EM-15

Amendment 1 to the Quality Assurance Project Plan and Associated SOP's

for

Empirical Human Exposure Assessment Multi-City Study Sampling Task

To
(Confidential)

June 16, 1999

Prepared by

Battelle
397 Washington Street
Duxbury, MA 02332
(781) 934-0571

APPROVALS

Donald Gunster Sampling Task Leader	Date
Rosanna Buhl Battelle Sampling Task QA Officer	Date
Marcia Nishioka Battelle Project Manager	7/9/99 Date
Susan Abbgy Battelle Program QA Officer	7-9-99 Date
	Date

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Objective

The objective of this amendment to the QAPP and SOP's is to document changes to several processes that have occurred within the field program of the Multi-City Study. The initial field survey resulted in several issues that require either amendment or inclusion into the defined protocol for the field study.

Protocol Changes

- Section 11.1.4 along with SOP M3-F-6 describes the labeling of samples collected during the study. In addition to the samples highlighted in both of these documents, labels will be produced for 'Trip Blank' samples.

- The QAPP describes the collection of samples for the Battelle Columbus facility only. At the clients request samples will be collected for two addition laboratories. The laboratories include the clients 'in house' environmental lab and a third party validation lab.
  The additions of these unexpected samples triple the number of containers collected during field activities. To ensure accurate sample control a labeling nomenclature system has been implemented. Samples for Battelle will contain a numerical identifier that corresponds to a given matrix followed by a 'B'. Samples for the client will contain the same numerical identifier but will contain a 'K' following the number. Samples for the validation lab will also contain the same numerical identifier but will contain a 'H' following the number (ex. POTW Effluent ID: MC-101B, MC-101K, and MC-101H).

- Section 12.2 of the QAPP indicates that samples will be shipped at the end of each day following collection. The logistical and scheduling difficulties associated with collecting over one hundred samples in a given day at various locations will, in most cases, precluded this from occurring. The amendment to this process is to store the samples on ice overnight and ship them as early as possible on the following day. Also, the shipment of samples on a Friday during a survey **REQUIRES** the prior scheduling of receipt on Saturday at either the destination facilities (OH or MN)or the Duxbury facility. If samples are shipped to Duxbury, then arrangements must be made to send the samples to the destination facilities on the next business day.

- SOP M3-F-4.0 Defines the labeling requirements for the spiking ampoules. The requirement is that each ampoule will be labeled individually with several pieces of information. The actual size of the ampoules precludes all this information from being recorded directly on the ampoules, therefore the information must be recorded separately and attached. To facilitate efficient and accurate labeling and spiking, a different approach will be initiated.
  The ampoules containing each type of spiking solution (polar and neutral compounds) will be stored and shipped in separate containers (i.e., ampoule storage container or standards storage box). On the exterior of the container all required information will be assigned. On the individual ampoules, only the name of the compound class, e.g., polar or neutral (for polar compound spiking mix or neutral compound spiking mix) and the intended matrix for

introduction will be affixed. This process will reduce the time required for labeling and spiking while ensuring the accurate introduction of the proper material to the sample.

- SOP M3-F-7.0 Section 3.0 describes the procedure for collecting water and sludge samples. These procedures indicate a step that requires the sample container to be wiped with methanol prior to and following sampling. This process adds hours to sample collection procedures. Following the initial field survey a discussion was held between the project manager and several team members to determine if the reduction in potential contamination warranted such a procedure. The result of this discussion is that this procedure will not be continued during subsequent surveys. The use of gloves during collection, and the prohibition of materials containing possible contamination sufficiently reduces the possibility of contamination.

MULTICITY FIELD QAPP
AMENDMENT 2
FISH and MICROLAYER WATER SAMPLING PLAN

Amendment 2 to the Quality Assurance Project Plan and Associated SOP's

for

Empirical Human Exposure Assessment Multi-City Study Sampling Task

To
(Confidential)

July 23, 1999

Prepared by

Battelle Marine Sciences Laboratory
1529 West Sequim Bay Road
Sequim, WA 98382
360-681-3660

APPROVALS

Donald Gunster Sampling Task Leader	Date
Rosanna Buhl Battelle Sampling Task QA Officer	Date
Marcia Nishioka Battelle Project Manager	Date
Susan Abbgy Battelle Program QA Officer	Date
	Date

Objective

The objective of this amendment to the QAPP and SOP's is to document scope changes that have occurred within the field program of the Multi-City Study. These changes pertain to field methods for collection of fish, bulk water, and microlayer samples.

