STANDARD OPERATING PROCEDURE FOR COLLECTION OF WATER CHEMISTRY SAMPLES

WILLARD SPUR
2011 MONITORING ACTIVITIES

State of Utah
Department of Environmental Quality
Division of Water Quality

Revision 1
Effective 9/10/2011

Utah Division of Water Quality (DWQ) Standard Operating Procedures (SOPs) are adapted from published methods, or developed by in-house technical experts. The primary purpose of this document is for internal DWQ use. This SOP should not replace any official published methods.

Any references within this document to specific equipment, manufacturers, or supplies is only for descriptive purposes and does not constitute an endorsement of a particular product or service by the author or by DWQ. Additionally, any distribution of this SOP does not constitute an endorsement of a particular procedure or method.

Although DWQ will follow this SOP in most instances, there may be instances in which DWQ will use an alternative methodology, procedure, or process.

REVISION PAGE

Date	Revision #	Summary of Changes	Sections	Other Comments
9/10/2011	1	not applicable	not applicable	Put into new standardized format, began document control/revision tracking

TABLE OF CONTENTS

1.0 SCOPE AND APPLICABILITY

This document presents the Utah Division of Water Quality's (DWQ) Standard Operating Procedure (SOP) for performing routine surface water sample collection for chemical analyses. This SOP does not cover lake/reservoir sampling, or processing of samples for chlorophyll-*a* analysis. Refer to DWQ's SOP for Collection of Lake Water Samples and DWQ's SOP for the Filtering of Chlorophyll-*a* Samples for these procedures.

This SOP focuses on grab samples used to determine the concentration of analytical parameters at a point in time for a given water body. This SOP does not cover flow-proportional composite sample collection. This method assumes that sampling targets (pollutants) are uniformly distributed in the water column and does not address depth-integrated sampling. This SOP applies to all DWQ field staff, non-DWQ government cooperators, and volunteer monitors trained on this SOP. This method is suitable for sampling streams and rivers, impounded or fringe wetlands and their outlets or inflows, and discharges, ponds, lagoons, or other surface water sampling points at regulated facilities.

2.0 SUMMARY OF METHOD

Grab samples may be collected using the following methods:

- Collection from the thalweg by wading into a flowing waterbody and direct dipping of sample bottle
- Collection from the bank/edge using a dip sampler
- Collection from the bank/edge and direct dipping of sample bottle
- Collection from a bridge using a bucket

If samples are to be analyzed for dissolved constituents, field filtering of the raw sample is performed. Samples are delivered to the State of Utah's Public Health Laboratories, Chemical and Environmental Services Bureau (hereafter referred to as the State Lab) or another certified laboratory, according to the applicable project-specific Sampling and Analysis Plan (SAP).

3.0 DEFINITIONS

Equipment Rinse/Equipment Blank: A sample that is collected by pouring DI water over or running DI water through sample collection/processing equipment. The blank is performed after equipment decontamination and before sample collection. The sample is collected into the appropriate sample container and is preserved, stored, handled, and analyzed identically to the regular samples. This sample evaluates contamination

resulting from field sample collection and/or processing equipment, sample collection technique, sample container and preservative, sample handling, shipment or transport to the lab, as well as sample handling and analysis at the laboratory.

Trip Blank: A sample that is prepared at the laboratory by pouring DI water into each appropriate sample container containing the appropriate preservative. The sample is taken out to the field, handled with the regular samples, and returned to the laboratory for analysis without having been opened by the field team. Trip blanks evaluate contamination resulting from sample container and preservative, sample handling and shipment or transport to the lab, as well as sample handling and analysis at the laboratory. Trip blanks may be used for any parameter but are especially important when sampling for volatile organic compounds or radiological parameters.

Field Duplicates/Replicates: Two (or more) samples taken closely in time and space collected into the appropriate sample containers and preserved, stored, handled, and analyzed identically to regular samples. This sample evaluates cumulative effects of both field precision (field sample collection and/or processing equipment, sample collection technique, sample container and preservative, sample handling, shipment or transport to the lab) and lab precision (sample handling and analysis at the laboratory).

Field Split Samples: Two (or more) subsamples taken from one water sample collected in the field. Enough sample needs to be collected to allow splitting and the sample must be well-mixed before splitting. The subsamples are placed into appropriate sample containers and preserved, stored, handled, and analyzed identically to the regular samples at two (or more) laboratories. This sample evaluates accuracy and bias between two laboratories and/or analytical methods as well as sampling handling in the field and laboratory.

