ADDENDUM 2 (2010) TO

ONONDAGA LAKE BASELINE MONITORING BOOK 1 DEEP BASIN WATER AND ZOOPLANKTON MONITORING WORK PLAN FOR 2008

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LIST OF ACRONYMS

Chl	chlorophyll
CH_3Hg	methylmercury
Cl^-	chloride
CPOI	chemical parameter of interest
DOC	dissolved organic carbon
DUSR	Data Usability and Assessment Report
Fe^{2+}	ferrous iron
H_2S	hydrogen sulfide
Hg	mercury
ISUS	high-resolution, rapid-profiling in-situ ultraviolet spectrophotometer
mL	milliliter
NO_x	nitrate+nitrite
NYSDEC	New York State Department of Environmental Conservation
ppm	parts per million
QAPP	quality assurance project plan
SMU	Sediment Management Unit
S^{2-}	sulfide
SO_4^{2-}	sulfate
SOP	standard operating procedure
SU	Syracuse University
TIC	total inorganic carbon
$T\text{-}NH_3$	total ammonia
TOC	total organic carbon
UFI	Upstate Freshwater Institute
USEPA	U.S. Environmental Protection Agency

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EXECUTIVE SUMMARY

This second addendum to the 2008 Book 1 Work Plan (UFI and SU, 2008) presents the scope for the 2010 deep basin water and zooplankton monitoring that is part of Honeywell's baseline monitoring program for Onondaga Lake prior to lake remediation. The baseline monitoring program objectives and program elements remain unchanged for 2010. The 2010 Book 1 work scope is the same as the Book 1 work scope for 2009 with one modification: the addition of up to four zooplankton sampling efforts around fall turnover; and components of the 2010 Book 1 work scope are water column, zooplankton, and sediment trap sampling at South Deep from late April through November. Analyses will include measurements of low-level total mercury and methylmercury and many other baseline parameters (such as nitrate) in the water column; total mercury, methylmercury, total solids content, and community composition for zooplankton; total mercury and other parameters in sediment trap solids. The rationale for the 2010 Book 1 work scope is presented focusing on modifications to the 2009 Book 1 work scope. The field and laboratory work proposed in this addendum will be based on the 2008 Book 1 Standard Operating Procedures (SOPs) and Quality Assurance Project Plan (QAPP). No new SOPs will be implemented during 2010. The only worksheet revised from the QAPP is Worksheet 20 presented as Table 6.

SECTION 1

INTRODUCTION

This second addendum to Honeywell's 2008 Baseline Monitoring Book 1 Work Plan (UFI and SU, 2008) presents the work scope for Honeywell's 2010 deep basin water and zooplankton monitoring effort. This work scope is consistent with the baseline monitoring program objectives, program elements, and data uses, and the work scope has been developed in part based on results from the 2008 and 2009 Book 1 work efforts. Rationale for modifying the 2009 work scope (UFI and SU, 2009) is also presented. Sampling and analysis work proposed in this Book 1 work plan addendum for 2010 will use the 2008 and 2009 Book 1 SOPs and QAPP.

1.1 OBJECTIVES AND DATA USES

Program objectives, program elements, and data uses for the deep basin water and zooplankton monitoring previously described in the draft Baseline Monitoring Scoping Document (Parsons, 2008) are presented in Table 1 along with a summary of how each was addressed in 2008 and will be addressed during 2010 by the work described in this addendum. The objectives, elements, and data uses described in this work plan are the same as those described previously.

1.2 RATIONALE FOR 2010 WORK SCOPE MODIFICATIONS

Deep basin conditions were very similar during 2007, 2008, and 2009 as summarized in Figure 1. This 2010 work plan addendum includes one modification to the 2009 Book 1 work scope. This modification for 2010 and its rationale are as follows:

- **Up to four additional zooplankton sampling efforts:**

  During 2010, zooplankton sampling will be conducted monthly during April, May, and June (consistent with water sampling); then biweekly from July until mid-September; weekly from mid-September through fall turnover; and finally biweekly again through November. The additional zooplankton samples will be collected weekly beginning in mid-September based largely on zooplankton mercury levels measured in samples collected during early October 2009 (see Figure 2). The total number of zooplankton sampling efforts cannot be precisely quantified at this time, because the timing of fall turnover cannot be predicted.

SECTION 2

2010 DEEP BASIN WATER, ZOOPLANKTON AND SEDIMENT TRAPMONITORING

The components of the 2010 deep basin water column and zooplankton monitoring program are briefly described below.

