent) and rinsed with tap water before storage. The interior of such equipment may be wiped with a damp cloth if necessary.

Other field instrumentation should be wiped with a clean, damp cloth; pH meter probes, conductivity probes, DO meter probes, etc. should be rinsed with deionized water before storage.

The desiccant in flow meters and other equipment should be checked and replaced, if necessary, each time the equipment is cleaned.

4.7.7 **Ice Chests and Shipping Containers**

All ice chests and reusable containers will be washed with laboratory detergent (interior and exterior) and rinsed with tap water and air dried before storage. In the event that an ice chest becomes severely contaminated, in the opinion of the field investigator, with concentrated waste or other toxic material, it shall be cleaned as thoroughly as possible, rendered unusable, and disposed of properly.

4.7.8 **Pressure Field Filtration Apparatus***

1. Proceed with steps 1 through 5 as outlined in Section 4.3, assembling and applying pressure to the apparatus after each rinse step (water and acid) to drive rinse material through the porous glass filter holder in the bottom of the apparatus.

2. Assemble the apparatus and cap both the pressure inlet and sample discharge lines with aluminum foil to prevent contamination during storage.

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* - The same procedure applies whether the pressure filtration apparatus is cleaned in the laboratory or equipments washroom or in the field.

4.7.9 Organic-Free Milli-Q Water Storage Containers

1. These containers will be used only for storing organic-free or Milli-Q water.

2. New containers shall be prepared as outlined in Section 4.5.5, Steps 1-5, then rinsed thoroughly with organic-free or Milli-Q water, filled with Milli-Q water and capped.

3. Used containers shall be capped with aluminum foil immediately after being used in the field.

4. The exterior of the container will be washed with laboratory detergent and rinsed with deionized water if necessary.

5. The interior of the container shall be rinsed twice with solvent.

6. The interior of the container will be thoroughly rinsed with organic-free or Milli-Q water. The container will be filled with organic-free or Milli-Q water and capped with aluminum foil for storage.

4.7.10 Vehicles

All vehicles utilized by sampling personnel should be washed when necessary at the conclusion of field trip. This routine maintenance should minimize any chance of contamination of equipment or samples due to contamination of vehicles. When vehicles are used in conjunction with hazardous waste site inspections, or on studies where pesticides, herbicides, organic compounds or other toxic materials are known or suspected to be present, a thorough interior and exterior cleaning is necessary at the conclusion of such investigations. It shall be the responsibility of the project leader and/or field investigators to judge its necessity and to see this procedure is followed.

All vehicles should be equipped with trash bags and/or trash containers to facilitate vehicle cleaning. All field personnel are responsible for keeping field vehicles clean by removing all trash and other debris before it accumulates. All contaminated trash and equipment must be kept separate from ordinary trash and must be disposed of properly on-site or upon return to appropriate facility for proper disposal.

4.8 FIELD EQUIPMENT CLEANING PROCEDURES

4.8.1 General

Sufficient clean equipment should be transported to the field so that an entire study can be conducted without the need for field cleaning. However, this is not possible for some specialized items of field equipment such as portable power augers (Little Beaver), well drilling rigs, soil coring rigs, and other large pieces of field equipment. In addition, during particularly large scale studies, it is not practical or possible to transport to the field all of the precleaned field equipment required. The following procedures are to be utilized when equipment must be cleaned in the field.

4.8.2 Equipment Used for Routine Sample Collection Activities

For routine operations involving classic parameter analyses, water quality sampling equipment such as Kemmerers, buckets, DO dunkers, dredges, bailers, etc. may be cleaned with sample or deionized water between sampling locations. Heavy duty disposable paper towel or cloth may also be used reciprocally with sample or deionized water to clean equipment when sample has any sticky product present. But the last step of cleaning should be rinsing with sample or deionized water. A brush may be used to remove deposits of material or sediment, if necessary. If deionized water is used, water samplers should be flushed with sample at the next sampling location

before the sample is collected. It should be emphasized that these procedures cannot be used to clean equipment for the collection of samples for organic compounds or trace metals analyses.

Flow measuring equipment such as weirs, staff gages, velocity meters, and other stream gaging equipment may be cleaned with tap water after use between measuring locations, if necessary.

4.8.3 Teflon, Stainless Steel or Metal Equipment Used to Collect Sample for Organic Compounds and Trace Metals Analyses*

1. Clean with tap water and laboratory detergent using a brush if necessary to remove particulate matter and surface films.
2. Rinse thoroughly with tap water.
3. Rinse thoroughly with deionized water.
4. Rinse twice with solvent.
5. Rinse thoroughly with organic-free water and allow to air dry as long as possible.
6. If organic-free water is not available, allow equipment to air dry as long as possible. Do not rinse with deionized or distilled water.
7. Wrap with aluminum foil, if appropriate, to prevent contamination if equipment is going to be stored or transported.