Thalweg: Typically the deepest and fastest part of the channel, containing the most cross-sectional flow.

DI Water: Deionized water prepared at the laboratory and tested to ensure it is analyte-free.

Sonde: The portion of the water quality field meter housing the probes and placed into the water.

SAP: Sampling and Analysis Plan.

PFD: Personal floatation device.

4.0 HEALTH AND SAFETY WARNINGS

Field personnel should be aware that hazardous conditions potentially exist at every waterbody. If unfavorable conditions are present at the time of flow measurement, it is recommended that the measurement be rescheduled. If hazardous conditions arise

during measurement, such as lightning, high winds, rising water, or flash flood warning, personnel should cease sampling and move to a safe location.

Field personnel should take appropriate precautions when operating equipment and working on, in, or around water, as well as possibly steep and unconsolidated banks, or edges of ponds/lagoons. All field crews should follow EPA, OSHA, and specific health and safety procedures and be equipped with safety equipment such as proper wading gear, personal flotation devices (PFDs), gloves, first aid kits, cellular phone, etc.

Always use caution when sampling from a bridge and take appropriate actions to make the situation as safe as possible; suspend the sampling if conditions are unsafe.

Most often, sample bottles are prepared by the State Lab and already contain preservative. During packing and handling of bottles, be sure that caps are tightly sealed. Be careful to avoid contact with preservative (acid). If minor skin contact occurs, rinse with copious amounts of water. If major skin or contact occurs, seek medical attention.

Wear gloves or be sure to wash hands after sampling, especially when sampling wastewater discharges or ponds, lagoons, or other potentially contaminated sampling points at regulated facilities.

5.0 CAUTIONS AND INTERFERENCES

Sample cross-contamination can occur if sampling devices are not properly decontaminated. Equipment blanks will be performed to demonstrate that all sampling and sample processing equipment is contaminant-free.

Contamination may also occur due to agitation of bottom sediments or surface floating debris. To prevent this, do not take samples near the bottom and do not skim the water surface. Also, collect samples upstream of the sampler and after any disturbed sediments have been cleared by the current.

When sampling wetlands or other slow-flowing or non-flowing water bodies, it is essential to reach out into the waterbody away from the bottom sediment stirred up when wading to the sampling point to ensure an undisturbed surface water sample. A dip sampler may be required to avoid getting disturbed bottom sediments in the sample. Alternatively, samples may be collected from a boat.

Samples should not be filtered near a running vehicle motor or a generator for risk of contamination by gas/oil fumes.

Samples must be collected in the appropriate sample containers with the appropriate preservative; failure to preserve a sample properly can lead to inaccurate results or invalidation of the sample by the laboratory.

Samples must be stored and handled appropriately; samples stored improperly or not meeting holding time requirements may be invalidated by the laboratory.

6.0 PERSONNEL QUALIFICATIONS/RESPONSIBILITIES

Samplers are required to read this SOP annually and acknowledge they have done so via a signature page (see **Appendix**) that will be kept on-file at DWQ along with the official hard copy of this SOP.

Personnel performing water sampling must be familiar with sampling techniques, safety procedures, proper handling, and record keeping. Samplers are responsible for attending refresher meetings held each spring to review procedures and techniques. New staff will be trained in the field by experienced personnel.

7.0 EQUIPMENT AND SUPPLIES

____copy of this SOP
____site portfolio
____copy of project-specific SAP
____Lab sheets/field notebook
____Water-proof pens/markers
____Sample labels
____Pre-filled sample tracking forms, known as “Lab Sheets” if delivering routine samples to the State Lab (or chain-of-custody forms if legal chain-of-custody is required)
____Sample bottles and preservatives
____Clean, unused plastic bottle (transfer bottle) for collecting raw sample to be filtered for dissolved constituents in the field
____Maps
____GPS unit
____Camera
____Dip Sampler
____Bucket, rope, and clean garbage bag (if bridge sampling); store the rope inside the garbage bag
____DI water (carboys, half-gallon jugs, and squeeze bottles)
____Forceps
____Glass-fiber pre-filters (0.7 µm, 47 mm diameter)
____Membrane filters (0.45 µm, 47 mm diameter cellulose nitrate or mixed cellulose ester)
____Geo-pump with quick-release pump head, fitted with approximately 3 feet of Masterflex tubing attached to a Swinnex-style filter holder (47 mm diameter) secured to tubing using a hose clamp
____Cooler
____Ice
____Safety gear

____Chest waders with belt or hip boots

8.0 PROCEDURE

8.1 Pre-Sampling Preparation

- Determine the total number of samples (including equipment blanks, trip blanks, duplicates, or field splits) to be collected for the trip (sampling event), the sampling locations, the parameters to be collected, the sampling method and equipment to be used, and other field information to be collected along with the sample. All of this information should be included in the project-specific SAP.