2.1 WATER COLUMN

Water column samples will be collected at South Deep at the depths and frequencies specified in Table 2. Analytes will be the same as during 2008 and 2009 (see Table 3). Profiles of total dissolved gas (TDG) pressure will be observed on a monthly basis and spatially detailed monitoring with the *in situ* ultraviolet spectrophotometer (ISUS) rapid profiling instrument will be conducted on a weekly basis consistent with the 2008 Book 1 Work Plan. The field sampling matrices for laboratory analyses of water samples are shown in Table 4. The ISUS parameters and methods are provided in Table 5.

As during 2008 and 2009, *in situ* robotic measurements (dissolved oxygen, temperature, specific conductance, pH, fluorometric chlorophyll, and turbidity) will be made at one meter depth interval profiles at South Deep, at least daily during the April-November interval; however, these data will not be presented formally as part of the Honeywell monitoring program. Instead, the robotic data will again be available online at www.ourlake.org.

2.2 ZOOPLANKTON

Zooplankton samples will be collected in a manner consistent with the zooplankton collections conducted during 2008 and 2009. Zooplankton samples will be enumerated by species and analyzed for total mercury, methylmercury, and percent solids (see Table 3). Up to four additional zooplankton sample collections will be conducted starting in mid-September 2010 based on early October 2009 zooplankton mercury results prior to lake turnover presented in Figure 2.

If present, *Daphnia* samples will be collected, freeze-dried, digested, and analyzed for total mercury and methylmercury from zooplankton tows conducted on up to 10 different dates. Mercury analyses will be performed by Syracuse University using low-level USEPA methods. Freeze-drying will permit analysis of very low sample masses

2.3 SEDIMENT TRAPS

Sediment trap sampling and analysis provide data to assess gross sedimentation of solids and total mercury during the field sampling season timeframe. Sediment traps were set at South Deep and collected and analyzed for solids content and for mercury during 1992 and 2009. Sediment trap mercury results for 2009 were similar to surface sediment mercury results based on the 0 to

2 cm sediment depth interval from the 2008 high-resolution cores. The average 2009 mercury concentration in sediment trap solids was 1.7 milligrams per kilogram.

Sediment trap samples will be collected again during 2010 consistent with the 2009 monitoring effort and UFI's sediment trap design and deployment protocols. A set of three traps will be deployed weekly from April to October 2010 at the South Deep sampling site below the thermocline (10-meter water depth). Sediment traps will generally be deployed for 7-day intervals. After retrieval, supernatant will be drained off via a stoppered opening located in the side of the traps well above the deposited sediments. The samples will then be homogenized, poured into polyethylene bottles, and put on ice.

Laboratory analyses of sediment trap samples will be consistent with 2009 efforts. Analytes will include total suspended solids, fixed and volatile suspended solids, particulate carbon, total and acidified calcium, and total mercury. One trap from each date when zooplankton will be sampled will be analyzed for total mercury and samples from the remaining two traps on those dates will be archived for potential future analyses.

2.4 HEALTH AND SAFETY

Health and safety is the highest priority for the Book 1 work efforts. The UFI Safety Plan (Appendix C of UFI and SU, 2007a) prepared for previous Onondaga Lake field activities will be used for this investigation and will be strictly followed by all personnel. Any task outside of the current scope defined in the Safety Plan including deployment and collection of sediment traps will have a new Job Safety Analysis (JSA) completed before the task begins. A summary of the roles/responsibilities and contact information is included in Appendix C of the UFI Safety Plan, which will be maintained at the support zone and on each vessel.

2.5 QUALITY ASSURANCE, DATA MANAGEMENT AND REPORTING

Various field and laboratory duplicate and blank samples will be collected and analyzed in accordance with the previously-approved quality assurance project plan for Book 1 work. The extent of field and matrix duplicate and blank sample collection and analysis is summarized in Table 6.

Preliminary, unvalidated data will be submitted to NYSDEC by late summer prior to data validation, unless agreed to otherwise by NYSDEC. Analytical data generated during this investigation will be reviewed and validated as described in 2008 Book 1 QAPP (UFI and SU, 2008). All analytes will be subject to Level III validation as described in the QAPP for the Phase I Pre-Design Investigation (Parsons, 2005). In addition, 10 percent of the nitrate, total mercury, and methylmercury results will be validated based on Level IV protocols. The validated results will be incorporated into the Locus Focus™ database by Parsons following validation.