4.9 PREPARATION OF DISPOSABLE SAMPLE CONTAINERS

4.9.1 General

No sample container (with the exception of the glass and plastic compositing containers) will ever be reused. All disposable sample containers will be stored in their original packing containers. When packages of uncapped sample containers are opened, they will be placed in new plastic garbage bags and sealed to prevent contamination during storage. Specific precleaning instructions for disposable sample containers are given in the following sections. These instructions apply to precleaned disposable sample containers whether they are purchased from a contractor or are precleaned by any appropriate personnel.

4.9.2 One-Pint Storemore, One-Quart Storemore, One-Half Gallon, and One-Gallon Plastic Containers for Oxygen Demand, Nutrients, Classic Inorganic, Sulfide, and Cyanide Analyses

Only new containers will be used.

4.9.3 One-Half and One-Gallon Amber Glass Bottles (Water Samples), 8-, 16-, and 32 -Ounce Clear Wide-mouth Jars (Soil, Sediment, Sludge, and Concentrated Waste) With Teflon Lined Caps for Organic Compounds (Excluding Purgeables) and Metals Analysis

1. Wash bottles and jars, Teflon liners, and caps in hot tap water and laboratory detergent.

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* - Portable power augers (such as the Little Beaver) or large soil boring or drill rigs should be cleaned as outlined in Step 1 of Section 4.7.3 before boring or drilling operations.

2. Rinse three times with tap water.

3. Rinse with nitric acid solution.*

4. Rinse three times with deionized water.

5. Rinse bottles, jars, and liners (not caps) with solvent.*

6. Oven dry bottles, jars, and liners at 125° C. Allow to cool.

7. Place liners in caps and cap containers.

8. Store containers in contaminant-free area.

4.9.4 **40 ml Glass Vials for Water Samples (Purgeable Organic Compounds Analysis) and 250 ml Amber Glass Narrow Necked Bottles for Water Samples (TOX Analysis) with Teflon Lined Septa; and 4-Ounce (120 ml) Clear Wide-mouth Glass Jars with Teflon Liner for Soil Samples (Purgeable Organic Compounds Analysis)**

1. Wash vials, bottles and jars, Teflon liners and septa, and caps in hot tap water and laboratory detergent (non-phosphate).

2. Rinse three times with hot tap water, and rinse three times with deionized water.

3. Oven dry at 125° C.

4. Allow all vials, bottles, jars, liners, and septa to cool in an enclosed contaminant-free environment.

5. Seal vials, bottles, and jars with liners or septa as appropriate and cap.

6. Store vials, bottles, and jars in a contaminant free area.

4.9.5 **One Liter Polyethylene Bottle for Metals and General Inorganics**

1. Wash polyethylene bottles and caps in hot water with laboratory detergent.

2. Rinse both with nitric acid solution.

3. Rinse three times with deionized water.

4. Invert bottles and dry in contaminant free environment.

5. Cap bottles.

6. Store in contaminant free area.

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* - Some bottle cleaning contractors use pesticide grade methylene chloride to solvent rinse sample containers. Also some of these contractors use 1:1 reagent grade nitric acid to rinse sample containers. For the purpose of cleaning sample containers as outlined in Section 4.9.3 and 4.9.5, both of these deviations from the information contained in Section 4.1.2 are permitted.

4.9.6 Containers for Conventionals, and Nitrogen and Phosphorous Series

1. Use new plastic or borosilicate glass bottles (1 liter minimum).
2. Wash containers and caps with hot water.
3. Rinse with 1:1 sulfuric acid.
4. Rinse three times with ASTM Type I reagent water.
5. Air dry.
6. Cap bottles when dry.

4.10 EMERGENCY DISPOSABLE SAMPLE CONTAINER CLEANING

New one-pint or one-quart mason jars may be used to collect samples for analyses of organic compounds and metals in waste and soil samples in an emergency. These containers would also be acceptable on an emergency basis for the collection of water samples for extractable and pesticide organic analyses, as well as metal analyses. These jars cannot be used for the collection of water samples for purgeable organic analyses.

The rubber sealing ring should not be in contact with the jar and aluminum foil should be used, if possible, between the jar and the sealing ring. If possible, the jar and aluminum foil should be rinsed with pesticides grade methanol* and allowed to air dry before use. Several empty bottles and lids should be submitted to the laboratory as blanks for quality control purposes.

* - Pesticide-grade petroleum ether or hexane may also be used. The specific solvent used should be specified.