- Contact the laboratory to obtain the trip blank bottles, the appropriate sample bottles and preservatives, and to confirm storage conditions and holding times.

- Pre-clean sampling and sample processing equipment.

- Obtain any necessary permission for site access.

- Print off all necessary sample labels, sample tracking forms ("Lab Sheets" if using State Lab) or chain-of-custody forms, and field sheets.

For more information refer to DWQ's SOP for Water Quality Monitoring Runs.

8.2 Sample Collection

8.2.1 General

At the site, pre-label all sample bottles. Note sampling conditions on field sheets or in field notes, as specified in the SAP. Collect water quality field parameters prior to sampling or such that the sonde does not cause bottom sediments to be stirred up and collected in the sampling container. Perform flow measurements after sample collection or downstream during sample collection. Always collect samples facing the sampling equipment or sample bottles upstream. Put on safety gear such as PFD's, waders, and gloves.

Do not rinse sample bottles unless directed by the lab or the project manager. In most cases, bottles are obtained from the State Lab and are pre-cleaned and already contain preservative.

8.2.2 Sample collection by wading

Use this technique when the stream can be waded safely.

1. Put on chest waders or hip boots. If wearing chest waders, use a belt for safety.

2. Gather pre-labeled sample bottles.

3. Approach the sampling location slowly, walking from downstream to upstream. Make sure any disturbed sediments are moved downstream by the current before collecting the sample.

4. Samples should be collected in the thalweg if possible but if this area is to deep, choose a point in the channel cross-section where water is flowing and appears to be well-mixed (avoid backflows and eddies). In wetland areas with little or no flow, extreme caution should be taken to avoid contamination from sediment stirred up by boats or walking to sample locations.

5. Remove the sample bottle cap.

6. Reach forward facing the bottle opening into the current upstream and quickly plunge the container below the surface to avoid any introduction of surface scum or floating debris. Do not touch the inside of the bottle cap, lip of the container, or inside of the container. Avoid touching the bottle to the stream bottom.

7. Be careful not to overfill sample bottles, unless directed by laboratory (for example, for volatile organic compound analysis). For bottles pre-filled with preservative, overfilling would cause loss of the preservative and therefore some headspace must be remaining.

8. Bring the bottle up out of the water and immediately replace the cap.

9. Repeat for the remaining sample bottles and return to shore.

8.2.3 Sample collection from the bank/edge

Use this technique when water is flowing too fast or is too deep to safely wade out into the stream. A dip sampler (a sample bottle holder with an extension handle) may be used to reach further out in the cross-section to an area with more flow and that is well-mixed. If flow is too fast to use a dip sampler (sampler gets pulled downstream when placed in water), simply collect the sample by hand from the shore at an area along the bank where water is flowing and appears to be well-mixed.

1. Gather pre-labeled sample bottles and either hold in hand or place a pre-cleaned sampling container into dip sampler if using.

2. Approach the sampling location slowly from downstream.

3. Remove the sample bottle/sampling container cap.

4. Carefully reach over the bank/edge facing the bottle/container opening into the current upstream and quickly plunge the bottle/container below the surface to avoid any introduction of surface scum or floating debris. Do not touch the inside

of the cap, the lip, or the inside of the bottle/container. Avoid touching the bottle/container to the stream bottom.

5. Be careful not to overfill sample bottles, unless directed by laboratory (for example, for volatile organic compound analysis). For bottles pre-filled with preservative, overfilling would cause loss of the preservative and therefore some headspace must be remaining.

6. Bring the bottle/container up out of the water and immediately replace the cap.

7. Repeat for the remaining sample bottles and return to shore. If using a dip sampler with a sampling container, fill the container using procedures above and carefully pour the sample into the individual sample bottles, being sure the sample is well-mixed before each pour.

8.3 Sample Filtering

If dissolved metals and/or dissolved nutrients analysis is required, samples should ideally be filtered in the field immediately following collection, or as directed in the project-specific SAP.