Once the data validation has been completed, a data usability and summary report (DUSR) will be prepared and submitted to NYSDEC. The DUSR will present the results of data

validation and data usability assessment. Data interpretation and trend analysis will also be presented to NYSDEC.

2.6 REFERENCES

Addess, J. M. 1990. Methane cycling in Onondaga Lake, New York. M.S. Thesis, College of Environmental Science and Forestry, State University of New York, Syracuse, NY.

Heaney, S.I., and W. Davison. 1977. The Determination of Ferrous Iron in Natural Waters with 2,2′-bipyridyl. Limnol. Oceanogr. 22(4):753–759.

Parsons, 2005. Onondaga Lake Pre-Design Investigation: Phase I Work Plan. Prepared for Honeywell, Inc., Morristown, New Jersey. Parsons, Liverpool, NY.

Appendix A *Phase I Sampling And Analysis Plan*

Appendix B *Quality Assurance Project Plan*

Appendix C *Project Safety Plan*

Parsons, 2008. Draft Baseline Monitoring Scoping Document for the Onondaga Lake Bottom Subsite. Prepared for Honeywell, Inc., East Syracuse, NY. Parsons, Liverpool, NY.

Parsons and Exponent. 2009. Onondaga Lake Baseline Monitoring Book 3 Tributary Monitoring Work Plan for 2009. Prepared for Honeywell. September 2009. Draft.

UFI and SU, 2007a. Work Plan for Evaluation of Nitrate Addition to Control Methylmercury Production in Onondaga Lake, Preliminary Feasibility Analysis and 2006 Study. Prepared for Honeywell, Inc., East Syracuse, NY. Upstate Freshwater Institute, Syracuse, NY and Syracuse University, Center for Environmental Systems Engineering, Syracuse, NY.

UFI and SU, 2007b. Work Plan for Evaluation of Nitrate Addition to Control Methylmercury Production in Onondaga Lake, 2007 Study. Prepared for Honeywell, Inc., East Syracuse, NY. Upstate Freshwater Institute, Syracuse, NY and Syracuse University, Center for Environmental Systems Engineering, Syracuse, NY. May 2007.

UFI and SU, 2008. Onondaga Lake Baseline Monitoring Book 1 Deep Basin Water and Zooplankton Monitoring Work Plan for 2008. Prepared for Honeywell, Inc., East Syracuse, NY. Upstate Freshwater Institute and Syracuse University, Syracuse, NY. May 2008.

UFI and SU, 2009. Addendum 1 (2009) to Onondaga Lake Baseline Monitoring Book 1 Deep Basin Water and Zooplankton Monitoring Work Plan for 2008. Prepared for Honeywell, Inc., East Syracuse, NY. Upstate Freshwater Institute and Syracuse University, Syracuse, NY. September 2009.

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FIGURES

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FIGURE 1
VOLUME-WEIGHTED HYPOLIMNION TIME-SERIES AVERAGES OF ONONDAGA LAKE METABOLIC INDICATORS: 2006-2009

