Lower Passaic River Restoration Project

# 2011 CAGED BIVALVE STUDY DATA FOR THE LOWER PASSAIC RIVER STUDY AREA

**FINAL**

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## Acronyms

| | |
|---|---|
| **AES** | atomic emission spectrometry |
| **ARO** | Aquatic Research Organisms |
| **BHC** | benzene hexachloride |
| **COC** | chain of custody |
| **CPG** | Cooperating Parties Group |
| **CRM** | certified reference material |
| **CSO** | combined sewer overflow |
| **CVAFS** | cold vapor atomic fluorescence spectrometer |
| **CWCM** | chemical water column monitoring |
| **DDD** | dichlorodiphenyldichloroethane |
| **DDE** | dichlorodiphenyldichloroethylene |
| **DDT** | dichlorodiphenyltrichloroethane |
| **DO** | dissolved oxygen |
| **ECD** | electron capture device |
| **EMPC** | estimated maximum possible concentration |
| **ERA** | ecological risk asessment |
| **FS** | feasibility study |
| **GC** | gas chromatograph |
| **GFAAS** | graphite furnace atomic absorption spectrometer |
| **HPAH** | high-molecular-weight polycyclic aromatic hydrocarbon |
| **HpCDD** | heptachlorodibenzo-*p*-dioxin |
| **HpCDF** | heptachlorodibenzofuran |
| **HRGC** | high-resolution gas chromatograph |
| **HRMS** | high-resolution mass spectrometer |
| **HxCDD** | hexachlorodibenzo-*p*-dioxin |
| **HxCDF** | hexachlorodibenzofuran |
| **ICP** | inductively coupled plasma |
| **ID** | identification |
| **LCS** | laboratory control sample |
| **LCSD** | laboratory control sample duplicate |
| **LDC** | Laboratory Data Consultants |
| **LPAH** | low-molecular-weight polycyclic aromatic hydrocarbon |
| **LPRSA** | Lower Passaic River Study Area |
| **LRC** | low-resolution coring |
| **MLLW** | mean lower low water |
| **MS** | mass spectrometer |

| | |
|---|---|
| **ND** | non-detected concentration |
| **NJDEP** | New Jersey Department of Environmental Protection |
| **NJDOT** | New Jersey Department of Transportation |
| **NOAA** | National Oceanic and Atmospheric Administration |
| **OC** | organochlorine |
| **OCDD** | octachlorodibenzo-*p*-dioxin |
| **OCDF** | octachlorodibenzofuran |
| **PA** | Partner Agencies |
| **PAH** | polycyclic aromatic hydrocarbon |
| **PCB** | polychlorinated biphenyl |
| **PCDD** | polychlorinated dibenzo-*p*-dioxin |
| **PCDF** | polychlorinated dibenzofuran |
| **PeCDD** | pentachlorodibenzo-*p*-dioxin |
| **PeCDF** | pentachlorodibenzofuran |
| **PMF** | protocol modification form |
| **ppth** | parts per thousand |
| **PWCM** | physical water column monitoring |
| **QAPP** | quality assurance project plan |
| **QC** | quality control |
| **RI** | remedial investigation |
| **RL** | reporting limit |
| **RM** | river mile |
| **RPD** | relative percent difference |
| **SDG** | sample delivery group |
| **SIM** | selective ion monitoring |
| **SOP** | standard operating procedure |
| **St Dev** | standard deviation |
| **SVOC** | semivolatile organic compound |
| **$T_0$** | time zero |
| **TCDD** | tetrachlorodibenzo-*p*-dioxin |
| **TCDF** | tetrachlorodibenzofuran |
| **total DDx** | sum of all six DDT isomers (2,4′-DDD, 4,4′-DDD, 2,4′-DDE, 4,4′-DDE, 2,4′-DDT and 4,4′-DDT) |
| **USEPA** | US Environmental Protection Agency |
| **USACE** | US Army Corps of Engineers |
| **USFWS** | US Fish and Wildlife Service |
| **ww** | wet weight |