1. Rinse the outside of the intake tubing thoroughly with DI water.

2. Place the intake tubing into the DI water jug.

3. Turn on the pump.

4. Flush the filter holder and tubing with at least 500 milliliters of DI water, using the pump to pull the DI water through the filtering apparatus.

5. Turn off the pump.

6. Thoroughly mix the raw water sample to be filtered by gently inverting the sample container several times.

7. Place the intake tubing into the raw water sample container.

8. Turn on the pump.

9. Flush the filter holder and tubing with at least 500 milliliters of sample water to purge the apparatus of the DI water, using the pump to pull the sample water through the filtering apparatus.

10. Turn off the pump.

11. Unscrew the filter holder to access the filter stage, being careful to not touch the inside of the filter holder.

12. Using clean forceps, load the filter holder with an unused membrane filter, being careful not to touch the filter.

13. If water sample has any visible turbidity, overlay the membrane filter with a glass-fiber pre-filter.

14. Screw the filter holder back together.

15. Remove the caps from the sample bottles for the dissolved constituents.

16. Turn on the pump and hold the filter holder over the sample bottle, being careful to not let the filter holder contact the lip or inside of the bottle.

17. Alternate between the sample bottles during filling and gently swirl the raw water sample container to ensure homogenous samples.

18. If the filter clogs before the sample bottles can be filled, the pump must be turned off and the clogged filter must be removed and a new filter placed into the filter holder.

19. Be sure not to overfill the bottles. For bottles pre-filled with preservative, overfilling would cause loss of the preservative and therefore some headspace must be remaining.

20. Turn off the pump.

21. Immediately replace the sample bottle caps.

22. Remove the used filters and discard.

23. Rinse the entire filtering apparatus with at least 500 milliliters of DI water.

24. Store the filtering apparatus in a clean location until the next sample.

8.4 Sample Handling and Preservation

Refer to the project-specific SAP for specific sample handling and preservation requirements or to the analyzing laboratory's request form or analytical method. For routine water chemistry samples to be analyzed at the State Lab, bottles come pre-cleaned with preservatives inside the bottles. These samples must be stored on ice or refrigerated immediately after sample collection until delivery to the laboratory. **Table 1** below lists the sample preservation and holding time requirements for analyses performed by the State Lab.

Table 1. Sample preservation and holding time requirements for each analysis performed by the State Lab (from State Lab's 2010 Quality Assurance Program Plan).

TEST: METHOD	CONTAINER TYPE	VOL.	PRESERVE	HOLDING TIME
Ammonia: Method EPA 350.3	Plastic[1]	500 ml	H_2SO_4 pH < 2 store at 4-6ºC	28 Days
Alkalinity(See Total Alkalinity SM2320B)	Plastic[1]	125 ml	Store at 4-6ºC	14 Days
Bacillus: Method	Sterile Plastic	200 ml	Sodium Thiosulfate, store at 4-6ºC	48 Hours
BOD_5: Method EPA 405.1	Plastic[1]	2 liter	No preservative, store at 4-6ºC	48 Hours
BTEX: Modified Method 602, Modified Method 8020	Glass[2] Teflon lined silicon septa	2/40 ml	1:1 HCl to pH < 2 store at 4-6ºC	14 Days
Carbamates: Method EPA 531.1	Amber Glass[2]with Teflon cap liner	40 ml	1.2 ml Monochloracetic Acid Buffer, store at 4-6ºC, Sodium Thiosulfate if residual chlorine present	28 Days
Chlorinated Pesticides (Soil): Method EPA 8150	Wide Mouth[3] Glass with Teflon Lined Lid	4 oz	Keep cool at 4-6ºC,	Extract within 14 Days, analyze within 40 Days
Chloride: Method EPA 323.3	Plastic[1]	2 Liter	Store at 4-6ºC	28 Days
Chlorophyll a: Method SM10200H	Opaque Plasic[1]	Variable Filtration Volume	Keep Frozen	21 Days
Chromium VI: Method SM3500-CD	Plastic[1]	250 ml	Store at 4-6ºC	24 Hours
C.O.D. (Chemical Oxygen Demand): Method EPA 410.4	Plastic[1]	500 ml	H_2SO_4 to pH < 2 Store at 4-6ºC	28 Days