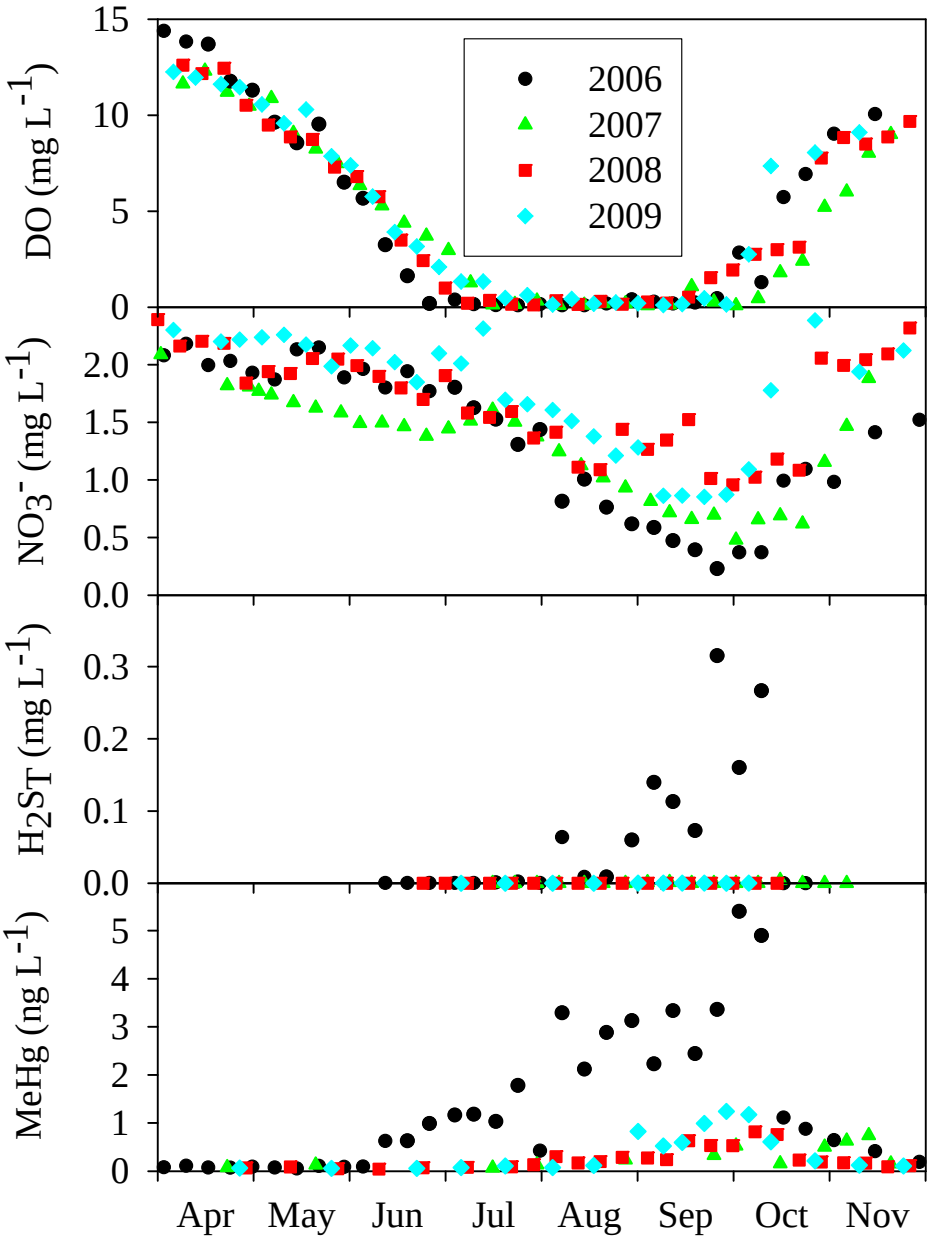

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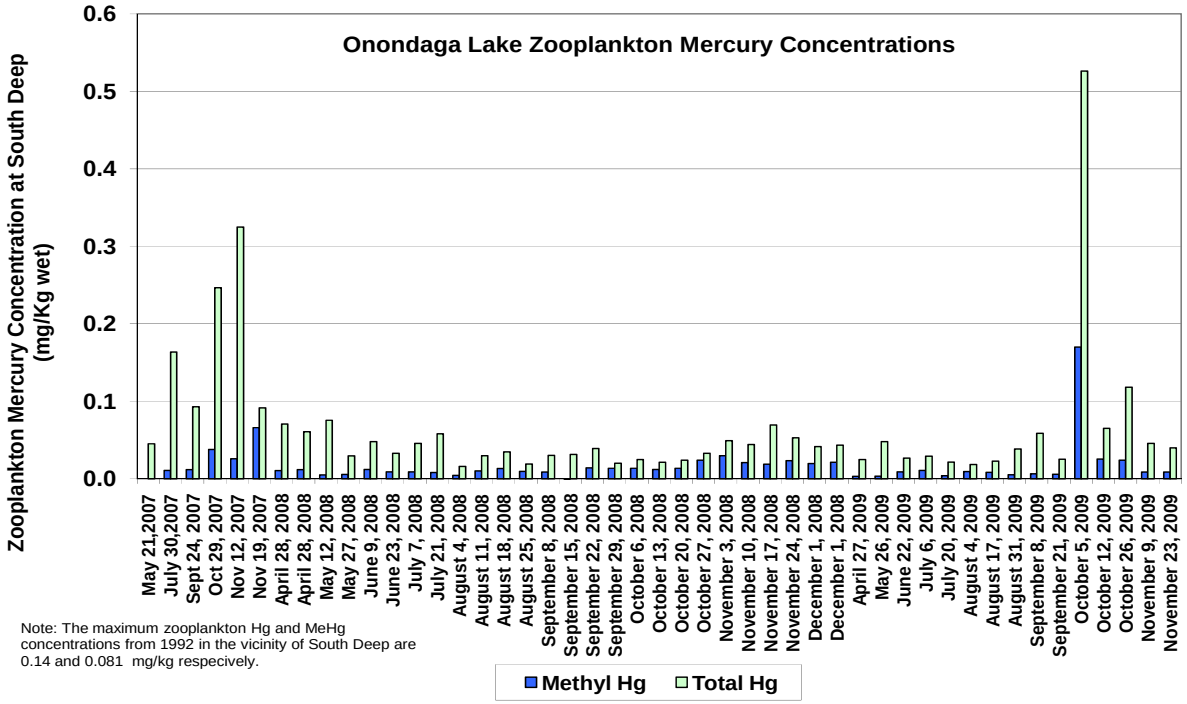
FIGURE 2
ONONDAGA LAKE ZOOPLANKTON MERCURY CONCENTRATIONS: 2007-2009