# 1 Introduction

This report summarizes the field and tissue chemistry results for the *in situ* caged bivalve study conducted in the Lower Passaic River Study Area (LPRSA) in the spring of 2011. The *in situ* caged bivalve study was conducted starting on March 9, 2011, and ending on June 8, 2011, following the methods presented in the *Lower Passaic River Restoration Project Quality Assurance Project Plan: Surface Sediment Chemical Analysis and Benthic Invertebrate Toxicity and Bioaccumulation Testing* (Windward 2009b), hereafter referred to as the Benthic Quality Assurance Project Plan (QAPP), and the *Lower Passaic River Restoration Project Quality Assurance Project Plan: Caged Bivalve Study Addendum to the Quality Assurance Project Plan: Surface Sediment Chemical Analyses and Benthic Invertebrate Toxicity and Bioaccumulation Testing, Addendum No. 4* (Windward 2011), hereafter referred to as the Benthic QAPP Addendum No. 4. The *in situ* caged bivalve study was conducted pursuant to the May 2007 Settlement Agreement and Order on Consent (Section IX.37.d.) (USEPA 2007) between the US Environmental Protection Agency (USEPA) and the Cooperating Parties Group (CPG), a consortium of approximately 70 companies that agreed to complete the remedial investigation/feasibility study (RI/FS) of the 17.4-mile stretch of the Passaic River between Newark Bay and Dundee Dam.

The data collected during the *in situ* caged bivalve study (e.g., survival of each bivalve species under the variable salinity conditions in the LPRSA) can be used to evaluate the potential for caged bivalves to be used as a long-term monitoring tool of chemicals in the water column of the LPRSA. In addition, per USEPA direction, chemical concentrations in the tissue of caged bivalves will be used in the ecological risk assessment (ERA) to gauge the potential effect of LPRSA chemicals on bivalves (Windward 2011).

Two species of mussels were used in the *in situ* caged bivalve study: eastern elliptio mussels (*Elliptio complanata)*, a freshwater mussel, and ribbed mussels (*Geukensia demissa*), an estuarine mussel. Eastern elliptio were deployed at locations in the freshwater portion of the river (river mile [RM] 10 to RM 17.4), and ribbed mussels were deployed at locations in the estuarine portion (RM 0 to RM 10). Data collected included the measurement (i.e., length) of each mussel from each sampling location, survival numbers, and analytical tissue results from a single composite tissue sample from each location at the end of the exposure period. Tissue samples from each species were also collected prior to deployment (i.e., time zero [$T_0$] samples) and submitted for analytical chemistry analysis. The $T_0$ samples were included to provide information on tissue concentrations at the start of the exposure period.

## 1.1 OVERVIEW OF THE LPRSA SAMPLING PROGRAM

CPG has implemented several sampling programs, during which numerous site-specific data have been collected to support the RI/FS, including the ecological and human health risk assessments. These sampling programs have followed the overarching sampling design presented in the *Lower Passaic River Restoration Project Draft Field Sampling Plan, Volume 2* (Malcolm Pirnie et al. 2006), hereafter referred to as FSP2, which was prepared for USEPA and its Partner Agencies (PA).[1] A summary of the field efforts conducted or planned by CPG from 2008 to 2012 is presented in Table 1-1.