TEST: METHOD	CONTAINER TYPE	VOL.	PRESERVE	HOLDING TIME
Coliforms Total & Fecal Colilert – Drinking water & pools: Method SM9223B	Sterile plastic	100 ml	Sodium Thiosulfate, store at 4-6ºC	30 Hours
Coliforms Total & Fecal Membrane filtration – Surface waters: Method SM9222B, D	Sterile plastic	100 ml	Sodium Thiosulfate, store at 4-6ºC	8 Hours
Color: Method EPA 110.2	Plastic[1]	250 ml	No preservative, store at 4-6ºC	48 Hours
Conductivity EPA 120.1 (See Specific Conductivity)	Plastic[1]	125 ml	Store at 4-6ºC	28 Days
Copper/Lead: Method EPA 200.8	Plastic[1]	1 liter	4 ml HNO_3 to pH <2 add on arrival at the lab	6 Months
Corrosivity (Characteristic of a Hazardous Waste): Method EPA 1110 **	Glass, Amber[2]	2 liter	None Required	7 Days
Crypto & Giardia Method EPA 1623	Envirocheck Filter Gelman #12110	10 liters filtered	No preservative, store at 4-6ºC	24 Hours
Cyanide (Total and amenable to chlorination): Method EPA 335.4	Plastic[1]	500 ml	NaOH to pH>12 Ascorbic acid in the presence of residual chlorine	14 Days
Dissolved Solids: Method SM2540C, EPA 160.1 (See Solids)	Plastic[1]	2 liter	Store at 4-6ºC	7 Days
Ethylene and Propylene Glycol: Method GC/FID	Amber Glass[2] with Teflon cap liner	40 ml	Store at 4-6ºC	28 Days
Fluoride: Method SM4500C	Plastic[1]	125 ml	None Required	28 Days
HAAs (Haloacetic Acids): SM6251B	Glass[2] with Teflon lined septum	4/40 ml	65 mg NH_4CI, store at 4-6ºC	Extract within 14 Days, analyze extract within 7 Days

TEST: METHOD	CONTAINER TYPE	VOL.	PRESERVE	HOLDING TIME
Ignitability: Method EPA 1010 **	Wide Mouth Glass[2]	4 oz	Store at 4-6ºC	7 Days
Ion Chromatography Bromide, Chloride: Method EPA 300.0	Plastic[1]	125 ml	Store at 4-6ºC	28 Days
Ion Chromatography Bromate: Method EPA 300.0	Plastic[1]	125 ml	Store at 4-6ºC Ethylenediamine	14 Days
Ion Chromatography Chlorate, Chlorite: Method EPA 300.0	Plastic[1]	125 ml	Store at 4-6ºC	28 Days
Lead/Copper: Method EPA 200.8	Plastic[1]	1 liter	4 ml HNO_3 to pH<2 add on arrival at the lab	6 Months
Maximum THM Potential: Method EPA 502.2	Glass[2], Cap with Teflon lined septum	2/40 ml	No preservative, store at 4-6ºC	Spike with Chlorine as soon as possible. Analyze within 14 Days after quenching
Metals: (See Total Metals)	Plastic[1]	250 ml	HNO_3 to pH<2	6 Months
Mercury: (See Total Metals)	Plastic[1]	250 ml	HNO_3 to pH<2	28 Days
MPA consensus method	Commercial LT-10 filter	100 – 1000 gallons	No preservative, store at 4-6ºC	48 Hours
Nitrate Plus Nitrite: Method EPA 353.2	Plastic[1]	120 ml	H_2SO_4 to pH<2 store at 4-6ºC	28 Days
Nitrite: Method EPA 353.2	Plastic[1]	125 ml	No preservative, store at 4-6ºC	48 Hours
Nutrients (Total phosphate: Method 365.1, Nitrate plus Nitrite Method EPA 353.2)	Plastic[1]	500 ml	H_2SO_4 to pH<2 Store at 4-6ºC	28 Days
Odor: Method EPA 140.1	Amber Glass[2]	250 ml	No preservative, store at 4-6ºC	24 Hours