Note: The maximum zooplankton Hg and MeHg concentrations from 1992 in the vicinity of South Deep are 0.14 and 0.081 mg/kg respecively.

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TABLES

TABLE 1

ONONDAGA LAKE BASELINE MONITORING
PROGRAM OBJECTIVES, PROGRAM ELEMENTS, AND DATA USES
PERTAINING TO BASELINE MONITORING BOOK 1

Program Objective	Program Element	Data Use	2008 Book 1	Book 1 Addendum 2 (2010)	Comments
Establish baseline chemical and physical conditions	Lake Water Sampling	**Baseline for Remedy Effectiveness**			
		Provide basis to measure achievement of PRG3 (surface water quality standards)	Book 1 included analysis of unfiltered and filtered (i.e., dissolved) total mercury at 2 m water depth at South Deep. The lowest State of New York mercury surface water quality standards are on a dissolved total mercury basis.	Same as 2009 (slightly lower sampling frequency than 2008).	Additional CPOIs will be monitored in 2010 or 2011 at South Deep, at nearshore locations where exceedances were previously noted, and/or near source areas. This work will be done in conjunction with monitoring by Honeywell's Operations design work for the purpose of establishing water quality goals during implementation.
		Provide basis to measure success in controlling key processes (e.g., mercury methylation, sediment resuspension from the in-lake waste deposit, mercury release from profundal sediment)	Book 1 included analysis of total mercury and methylmercury at multiple water depths and sufficient frequency at South Deep to document mercury methylation and mercury release from profundal sediment. It also included measurement of gas ebullition rates from profundal sediment and high resolution measurements of nitrate using ISUS.	Same water column sampling as 2009 (slightly less frequency and fewer depths than during 2008). Gas ebullition measurements were discontinued starting in 2009. Continuation of ISUS nitrate measurements on water column sampling days. Sediment trap samples were collected and analyzed during 2009 and will be collected and analyzed again during 2010 to track changes in solids and mercury loading to profundal sediment.	Water column monitoring at South Deep will continue annually through the design phase.
		Baseline for Remedy Design			
		Provide information for design of nitrate addition/oxygenation pilot tests and basis to measure results	Book 1 included analysis of oxygen, nitrate, and methylmercury at multiple water depths and sufficient frequency at South Deep to identify the critical concentrations of oxygen and nitrate associated with limited methylmercury efflux from sediment.	Same as 2009 (slightly less frequency and fewer depths than during 2008).	Results will be used in design of nitrate addition/oxygenation pilot tests
Provide additional data for future understanding of remedy effectiveness in achieving PRGs	Other biota sampling	**Baseline for Remedy Effectiveness**			
		Assess biological factors that may contribute to variability in fish mercury concentrations	Book 1 included analysis of total mercury and methyl mercury in zooplankton and Daphnia, and zooplankton community composition.	Same as 2008 and 2009 with the following exception: additional zooplankton sample collection from mid-September until lake turnover.	Zooplankton monitoring will continue annually through the design phase.