Protocol Changes

- Table 3 is amended below to include microlayer and bulk water samples.

Table 3. Sample Types, Sampling Devices, and Sample Volumes

Sample type	Sampling device	Volume or Amount collected per sample
Drinking Water		
Surface Water source (3 locations – 500 ft apart)	Sample bottle[a]	1 L from each location; bulk water, not surface
Sediment from surface water source (3 locations, match w/ water sample)	Grab sampler or scoop	200 g from top 2 cm
Plant intake	Sample bottle	1 L
Treated water from plant	Sample bottle	1 L
Tap water from retail establishment (from 3 locations in city)	Sample bottle	1 L
Microlayer from surface water	Glass plate	1 L
Bulk water from surface water	Sample bottle	1 L
Water from groundwater source	Sample bottle	1 L
Publicly-Owned Treatment Works (POTW)		
Post-chlorination influent (if available)	Sample bottle	1 L
Sludge	Scoop	200 g
Effluent	Sample bottle	1 L
Landfill		
Leachate	Sample bottle	1 L
Urban Air		
Particulates (glass fiber filter)	General Metal Works Model PS-1 air sampler	12 h at 250 L/min
Vapor (polyurethane foam cartridge)		12 h at 250 L/min
Local Food Supply		
Ground beef (3 stores)	Store packaging	1 lb
Pork chops with bone (3 stores)	Store packaging	1 lb (~ 2 chops)
Boneless, skinless chicken breast (3 stores)	Store packaging	1 lb (1 whole breast)
Pork-and-beef hot dogs (3 stores)	Store packaging	1 lb (1 package)
Regional fish (3 stores)	Store packaging	1 lb (filleted)
Eggs (3 stores)	Store packaging	6 large
Whole milk in plastic or cardboard container (3 stores)	Store packaging	1 qt
White bread (3 stores)	Store packaging	1 loaf
Frozen green beans in plastic bag (3 stores)	Store packaging	1 pkg
Fresh apples (3 stores)	Store packaging	1 lb (at least 2 apples)

Organic bread or flour (1 store)	Store packaging	1 lb or 1 loaf
Fish		
Finfish (electroshock) from surface water source (above)	Smith-Root Model 12 backpack electroshocker	200 g (minimum)

(a) Sample bottles will be ESS precleaned, certified polyethylene bottles
(b) Not planned for Multi-City Study

- Table 4 is amended below to include bulk water, microlayer, and finfish samples.

Table 4. Sample Types and Numbers at Sampling Locations at Each City

Matrix	Analysis for Site 1 Sample	Sample Volume			Analysis for
		Site 1	Site 2	Site 3	Sites 2&3 Samples
Surface Water (one water body)	Sample: P&N residuals (P & N)	1 L	1 L	1 L	P & N
	Sample: Total PFOS (in duplicate)	1 L			
	Field duplicate & laboratory duplicate: P	1 L			
	Field spike: P&N	1 L			
	Laboratory spike: P&N	1 L			
	Field Blank: P & N				
	Field Blank: Total PFOS				
Microlayer water	Sample: Total PFOS (in duplicate) Field Blank: Total PFOS	1 L			
Bulk water	Sample: Total PFOS (in duplicate) Field Spike: Total PFOS	1 L 1 L			
Sediment	Field duplicate & laboratory duplicate: P	200 g	200 g	200 g	P&N; Total PFOS
	Field spike: P&N				
	Laboratory spike: P&N				
Drinking water (plant influent)	Field Blank: P & N	1 L			
	Field Blank: Total PFOS	1 L			
	Field duplicate & laboratory duplicate: P	1 L			
	Field spike: P&N	1 L			
	Laboratory spike: P&N	1 L			
	Field Blank: P & N				
Drinking water (plant outflow)	Sample: P&N	1 L			
	Sample: Total PFOS (in duplicate)	1 L			
	Field duplicate &laboratory duplicate: P	1 L			
	Field spike: P&N	1 L			
	Laboratory spike: P&N	1 L			
Tap water (retail outlet)	Sample: P&N	1 L	1 L	1 L	P & N
	Sample: Total PFOS (in duplicate)	1 L			
	Field duplicate & laboratory duplicate: P	1 L			
	Field spike: P&N	1 L			
	Laboratory spike: P&N	1 L			
	Field Blank: P & N				
Landfill leachate	Samples and laboratory QC (no field spikes): P & N; Total PFOS	1 L			
	Field Blank: P & N				
POTW influent	Sample and laboratory duplicate: P & N	1 L			
	Sample: Total PFOS (in duplicate)	1 L			
POTW sludge	Samples and laboratory QC (no field spikes): P & N; Total PFOS	200 g			
	Field Blank: P & N				
POTW effluent	Sample and laboratory duplicate: P&N	1 L			