TEST: METHOD	CONTAINER TYPE	VOL.	PRESERVE	HOLDING TIME
Oil & Grease (Solids): Method SM5520 B	Wide Mouth Glass[2]	4 oz	Store at 4-6ºC	28 Days
Organohalides and PCBs: Method EPA 608	Glass[2] With Teflon lined lid	1 Liter	If residual chlorine present, 3 mg sodium thiosulfate, store at 4-6ºC	Extract within 7 Days, analyze extract within 40 Days
Organohalides and PCBs(Soil): Method EPA 8081	Wide Mouth Glass[2] with Teflon Lined Lid	4 oz	Keep cool at 4-6ºC	Extract within 14 Days, analyze extract within 40 Days
Organohalides and PCBs(water): Method EPA 8081	Amber Glass[2] with Teflon lined lid	1 liter	0.08 % sodium thiosulfate if residual chlorine, store at 4-6ºC	Extract within 7 Days, analyze extract within 40 Days
Perchlorate: Method EPA 314.0	Plastic[1] or Glass[2]		None	28 Days
PCB Screening: Method EPA 508A	Glass[2] With Teflon lined lid	1 liter	Store at 4-6ºC	Extract within 14 Days and analyze the extract within 30 Days
Pesticides, Herbicides, Chlorinated Acids: Method EPA 515.1, EPA 508.1	Amber Glass[2] with Teflon cap liner	1 liter	Store at 4-6ºC, Sodium Thiosulfate if residual chlorine present	Extract within 14 Days and analyze the extract within 28 Days
pH: Method EPA 150.1	Plastic[1]	2 liter	No preservative	Analyze Immediately
Phosphate, total: Method EPA 365.1 (See Nutrients)	Plastic[1]	500 ml	H_2SO_4 to pH<2 Store at 4-6ºC	28 Days
Phenols: Method EPA 625	Amber Glass[2] with Teflon cap liner	2/1 liter	0.008% Sodium Thiosulfate, Store at 4-6ºC	Extract within 7 Days, analyze extract within 40 Days
Radiochemistry Gross Alpha and Beta: Method EPA 900.0	Plastic[1]	2 liter	HNO_3 to pH<2 (must preserved)	6 Months (within 5 Days)

TEST: METHOD	CONTAINER TYPE	VOL.	PRESERVE	HOLDING TIME
Radiochemistry Radium 226: Method EPA 903.1, Radium 228: Method EPA 904.0, Uranium (Total and Dissolved): Method EPA 908.0, Gamma Emission: Method EPA 901.1	Plastic[1]	½ gallon	HNO_3	6 Months
Radon: Method EPA 913.0	Glass[2]	3/40 ml	No preservative, insulated packaging	72 Hours maximum, but prefer within 24 Hours
Reactive Cyanide and Sulfide: Method EPA 9030	Wide Mouth Glass[2]	4 oz	Store at 4-6ºC	7 Days
Semi Volatile Organic Compounds: Method EPA 525.2	Amber Glass[2]	1 liter	50 mg sodium thiosulfate, to pH<2 with HCI, store at 4-6ºC	Extract within 14 Days analyze extract within 30 Days
Semi Volatiles Methods EPA 625	Amber Glass[2] with Teflon cap liner	2/1 liter	Store at 4-6ºC, If residual chlorine add 8 mg/L sodium thiosulfate	Extract within 7 Days, analyze extract within 40 Days
Semi Volatile Organics (Soil): Method EPA 8270	Wide Mouth Glass[2] with Teflon Lined Lid	4 oz	Keep cool at 4-6ºC	Extract within 14 Days, analyze extract within 40 Days
Semi Volatile Organics(Water): Method EPA 8270	Glass, Amber with Teflon lined lid	1 liter	0.08 % sodium thiosulfate if residual chlorine, store at 4^{o} C	Extract within 7 Days, analyze extract within 40 Days
Silica: Method EPA 370.1	Plastic[1]	2 liter	Cool 4-6ºC	28 Days
Solids: Total Suspended Method EPA 160.2	Plastic[1]	2 liter	Store at 4-6ºC	7 Days
Solids: Total Dissolved Method SM2540C, EPA 160.1	Plastic[1]	2 liter	Store at 4-6ºC	7 Days