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TABLE 2
WATER COLUMN SAMPLING SCHEDULE FOR 2010

Month	Water Column		
	Frequency	Sampling Date	South Deep Depths (m)
April	once	5/3	2, 12, 18
May	once	5/24	2, 12, 18
June	once	6/21	2, 12, 18
July	bi-weekly	7/6, 7/19	2, 12, 16, 18
August	bi-weekly	8/2, 8/16, 8/30	2, 12, 16, 18
September	weekly	9/7, 9/13, 9/20, 9/27	2, 12, 14, 16, 18
October	weekly	10/4, 10/11, 10/18, 10/25	2, 12, 14, 16, 18
November	Weekly thru turnover, then biweekly	11/1, 11/8	2, 12, 14, 16, 18
		11/22	2, 12, 18

Note: This sampling schedule is based on the lake being stratified from early July until early November. If the timing for stratification is significantly different during 2010 (e.g., turnover occurs earlier), sampling frequency and depths may be adjusted. Any possible adjustments will be discussed with NYSDEC before being implemented.

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TABLE 3
SPECIFICATIONS FOR 2010 BASELINE MONITORING AT SOUTH DEEP, LABORATORY ANALYTES

Parameter	Method	South Deep Depths (m) and Dates	Total Number of Field Samples for 2010[x]
[@]Chl	EPA 445	2,12 (see Table 2 for dates)	38
NO_X	EPA 353.2	See Table 2	82
NO_2^-	EPA 353.2	See Table 2	82
T-NH_3	EPA 350.1	See Table 2	82
DOC	SM 18-20 5310C	See Table 2	82
TIC	SM 18-20 5310C	See Table 2	82
Cl^-	SM 18-20 4500 Cl^- C	See Table 2	82
[+*]Total Hg	EPA 1631E	See Table 2	82
[+*]Total Hg, dissolved	EPA 1631E	2 meter water depth once in April, May, June, bi-weekly thereafter plus the 14 meter water depth biweekly 9/13 to 11/8	19
[+*]CH_3Hg	EPA 1630	See Table 2	82
[#]H_2S method 1	SM 18-20 4500 S^{2-} E	anoxic depths: 1 meter depth intervals (mid-July to mid-November)	70
°method 2	SM 18-20 4500 S^{2-} G	anoxic depths: 1 meter depth intervals (mid-July to mid-November)	70
Fe^{2+}	Heaney and Davison (1977)	anoxic depths: 12, 16, and 18 meter water depths (mid-July to mid-November)	42
CH_4	Addess (1990)	anoxic depths: 12, 16, and 18 meter water depths (mid-July to mid-November)	42
Zooplankton: Total Hg, CH_3Hg, percent solids, and taxonomic enumeration	EPA Methods 1630 and 1631 for Hg	Vertical tows at 13-meter water depth once in April, May, June, bi-weekly from July to mid-September, weekly mid-September until turnover, and then biweekly through November	19 (plus up to 10 daphnia zooplankton samples to be analyzed)

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TABLE 3 (CONTINUED)
SPECIFICATIONS FOR 2010 BASELINE MONITORING AT SOUTH DEEP, LABORATORY ANALYTES

Parameter	Method	South Deep Depths (m) and Dates	Total Number of Field Samples for 2010x
Sediment Traps: total suspended solids, fixed and volatile solids, particulate carbon, total and acidified calcium, and total Hg	EPA methods for Hg; see Table 6 for other parameters	Up to 30 weekly trap deployments from April through October. Frequency for Hg analyses will be the same as for zooplankton.	19 for mercury and 90 for others

Footnotes:

[@] Higher resolution data will be provided by the *in situ* robotic monitoring, which will be measuring chlorophyll *a* at 1m depth intervals every day at the same location (South Deep). The main purpose of the chlorophyll analyses at 2 and 12 m is to provide confirmation of the robotic monitoring data.

[x] Field samples only. See QAPP Worksheet #20 (Table 6) for total number of samples to laboratory including field triplicates and blanks for UFI analytes, field blanks and field duplicates at one depth for total mercury and methylmercury, field duplicates for dissolved total mercury and for zooplankton total mercury and methylmercury. UFI trip blanks are sample bottles that are filled in the laboratory, transported to the field, and then back to the laboratory for analysis. Mercury field blanks are sample bottles that are filled in the laboratory, transported to the field, and then poured into a second sample bottle that is taken back to the laboratory for analysis.

[+] Total mercury and methyl mercury analysis of water and zooplankton will be performed by a qualified laboratory contracted by Honeywell. In addition, Syracuse University will freeze dry and analyze Daphnia samples for total mercury and methyl mercury. All other water analyses and zooplankton enumeration will be performed by UFI.