### Table 1-1. Summary of CPG field efforts

| Data Collection Effort | Data Type | QAPP Citation |
|---|---|---|
| 2008 LRC sediment sampling | surface and subsurface sediment chemistry data | ENSR et al. (2008) |
| 2009 water column monitoring and sampling | surface water physical parameter data | AECOM (2010b) |
| 2009 fish and decapod tissue sampling | fish/decapod tissue chemistry data | Windward (2009a) |
| 2009 late summer/early fall fish and decapod tissue community survey | fish community survey data | |
| 2009 sediment sampling | surface sediment chemistry data | Windward (2009b) |
| 2009 bioaccumulation tissue testing | bioaccumulation tissue chemistry data | |
| 2009 toxicity testing | surface sediment toxicity data | |
| 2009 benthic invertebrate community survey | benthic community survey (taxonomy) data | |
| 2010 spring benthic invertebrate community survey | benthic community survey (taxonomy) data | Windward (2010g) |
| 2010 summer benthic invertebrate community survey | benthic community survey (taxonomy) data | Windward (2010g) |
| 2010 winter fish community survey | fish community survey data | Windward (2010h) |
| 2010 reconnaissance small forage fish sampling | mummichog egg lipid data | Windward (2010f) |
| 2010 late spring/early summer fish community survey | fish community survey data | Windward (2010d) |
| 2010 late spring/early summer fish tissue sampling | fish tissue chemistry data | Windward (2010e) |
| 2010 focused small forage fish tissue sampling | fish tissue chemistry data | Windward (2010b) |
| 2010 sediment sampling | surface sediment chemistry data | Windward (2010b) |
| 2010/2011 avian seasonal community surveys | avian community survey data | Windward (2010a) |
| 2010 habitat identification survey | habitat survey data | Windward (2010c) |

[1] The PA include the US Army Corps of Engineers (USACE), the New Jersey Department of Environmental Protection (NJDEP), the New Jersey Department of Transportation (NJDOT), the National Oceanic and Atmospheric Administration (NOAA), and the US Fish and Wildlife Service (USFWS).

**Table 1-1. Summary of CPG field efforts**

| Data Collection Effort | Data Type | QAPP Citation |
|---|---|---|
| 2010 PWCM sampling | surface water physical parameter data | AECOM (2010b) |
| 2011 *in situ* caged bivalve study[a] | bivalve tissue chemistry data | Windward (2011) |
| 2011 CSO/stormwater outfall sampling | CSO and stormwater chemistry data | Tierra Solutions (2011) |
| 2011/2012 RM 10.9 characterization | surface and subsurface sediment chemistry data from RM 10.9 | AECOM (2012d) |
| 2011 RM 10.9 hydrodynamic field investigation | sediment movement | AECOM (2011) |
| 2011 bathymetric survey | periodic survey of river depth | AECOM (2010a) |
| 2011/2012 small-volume CWCM sampling | surface water chemistry data | AECOM (2012b) |
| 2012 high-volume CWCM sampling | surface water chemistry data | AECOM (2012c) |
| 2012 supplemental sediment sampling (LRC) | surface and subsurface sediment chemistry data | AECOM (2012a) |

[a] The *in situ* caged bivalve results and analytical tissue data from this data collection effort are presented in this report.

CPG – Cooperating Parties Group
CSO – combined sewer overflow
CWCM – chemical water column monitoring
LRC – low-resolution coring
PWCM – physical water column monitoring
QAPP – quality assurance project plan
RM – river mile

## 1.2 CAGED BIVALVE TISSUE DATA USE

As described in the Benthic QAPP Addendum No. 4 (Windward 2011), the *in situ* caged bivalve study was conducted at USEPA's direction, and the study's results will be used to evaluate the potential for caged bivalves to be used as a long-term monitoring tool of chemicals in the water column of the LPRSA. In addition, per USEPA direction, chemical concentrations in the tissue from caged bivalves will be used to assess the potential effects of LPRSA chemicals on bivalves in the baseline ERA for the LPRSA.