TEST: METHOD	CONTAINER TYPE	VOL.	PRESERVE	HOLDING TIME
Solids: Total Volatile Method EPA 160.4	Plastic[1]	2 liter	Store at 4-6ºC	7 Days
Solids: Settable Method EPA 160.5	Plastic[1]	1000ml	Store at 4-6ºC	48 Hours
Specific Conductivity: Method EPA 120.1	Plastic[1]	125 ml	Store at 4-6ºC	28 Days
Sulfate: Method EPA 375.2,	Plastic[1]	125 ml	Store at 4-6ºC	28 Days
Sulfide: Method EPA 376.2	Plastic[1]	125 ml	3 Drops Zinc Acetate & NaOH to pH>9	7 Days
Surfactants: Method SM5540C	Amber Glass[2]	1 liter	No preservative, Store at 4-6ºC	48 Hours
Suspended Solids: Method EPA 160.2 (See Solids)	Plastic[1]	2 liter	Store at 4-6ºC	7 Days
TCLP(Toxic Characteristic Leaching Procedure)-Metals: Mercury Method EPA 1311	Wide Mouth Glass[2] or Plastic[1]	16 oz solid or 4 L of Liquid	Preserve with Nitric Acid to pH <2 after TCLP	Mercury: 7 Days to TCLP, 28 Days to analyze
TCLP(Toxic Characteristic Leaching Procedure)-Metals: Other Metals Method EPA 1311	Wide Mouth Glass[2] or Plastic[1]	16 oz solid or 4 L of Liquid	Preserve with Nitric Acid to pH <2 after TCLP	Other Metals 7 Days to TCLP, 180 Days to analyze
TCLP(Toxic Characteristic Leaching Procedure)- Organics: Semi-VOAs Method EPA 1311	Wide Mouth Glass[2] with Teflon Lined Lid	8 oz (240 ml)[3]	Keep cool at 4-6ºC	Semi Volatiles: 7 Days to TCLP, 40 Days to Analyze

TEST: METHOD	CONTAINER TYPE	VOL.	PRESERVE	HOLDING TIME
TCLP(Toxic Characteristic Leaching Procedure)-Organics: VOAs EPA 1311 ZHE	Wide Mouth Glass[1] with Teflon Lined Lid	8 oz (240 ml)[3]	Keep cool at 4-6ºC	Volatiles: 14 Days to TCLP ZHE 14 Days to Analyze
THM, Maximum Potential: Method 524.2	Glass[2] , Cap with Teflon lined septum	2/40 ml	No preservative, store at 4-6ºC	Spike with chlorine as soon as possible. Analyze within 14 Days after quenching.
THMs: Method EPA 502.2	Glass[2] , Cap with Teflon lined septum	4/40 ml	Sodium thiosulfate, store at 4-6ºC	14 Days
THM/TTHM: Method EPA 524.2	Glass[2] with Teflon lined septum	2/40 ml	4 mg sodium thiosulfate, Store at 4-6ºC	14 Days
T.K.N.: Method EPA 351.4	Plastic[1]	500 ml	H_2SO_4 to pH < 2 Store at 4-6ºC	28 Days
TOC: Method SM5310B, SM5310C	Amber Glass[2]	4 to 6 oz	H_2SO_4 to pH < 2 Store at 4-6ºC	28 Days
Total Alkalinity: Method SM2320B	Plastic[1]	125 ml	Store at 4-6ºC	14 Days
Total Chemistry (Various methods and analytes)	Plastic[1]	2 liter	Store at 4-6ºC	Variable, depending on analyte
Total Metals (Drinking and Wastewater): Methods EPA 200.7, EPA 200.8, EPA 200.9, EPA 245.1 (Mercury)	Plastic[1]	250 ml	HNO_3 to pH<2	Mercury: 28 Days Other Metals 6 Months
Total Metals (Soils/Sediments and Sludges): Methods EPA 6010, EPA 6020, and EPA 7471 (Mercury)	Wide Mouth Plastic[1] or Glass[2]	4 oz[3]	Store at 4-6ºC	Mercury: 28 Days Other Metals 6 Months

TEST: METHOD	CONTAINER TYPE	VOL.	PRESERVE	HOLDING TIME
TPH: Method EPA 8015 (Modified)	Glass[2] with Teflon lined septum	2/40 ml	No preservative store at 4-6ºC	Extract within 14 Days, analyze extract within 40 Days
Turbidity: Method EPA 180.1	Plastic[1]	2 liters	Store at 4-6ºC	48 Hours
UV-254: Method SM5910B	Amber Glass[2]	4oz	No preservative store at 4-6ºC	As soon as possible, not to exceed 48 Hours
Volatile Organic Compounds: Method EPA 524.2	Glass[2] with Teflon lined silicon septum	3/40 ml Includes Trip Blank	25 mg ascorbic acid, to pH<2 with HCL, store at 4-6ºC	14 Days
Volatile Organic Compounds: Method EPA 624	Glass[2] with Teflon lined septum	2/40 ml	Store at 4-6ºC 10mg/L of sodium thiosulfate if residual chlorine present, If testing for aromatics, use HCl to pH < 2	14 Days
Volatile Organic Compounds (Soil): Method EPA 8260	Wide Mouth Glass[2,3] with Teflon Lined Lid	4 oz	Keep cool at 4-6ºC	Extract with 14 Days, analyze extract within 14 Days
Volatile Organic Compounds(Water): Method EPA 8260	Glass[2] with Teflon lined septum	2/40 ml	store at 4-6ºC Add sodium thiosulfate, if residual chlorine present	14 Days
Volatile Solids: Method EPA 160.4 (See Solids)	Plastic[1]	2 liter	Store at 4-6ºC	7 Days

[1] All plastic containers, as specified by the Method, will be new, with the proper preservative added for the type of sample to be collected.