[#] Total number of field samples will depend on the time of year and extent of anoxic conditions in the SMU 8 hypolimnion. The estimated number of samples assumes five depths per sampling event. QC includes one field blank and two field replicates per sampling event.

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TABLE 4
FIELD SAMPLING MATRICES FOR LABORATORY ANALYSES OF 2010 WATER SAMPLES[1]

April, May, June, and after turnover 2010

Sampling Depth	Chl	NO_X	NO_2	T-NH_3	TIC	DOC	Cl^-	[3]Total Hg	[4]CH_3Hg
2m	XXX	XXX	XXX	XXX	XXX	XXX	XXX	XX	XX
12m	X	X	X	X	X	X	X	X	X
18m		X	X	X	X	X	X	X	X

July – August 2010

Sampling Depth	Chl	NO_X	NO_2	T-NH_3	TIC	DOC	Cl^-	[2] H_2S	Fe^{2+}	CH_4	[3]Total Hg	[4]CH_3Hg
2m	XXX	XXX	XXX	XXX	XXX	XXX	XXX				XX	XX
12m	X	X	X	X	X	X	X	anoxic depths	X	X	X	X
16m		X	X	X	X	X	X	anoxic depths	X	X	X	X
18m		X	X	X	X	X	X	anoxic depths	XXX	XXX	X	X

September – turnover 2010

Sampling Depth	Chl	NO_X	NO_2	T-NH_3	TIC	DOC	Cl^-	[2] H_2S	Fe^{2+}	CH_4	Total Hg	CH_3Hg
2m	XXX	XXX	XXX	XXX	XXX	XXX	XXX				XX	XX
12m	X	X	X	X	X	X	X	anoxic depths	X	X	X	X
14m		X	X	X	X	X	X	anoxic depths			X	X
16m		X	X	X	X	X	X	anoxic depths	X	X	X	X
18m		X	X	X	X	X	X	anoxic depths	XXX	XXX	X	X

NOTES:

X Represents one field sample. XX and XXX represent duplicate and triplicate field samples, respectively.

1 South Deep will be sampled on a total of approximately 19 occasions as specified in Table 2.

2 H_2S samples will be collected at all anoxic depths and one meter above the uppermost anoxic depth (oxic sample).

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TABLE 5

LIST OF ISUS (WATER) PARAMETERS

Parameter	Sensor[x]	Performance Accuracy/Resolution	Attribute/Value
$^{+}NO_3^-$	Satlantic ISUS V2	0.5 µM (dl[7])	status, preferred electron acceptor
$^{+}HS^-$	Satlantic ISUS V2		redox constituent, SO_4^-reduction
T[1]	SBE 3F	± 0.002 °C/0.0003 °C	stratification
SC[2]	SBE4	± 3 µS/cm/0.1 µS/cm	tracer/stratification
$\mathbf{c}_{660}$[3]	Wetlabs C-Star	± 0.1% transmission	particle indicator
OBS[4]	D&A OBS-3	± 0.25 NTU/0.1 NTU	particle indicator
Chl_f[5]	Wetlabs WETstar	± NA/0.1 µg/L Chl	vertical pattern of phyto
PAR[6]	Li-Cor LI-193	± 5% reading	light penetration

[x] factory calibrated annually, maintained according to manufacturers instructions

[+] as described in Johnson and Coletti (2002)

[1] temperature

[2] specific conductance

[3] beam attenuation coefficient at 660 nm

[4] optical backscattering

[5] chlorophyll fluorescence

[6] photosynthetically active irradiance

[7] detection limit

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TABLE 6
QAPP WORKSHEET 20 – FIELD QUALITY CONTROL SAMPLE SUMMARY TABLE

Matrix	Analytical Group	Concen-tration Level	Analytical and Preparation SOP Reference[1]	No. of Sampling Locations[2]	No. of Field Duplicate Pairs	Inorganic: No. of MS[3]	No. of Field Blanks[4]	No. of Equip. Blanks	No. of PT Samples	Total No. of Samples to Lab
Water	Chlorophyll	Low	L-8	1 station, 2 depths, 19 sampling trips (38 samples)	One Triplicate set per trip (38 samples)		8			84
Water	Nitrate/Nitrite as N (NO_x)	Low	L-2	1 station, 3–5 depths, 19 sampling trips (82 samples)	One Triplicate set per trip (38 samples)		8			128
Water	Nitrate as N (NO_2)	Low	L-2	1 station, 3–5 depths, 19 sampling trips (82 samples)	One Triplicate set per trip (38 samples)		8			128
Water	Ammonia as N ($T\text{-}NH_3$)	Low	L-3	1 station, 3–5 depths, 19 sampling trips (82 samples)	One Triplicate set per trip (38 samples)		8			128
Water	Organic Carbon, Total/Total Dissolved as C (DOC)	Low	L-4	1 station, 3–5 depths, 19 sampling trips (82 samples)	One Triplicate set per trip (38 samples)		8			128
Water	Carbon, Inorganic Dissolved and Total (TIC)	Low	L-7	1 station, 3–5 depths, 19 sampling trips (82 samples)	One Triplicate set per trip (38 samples)		8			128