	Sample: Total PFOS (in duplicate) Field duplicate: P & N	1 L			
	Field spike: P & N	1 L			
	Laboratory spike: P & N	1 L			
	Field Blank: P & N				
Urban air	Sample: P&N	Filter/PUF			
	Field spike- no air	Filter/PUF			
	Field Blank: P & N	Filter/PUF			
Food	Samples and laboratory QC (no field blanks/field spikes): P & N; Total PFOS	All	All	All	P&N; Total PFOS
Finfish	Sample and laboratory QC	200 g			
Organic flour	Samples and laboratory QC (no field blank/field spike): P & N; Total PFOS	1 lb			
Trip Blank	MilliQ water: P & N	1 L			
Trip Blank	MilliQ water: Total PFOS	1 L			

P= polars: PFOS, PUAA, PFOSA, PFOSAA, M556; N= neutrals: Et/Me of FOSE-OH, FOSE-Cl, FOSE-Amide

- Table 5 is amended below to include bulk water and microlayer samples.

Table 5. QC Samples by Matrix

Matrix and Analysis Type	Field Sites	Field Rep	Lab Reps	Spikes		Field Blank	Field Spike Conc.
				Field	Lab		
Surface Water							
P & N	3	1	(1)[a]	1	1	1	100 ng/L
Total PFOS	1	0	(1)	0	0	1	
Microlayer Water							
Total PFOS	1	3	(1)	0	0	1	
Bulk Water							
Total PFOS	1	3	(1)	3	0	0	100 ng/L
Sediment							
P & N	3	0	(3)[a]	0	(1)	1	
Total PFOS	(3)	0	(3)	0	(1)	1	
Drinking Water (influent)							
P & N	1	1	(1)	1	1	1	100 ng/L
Total PFOS	1	0	(1)	0	0	0	
Drinking Water (outflow)							
P & N	1	1	(1)	1	1	0	100 ng/L
Total PFOS	1	0	(1)	0	0	0	
Tap Water							
P & N	3	1	(1)	1	1	1	100 ng/L
Total PFOS	1	0	(1)	0	0	0	
Landfill Leachate							
P & N	1	0	(3)	0	(1)	1	
Total PFOS	(1)	0	(3)	0	(1)	0	
POTW (influent)							
P & N	1	0	(1)	0	0	0	
Total PFOS	1	0	(1)	0	0	0	
POTW sludge							
P & N	1	0	(3)	0	(1)	1	
Total PFOS	(1)	0	(3)	0	(1)	0	
POTW (effluent)							
P & N	1	(1)	(1)	1	1	1	1000 ng/L

Total PFOS	1	0	(1)	0	0	0	
Urban Air							
P & N	1	0	0	1	0	1	Filter: 100 ng PFOS & POAA PUF: 100 ng Et- & -Me-FOSE-OH
Total PFOS	0	0	0	0	0	0	
Food (including finfish)							
P & N	3[c]	0	(1)[d]	0	(1)	0	
Total PFOS	(3)[c]	0	(1)[d]	0	(1)	0	

[a]Numbers in parentheses indicate samples that will be created from splits or aliquots in the laboratory.
[b]Triplicate analysis of one sediment sample.
[c]Organic flour at one site, only.
[d]Duplicate analysis of the fish samples.
P– polars: PFOS, POAA, PFOSA, PFOSAA, M556; N= neutrals: Et/Me of FOSE-OH, FOSE-Cl, FOSE-Amide

- Table 6 is amended below to include SOPs for finfish and microlayer sampling.