[2] All glass containers, as specified by the Method, will be washed with soap and water, rinsed with de-ionized water, rinsed with distilled water, and oven dried.

[3] The above sample containers assume that the sample is 100% solids and uniform particle size. If the sample is less than 100% solid a larger sample volume is required.

** No longer performed at State Health Laboratory, but sample may be received preserved as indicated and then analyzed by a subcontracting laboratory.

If samples are for enforcement, follow legal chain-of-custody procedures for sample handling and sample tracking (refer to DWQ's SOP for Chain-of-Custody Procedures).

9.0 DATA AND RECORDS MANAGEMENT

Specific data and records management requirements can be found in the project-specifc SAP. Sample bottles must be labeled properly and the information on the label must match the information on the "Lab Sheet" or other sample tracking or chain-of-custody form. Information on sample labels must be written in permanent ink, preferably using a "Sharpie" brand marker. For routine samples to be analyzed at the State Lab, sample labels must contain the following information: Site ID, site description, date, time, and sampler(s).

Before leaving field site, be sure that all required samples have been collected, labeled, and that all appropriate field sheets, field notes, and sample tracking forms have been filled out completely and accurately.

DWQ must receive a photocopy or scanned electronic copy of each "Lab Sheet", sample tracking form, or chain-of-custody form. These forms are given to the DWQ's Database Manager and used to perform data verification and track expected analytical results from the laboratory. The copies are then placed in the project file for storage.

For more information, refer to DWQ's SOP for Field Data Management.

10.0 QUALITY ASSURANCE AND QUALITY CONTROL

Representative samples are to be collected, according to the sampling conditions required under the project-specific SAP. Samplers should not alter designated sampling locations or times unless otherwise directed by a project manager. If hydrologic conditions are significantly different from those targeted in the SAP, samplers should contact the project manager for further instructions. Samplers should record in field notes any site conditions that may lead to an unrepresentative sample and should take site photographs to record these observations. Samplers should also be observant of any potential sources of pollution in the surrounding area of the sampling location, comment on these observations in the field notes, and notify the project manager upon returning to the office.

All sampling equipment must be decontaminated before and after use according to the SAP.

Quality control (QC) samples (equipment blanks, trip blanks, field duplicates, etc.) should be collected at the frequency given in the project-specific SAP. Minimum collection frequency and performance requirements for QC samples are given in DWQ's Quality Assurance Program Plan.

11.0 REFERENCES

DWQ's Quality Assurance Program Plan – currently in Draft form

DWQ's SOP for Chain-of-Custody – currently being drafted

DWQ's SOP for Field Data Management – currently being drafted

DWQ's SOP for Filtering of Chlorophyll-a Samples – currently in Draft form

DWQ's SOP for Lake Water Sample Collection – currently in Draft form

DWQ's SOP for Water Quality Monitoring Runs – currently in Draft form

Faber, T. 2002. Standard Operating Procedure for the Collection of Chemical and Biological Ambient Water Samples. The Office of Environmental Measurement and Evaluation. EPA New England Region 1. Water Sampling 1.0.wpd, Revision #1, 7/24/2002.

12.0 APPENDIX

SOP Acknowledgment and Training Form (front and back)

SOP Acknowledgement and Training Form

This SOP must be read and this form signed annually. This form must be kept with the current version of the SOP.

Document Title:	
Document Revision Number:	
Document Revision Date:	

Please sign below in accordance with the following statement: "I have read and understood the above referenced document. I agree to perform the procedures described in this SOP in accordance with the document until such time that it is superseded by a more recent approved revision."

Printed Name	Signature	Date

SOP Acknowledgement and Training Form (continued)

Trainee: Sign below to acknowledge that training on this SOP was received, understood, and all questions/concerns were addressed by the trainer.

Trainer: Sign below to acknowledge that training on this SOP was completed for the individual listed and that trainee is competent to perform the procedures described within.

Date of Training	Trainee Printed Name	Trainee Signature	Trainer Printed Name	Trainer Signature