TABLE 6 (CONTINUED)
QAPP WORKSHEET 20 – FIELD QUALITY CONTROL SAMPLE SUMMARY TABLE

Matrix	Analytical Group	Concentration Level	Analytical and Preparation SOP Reference[1]	No. of Sampling Locations[2]	No. of Field Duplicate Pairs	Inorganic No. of MS[3]	No. of Field Blanks[4]	No. of Equip. Blanks	No. of PT Samples	Total No. of Samples to Lab
Water	Chloride	Low	L-1	1 station, 3–5 depths, 19 sampling trips (82 samples)	One Triplicate set per trip (38 samples)		8			128
Water	Ferrous iron	Low	L-10	1 station, 3 depths, 14 sampling trips (42 samples)	One Triplicate set per trip (28 samples)		5			75
Water	Dissolved methane	Low	L-9	1 stations, 3 depths, 14 sampling trips (42 samples)	One Triplicate set per trip (28 samples)		5			75
Water	Sulfide as S (Method 2)	Low	L-6	1 station, ~10 depths, 14 sampling trips (140 samples)[5]	One Triplicate set per trip 19 (28 samples)		5			173[5]
Water	Total mercury	Low	L-11	1 station, 3–5 depths, 19 sampling trips (82 samples)	19		8	4		113
Water	Filtered mercury	Low	L-11	1 station, 1-2 depths, 14 sampling trips (19 samples)	5		2	1		27
Water	Methyl mercury	Low	L-12	1 station, 3–5 depths; 19 sampling trips (82 samples)	19		8	4		113

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TABLE 6 (CONTINUED)
QAPP WORKSHEET 20 – FIELD QUALITY CONTROL SAMPLE SUMMARY TABLE

Matrix	Analytical Group	Concen-tration Level	Analytical and Preparation SOP Reference[1]	No. of Sampling Locations[2]	No. of Field Duplicate Pairs	Inorganic No. of MS[3]	No. of Field Blanks[4]	No. of Equip. Blanks	No. of PT Samples	Total No. of Samples to Lab
Zooplankton assemblages	Total and methyl mercury and percent solids	Low	L-12, L-13	1 station, 19 sampling trips (19 samples)[6]	2					21
Sediment slurry from sediment traps	Total mercury	Low	LB-1	1 station, 1 trap, 19 sampling trips	5					24
Sediment slurry from sediment traps	Total, fixed, and volatile suspended solids	Average	L-20	1 station, triplicate traps, 30 sampling trips						90
Sediment slurry from sediment traps	Particulate inorganic carbon	Average	L-21	1 station, triplicate traps, 30 sampling trips						90
Sediment slurry from sediment traps	Total and acidified calcium	Average	L-22	1 station, triplicate traps, 30 sampling trips						90

1 See Worksheet 23 in the Book 3 Work Plan for 2009 (Parsons and Exponent, 2009 Draft).
2 Samples collected at different depths at the same location are counted separately.
3 Matrix spike and matrix spike duplicate samples will be prepared by the laboratory at a frequency of at least one pair per 20 samples.
4 A field blank for non-mercury analyses is termed a "field trip blank" by the laboratory (UFI) and, as defined in the work plan, will consist of sample bottles that are filled in the laboratory, transported to the field, and then back to the laboratory for analyses. A field blank for total mercury and methylmercury will consist of mercury-free water (i.e., water containing mercury at concentrations below the minimum detection limit) placed in a clean sample bottle in the laboratory, transported to the field, and then poured into a second clean sample bottle for transport back to the laboratory.
5 Total number of samples will depend on the time of year and extent of anoxia. This estimate assumes 10 depths per sampling event.
6 In addition, analyses of up to 10 daphnia zooplankton samples will be conducted by Syracuse University.