Table 6. Standard Operating Procedures

SOP Title	SOP No.
Collection and Handling of Air Samples for the Multi-Cities Project	M3-F-1
Collection and Handling of Water Samples for the Multi-Cities Project	M3-F-2
Spiking Field Samples for the Multi-Cities Project	M3-F-4
Assigning Sample IDs for the Multi-Cities Project	M3-F-6
Collection and Handling of Sediment Samples for the Multi-Cities Project	M3-F-7
GPS Operation and Calibration (draft)	Battelle 3-164
Sample Shipping for the Multi-Cities Project	Battelle 5-210
Sample Custody	Battelle 6-010
Collection and Handling of Aquatic Surface Microlayer Samples	MSL-T-022-00
Collection and Handling of Fish Samples Using a Backpack Electroshocker	MSL-T-023-00

- Section 7.3.1 is amended as follows: Scientific collecting permits and fishing licenses (if required) will be obtained for each state where fish will be collected.

- Section 7.3.3 and 11.1.3 are amended as follows: The Battelle Marine Sciences Laboratory and Pacific Northwest National Laboratory (MSL/PNNL) sampling team will be using a Trimble Geocxplorer hand-held GPS to determine the exact location (coordinates) at each sample collection location, rather than a Garmin 12 XL system. The Trimble unit will be operated according to SOP No. 3-164. Deviations from this SOP will be documented in the field and revisions to the QAPP will be submitted after the field effort.

- Section 7.3.5 is amended as follows: Microlayer and associated bulk water samples will be collected at each site where finfish are collected. Both sample types will be collected from one location within the matched sediment/water/fish site for each city. Samples will be collected as described for the whole (bulk) water collected in association with the surface

water source. Two liters of the surface microlayer (MSL-T-022-00) and 2 L of bulk water (SOP M3-F-2.0) will be collected into ESS (sic ESE) certified clean bottles.

- Section 7.3.10 is amended as follows: Finfish species will include largemouth bass and smallmouth bass, in addition to perch and bluegill. The common name "bluegill" is used here to refer to any of a number of different species belonging to the sunfish family (Centrarchidae), including pumpkinseed, redear sunfish, warmouth, green sunfish, white crappie, and black crappie. The [note] in the May 14, 1999 QAPP no longer applies.

- Section 8 is amended as follows: Finfish, microlayer, and bulk water sampling are scheduled to take place in Mobile, AL, Pensacola, FL, Port St. Lucie, FL in July 1999, and in Columbus, GA, Cleveland, TN, Decatur, AL in August 1999.

- Section 9.1 is amended as follows: Mr. Dave Shreffler from Battelle Marine Sciences Laboratory is the Sampling Team Leader for the fish and microlayer sampling. Mr. Shreffler will be responsible for all sampling activities, including mobilization, demobilization, and reporting. Mr. Shreffler will also be responsible for identifying problems and corrective actions while in the field, and communicating these activities to the Duxbury QA officer, and the Project Manager, as appropriate.

- Table 8 is amended below to include Mr. Dave Shreffler in place of Dr. Dennis Dauble as the finfish sampler and microlayer sampler.

Table 8. Key Personnel, Addresses, and Telephone Numbers

Name	Address	Phone
Marcia Nishioka Program Manager	Battelle Columbus 505 King Avenue Room 5-2-28 Columbus, OH 43201	614-424-4964 (work)
Don Gunster Sampling Task Leader	Battelle Duxbury 397 Washington Street Duxbury, MA 02332	781-952-5378 (work)
Rosanna Buhl Sampling QA Officer	Battelle Duxbury 397 Washington Street Duxbury, MA 02332	781-952-5309 (work)
Wayne Trulli Duxbury Field Operations Manager	Battelle Duxbury 397 Washington Street Duxbury, MA 02332	781-952-5380 (work) 508-888-6652 (home)
Michael Mcara Duxbury Sample Custodian	Battelle Duxbury 397 Washington Street Duxbury, MA 02332	781-952-5270 (work)
Scott Macomber Sampling Team Leader	Battelle Duxbury 397 Washington Street Duxbury, MA 02332	781-952-5379 (work)
Chris Gagnon Sampling Team Leader	Battelle Duxbury 397 Washington Street Duxbury, MA 02332	781-952-5325 (work)
Kim Andrews Multimedia Chemist	Battelle Columbus 505 King Avenue	614-424-5254 (work) 614-875-3344 (home)

	Room 11-1-060 Columbus, OH 43201	
Tony Wisbith Air Chemist	Battelle Columbus 505 King Avenue Room 6-1-31 Columbus, OH 43201	614-424-5481 (work) 740-587-7439 (home)
Dave Shreffler Finfish Sampler, Microlayer Sampler	Battelle Marine Sciences Lab. 1529 W. Sequim Bay Road Sequim, WA 98382	360-681-3660 (work)

- Section 11.1.2 is amended as follows: All microlayer samples will be shipped via overnight delivery to Ms. Kim Andrews at the address shown in Table 8. All fish samples will be shipped via overnight delivery to Mr. Michael Meara at the address shown in Table 8.

- Section 11.1.4 is amended as follows: Two labels will be provided for each finfish sample collected. One label is placed on the aluminum foil. The second label is placed between the double Ziploc bags. The labels provide a narrative description of the sample, as well as a unique number that is documented on the Finfish Data Sheet. One sample label will be affixed to each microlayer bottle and bulk water bottle.

- Table 9 is amended below to include largemouth and smallmouth bass in addition to bluegill and perch.

Table 9. Sample Containers, Storage Conditions, and Shipping

Sample Source and Type	Sample Containers	Preservation and Storage Conditions
Urban Air		
Particulate phase	Glass fiber filter	Place filter in zip-lock bag, seal. Store cool (4° C)
Vapor phase	Polyurethane foam sorbent	Wrap cartridge in precleaned foil. Place wrapped cartridge in zip-lock bag and wrap in bubblewrap. Store cool (4° C)
Drinking Water		
• Surface-water source • Plant intake • Treated water from plant • Tap water from retail establishment	1-L precleaned (certified) polyethylene jars	No preservation. Store cool (4° C)
Sediment from surface-water source	200ml precleaned (certified) polyethylene jars	Store cool (4° C)
POTW		
• Post-chlorination influent • Sludge • Effluent	1-L precleaned (certified) polyethylene jars	Store cool (4° C)
Landfill		
Leachate		Store cool (4° C)
Local Food		

• Ground beef • Pork chops (bone in) • Boneless, skinless chicken breasts • Pork-and-beef hot dogs • Regional fish • Eggs • Whole milk • White bread • Frozen green beans • Fresh apples • Organic bread or flour	Keep each item in its original container, and keep items separated in store-specific coolers.	Store cool (4° C)
Fish		
Finfish (bluegill, yellow perch, largemouth bass, smallmouth bass) (electroshock)	Methanol rinsed aluminum foil; plastic bags.	Store cool (4° C)

- Section 11.8.1 is amended as follows: The "target species" will include largemouth and smallmouth bass. Electroshocking will be conducted according to MSL-T-023-00. Finfish will be collected from the each site designated as the matched water/sediment/fish site. Finfish will not be collected from the sites designated at "quiet" water bodies.

- Section 11.8.1.1 is amended as follows: Individual fish will be placed in methanol rinsed aluminum foil and then double bagged in Ziploc bags and sealed with tape. A label with the city , sample site identification, matrix, date and initials of sampler, sampling date and time, unique sample ID, and project number will be placed between the double bags and on the aluminum foil. Fish will be placed on ice in a cooler for shipment on the day of sampling or stored on ice overnight for shipment as early as possible on the day following sampling. Fresh ice will be placed in the cooler prior to shipping.

- Section 11.8.1.2 is amended as follows: Fish length will not be recorded to the nearest mm in the field. Fish will be weighed only to determine if the mass is adequate for analysis (i.e., 200 g minimum), not weighed to the nearest g.

- A new section is added: Section 11.9 **Water Sampling Associated with Finfish Collection**

- 11.9.1 Microlayer sampling: Microlayer sampling will be performed according to SOP-T-022-00, and is summarized below.

1. Locate the water source and a point of access.
2. Record site information, as appropriate, on field log forms or a field log book (e.g., weather conditions, site location by GPS, observations of the water body and visible surface accumulations, adjacent site features that could be of significance) on the Aquatic Microlayer Sampling Data Sheet
3. Set up the microlayer sampler frame at a stable and level location. Install wiper and funnel.
4. Rinse equipment by collecting microlayer sample (approximately 20 repeated dips with the glass plate) and allowing it to drain through funnel without collecting in a sample bottle.

5. To collect aquatic microlayer, dip the glass plate vertically into the water gently, with minimal horizontal movement, and withdraw it slowly. Push the glass plate through the wiper and allow liquid to drain through the funnel. The sampler frame will require support with one hand.
6. Record sampling start time and initials of sampler.
7. Start collection of microlayer sample by removing the sample bottle cap and placing the bottle under the funnel in a position to catch liquid. Continue to dip the glass plate into the water to be sampled and push the plate through the sampler wiper.
8. Repeat until the sample bottle is filled. Minimal air space is allowed.
9. Recap the sample bottle securely and check that sample bottle is labeled properly with sample time and sampler identification.
10. Check with project-specific work plan for guidance for storage and shipment of samples. Samples are held in an insulated container (e.g., cooler) with ice or under refrigeration at approximately 4°C. Packing for shipment requires use of bubble wrap or other material to prevent physical damage to and breakage of sample containers and use of a sturdy, insulated container.
11. Complete the chain-of-custody form (see SOP MSL-A-002 and other project-specific guidance) and attach to the inside of the lid of each shipped cooler/container.

- 11.9.2 Bulk water sampling: Bulk water sampling associated with fish collection will take place according to SOP M3-F-2.0, and as summarized below.

1. Locate the water source and a point of access.
2. Complete the Station Log and take a GPS reading (SOP 3-164) as close as possible to the sampling location.
3. Wipe the exterior of the sampling bottle with methanol.
4. Submerge the sample bottle below the water surface and unscrew the bottle cap.
5. Fill the water bottle by turning the bottle parallel to the water surface and slowing rotating so that the mouth of the bottle is up-right. This procedure will ensure that water from the surface microlayer is not pulled into the sample bottle.
6. Recap the sample bottle under water.
7. Wipe the bottle with methanol and affix a sample label.
8. Place the sample in a cooler of ice.
9. Complete the chain-of-custody form.

- 13.2 The Trimble GPS used for finfish and microlayer/bulk water position determinations is calibrated as described for the Garmin GPS (SOP No. 3-164-01).

- Section 19.4 no longer applies and should be deleted.

- Section 19.5 Backpack Electroshocker: Maintenance of the backpack electroshocker is performed by the manufacturer.

- Section 19.6 Microlayer Sampler: The microlayer sampler will be rinsed with freshwater, rinsed with deionized water, and finally rinsed with methanol between sampling locations.

No soap will be used on the sampler. The sampler will then be placed in a clean plastic bag until next use.

- Appendix C Sampling Forms. The Finfish Data Sheet has been revised below to more accurately reflect the field data we will be recording. New sampling forms are also included below for Aquatic Microlayer Sampling and Subsurface Bulk Water Sampling.

FINFISH DATA SHEET

Project: N100666-01

Date	
Start/End Time	
Collectors	
Gear type	
Sampling location Photo #	
DGPS Coordinates	
Water Temperature Air Temperature	
Water Depth & Visibility	
Water Flow	
Max/Min Stream Widths	

Species	External Abnormalities	Sample ID

Relinquished By: _____ Date _____

Received By: _____ Date _____

AQUATIC MICROLAYER SAMPLING

Battelle Marine Sciences Laboratory
1529 West Sequim Bay Road
Sequim, Washington 98382

Project Number:	31565
Project Manager:	Dave Shreffler
Phone:	360.681.3660
Fax:	360.681.3681
Location:	Mobile, AL matched site
Date:	
Bottle Lot Number:	
Collected by (initials):	

Sample Number	recorded by: (initials)	Sample Description and Analysis
MC-4101 B		Microlayer - Battelle (PFOS duplicate analyses: 500 mL each)
MC-4102 K		Microlayer - 3M (PFOS; 500 mL)
MC-4103 H		Microlayer - Henion (PFOS; 500 mL)
MC-4104 B		PFOS Field Blank - Battelle (empty bottle)
MC-4105 K		PFOS Field Blank - 3M (empty bottle)
MC-4106 H		PFOS Field Blank - Henion (empty bottle)

Relinquished by: Date: Time: Ice Included (Y/N)

Received by: Date: Time: Condition:

SUBSURFACE BULK WATER SAMPLING

Battelle Marine Sciences Laboratory
1529 West Sequim Bay Road
Sequim, Washington 98382

Project Number:	31565
Proejct Manager:	Dave Shreffler
Phone:	360.681.3660
Fax:	360.681.3681
Location:	Mobile, AL matched site
Date:	
Bottle Lot Number:	
Collected by (initials):	

Sample Number	recorded by: (initials)	Sample Description and Analysis
MC-4101 B		
MC-4102 K		Bulk water - Battelle (PFOS duplicate analyses: 500 mL each)
MC-4103 H		Bulkwater - 3M (PFOS duplicate analyses: 500 mL each)
MC-4104 B		Bulkwater - Henion (PFOS duplicate analyses: 500 mL each)
MC-4105 K		Polars field spike - Battelle (duplicate analyses: 500 mL each)
MC-4106 H		Polars field spike -3M (duplicate analyses: 500 mL each)
		Polars field spike - Henion (duplicate analyses: 500 mL each)

Relinquished by: Date: Time: Ice Included (Y/N)

Received by: Date: Time: Condition:

AQUATIC MICROLAYER SAMPLING

Battelle Marine Sciences Laboratory
1529 West Sequim Bay Road
Sequim, Washington 98382

Project Number:	31565
Project Manager:	Dave Shreffler
Phone:	360.681.3660
Fax:	360.681.3681
Location:	Pensacola, FL matched site
Date:	
Bottle Lot Number:	
Collected by (initials):	

Sample Number	recorded by: (initials)	Sample Description and Analysis
MC-3101 B		Microlayer - Battelle (PFOS duplicate analyses: 500 mL each)
MC-3102 K		Microlayer - 3M (PFOS; 500 mL)
MC-3103 H		Microlayer - Henlon (PFOS; 500 mL)
MC-3104 B		PFOS Field Blank - Battelle (empty bottle)
MC-3105 K		PFOS Field Blank - 3M (empty bottle)
MC-3106 H		PFOS Field Blank - Henlon (empty bottle)

Relinquished by: Date: Time: Ice Included (Y/N)

Received by: Date: Time: Condition:

SUBSURFACE BULK WATER SAMPLING

Battelle Marine Sciences Laboratory
1529 West Sequim Bay Road
Sequim, Washington 98382

Project Number:	31565
Proejct Manager:	Dave Shreffler
Phone:	360.681.3660
Fax:	360.681.3681

Location: Pensacola, FL matched site

Date: _____

Bottle Lot Number: _____

Collected by (initials): _____

Sample Number	recorded by: (initials)	Sample Description and Analysis
MC-3107 B	_____	Bulk water - Battelle (PFOS duplicate analyses: 500 mL each)
MC-3108 K	_____	Bulkwater - 3M (PFOS duplicate analyses: 500 mL each)
MC-3109 H	_____	Bulkwater - Henion (PFOS duplicate analyses: 500 mL each)
MC-3110 B	_____	Polars field spike - Battelle (duplicate analyses: 500 mL each)
MC-3111 K	_____	Polars field spike -3M (duplicate analyses: 500 mL each)
MC-3112 H	_____	Polars field spike - Henion (duplicate analyses: 500 mL each)

Relinquished by: _____ Date: _____ Time: _____ Ice Included (Y/N)

Received by: _____ Date: _____ Time: _____ Condition: _____

AQUATIC MICROLAYER SAMPLING

Battelle Marine Sciences Laboratory
1529 West Sequim Bay Road
Sequim, Washington 98382

Project Number:	31565
Proejct Manager:	Dave Shreffler
Phone:	360.681.3660
Fax:	360.681.3681
Location:	Port St. Lucie matched site
Date:	
Bottle Lot Number:	
Collected by (initials):	

Sample Number	recorded by: (initials)	Sample Description and Analysis
MC-6101 B		
MC-6102 K		Microlayer - Battelle (PFOS duplicate analyses: 500 mL each)
MC-6103 H		Microlayer - 3M (PFOS; 500 mL)
MC-6104 B		Microlayer - Henion (PFOS; 500 mL)
MC-6105 K		PFOS Field Blank - Battelle (empty bottle)
MC-6106 H		PFOS Field Blank - 3M (empty bottle)
		PFOS Field Blank - Henion (empty bottle)

Relinquished by: Date: Time: Ice Included (Y/N)

Received by: Date: Time: Condition:

SUBSURFACE BULK WATER SAMPLING

Battelle Marine Sciences Laboratory
1529 West Sequim Bay Road
Sequim, Washington 98382

Project Number:	31565
Proejct Manager:	Dave Shreffler
Phone:	360.681.3660
Fax:	360.681.3681
Location:	Port St. Lucie, FL matched site
Date:	
Bottle Lot Number:	
Collected by (initials):	

Sample Number	recorded by: (initials)	Sample Description and Analysis
MC-6107 B		
MC-6108 K		Bulk water - Battelle (PFOS duplicate analyses: 500 mL each)
MC-6109 H		Bulkwater - 3M (PFOS duplicate analyses: 500 mL each)
MC-6110 B		Bulkwater - Henion (PFOS duplicate analyses: 500 mL each)
MC-6111 K		Polars field spike - Battelle (duplicate analyses: 500 mL each)
MC-6112 H		Polars field spike -3M (duplicate analyses: 500 mL each)
		Polars field spike - Henion (duplicate analyses: 500 mL each)

Relinquished by: Date: Time: Ice Included (Y/N)

Received by: Date: Time: Condition:

ENVIRONMENTAL MONITORING:
PART TWO – BIOSPHERE SAMPLING AND ANALYSIS

A plan to assess potential environmental exposure to perfluorooctanesulfonate and other fluorochemical substances has been developed by 3M and outside experts. One component of this plan involves characterization of the geographic distribution of fluorochemicals in biotic and abiotic receptors. Two studies are in progress, one focused in the vicinity of the 3M Decatur, Alabama manufacturing facility, and the other a much more comprehensive global biosphere monitoring program. The preliminary results obtained to date have been reported in the 3M Environmental White Paper entitled "Sulfonated Perfluorochemicals in the Environment: Sources, Dispersion, Fate and Effects."

The study in the Decatur, Alabama area is being designed to understand the impact, if any, of production operations in the local environment. Samples of the groundwater, surface water, sediments and fish and bird species will be collected in May and June, 2000 for analyses. This data will be used to evaluate the environmental presence of fluorochemicals and to assess the potential of any effects using ecotoxicological test results.

The Biosphere monitoring program was designed in consultation with Dr. John Geisy of Michigan State University. This plan is being viewed as an iterative process to assess global distribution of fluorochemicals. As results are obtained from the global environment, the plan is to concentrate on those areas where fluorochemicals are detected in samples and focus on additional sampling and analyses in those specific locations.

Initially, samples of tissues and blood plasma are being collected from archived specimens covering different species and locations. Areas of focus include North America (Great Lakes and coastal marine locations), the arctic region, and Europe. Species to be studied include lake trout, walleye, salmon, catfish, and brown trout; cormorants, eagles and albatross; mussels and shellfish; marine mammals; and other species. This sampling plan is in progress and as data is obtained and reports generated, additional submissions will be made to EPA.

Included in this section are the following documents:

1. **LCMSMS Analysis of Extracts reported in: "Preliminary Report Analysis of Perfluorinated Compounds in Environmental Samples" by P. Jones and K. Kannan - 4/7/99**

2. **Final Laboratory 3M Reports on Analysis of Fluorochemicals in Wild Bird Livers – 4/28/99**

3. **Screening of PFOS levels in Eagle and Albatross - 5/8/98**