## 1.3 DOCUMENT ORGANIZATION

The remainder of this report is organized as follows:

- Section 2 – Field sampling methods
- Section 3 – Laboratory methods
- Section 4 – Chemistry results
- Section 5 – Data validation
- Section 6 – References

The text of this report is supported by the following appendices:

- Appendix A – Field Forms
- Appendix B – Field Notebook
- Appendix C – Field Sampling and Sample Processing Photos
- Appendix D – Water Quality Measurement Data Table
- Appendix E – Caged Bivalve Survival Summary Table
- Appendix F – Caged Bivalve Health Assessment Summary Table
- Appendix G – Protocol Modification Forms
- Appendix H – Chain of Custody Forms
- Appendix I – Caged Bivalve Analysis Plan
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- Appendix P – Comparison of Laboratory Reporting Limits with Data Quality Levels

# 2 Field Sampling Methods

This section presents a brief overview of bivalve test organism procurement, cage deployment locations, sampling methods, and field data collected for the 2011 *in situ* caged bivalve study. The sampling design and methodology for the 2011 *in situ* caged bivalve study were presented in the Benthic QAPP Addendum No. 4 (Windward 2011).

## 2.1 Bivalve Procurement

Ribbed mussels *(G. demissa*) used in the caged bivalve study were obtained from Aquatic Research Organisms (ARO) in Hampton, New Hampshire. The ribbed mussels were field collected from Newport River Marsh in Beaufort, North Carolina, on February 26 and 27, 2011. Eastern elliptio mussels (*E. complanata*) used in the caged bivalve study were obtained from Carolina Biological Supply. The eastern elliptio mussels were field collected from Cattail Creek near Wendell, North Carolina, on March 6 and 7, 2011.

After their collection, the ribbed mussels were shipped to ARO, where they were divided into two batches and acclimated over a period of seven days to target salinity values and water temperature. To address wide-ranging salinity conditions encountered in the estuarine portion of the LPRSA, one batch of mussels was acclimated to a salinity of 10 parts per thousand (ppth), and the other was acclimated to a salinity of 2 ppth. Both batches of mussels were acclimated to the approximate water temperature recorded at the test locations at the time of deployment (i.e., approximately 11°C). The eastern elliptio mussels were collected from a freshwater system and did not need to be acclimated to a different salinity regime; therefore, they were sent directly from the supplier without additional acclimation procedures.

Upon receipt of the mussels from ARO and Carolina Biological Supply, 10 individuals of each species were randomly selected and sacrificed for an initial health exam to verify that the organisms were healthy and suitable for use in the caged bivalve study. As part of the health exam, the soft tissue of the 20 organisms was used to assess the assumption (made during the planning phase) of the number of mussels needed for deployment at each location in order to obtain sufficient tissue at the end of the 90-day exposure period. Information obtained during the health examination is provided on the field forms in Appendix A.

On Day 0 (i.e., day of deployment), sufficient numbers of organisms (i.e., 40 ribbed mussels and 33 eastern elliptio mussels) to create a $T_0$ sample for each species were set aside for the analysis of baseline tissue chemistry concentrations. $T_0$ samples were measured for length and placed in individually labeled ziplock bags. The samples were then wrapped in bubble wrap to avoid damaging the mussel shells and

couriered to the analytical laboratory, where they were frozen and held in storage until all test tissue was processed.

## 2.2 SAMPLING LOCATIONS AND DEPLOYMENT

The caged bivalve study began on March 9, 2011, and was completed on June 8, 2011. Target sampling locations for the study were presented in the Benthic QAPP Addendum No. 4 (Windward 2011). Cages containing ribbed mussels were deployed at seven estuarine sampling locations, and cages containing eastern elliptio mussels were deployed at five freshwater sampling locations as specified in Table 2-1 and shown on Figure 2-1.

**Table 2-1. Deployment locations for caged bivalves in the LPRSA**

| Location ID[a] | Easting (X)[b] | Northing (Y)[b] | Reach[c] | RM | Zone[d] | Bivalve Type |
|---|---|---|---|---|---|---|
| LPR1XX | 597610 | 688766 | 1 | 0.9 | estuarine | ribbed mussel[e] |
| LPR2AD | 597784 | 694564 | 2 | 2.1 | estuarine | ribbed mussel[e] |
| LPR3SS | 588689 | 692693 | 3 | 4.1 | estuarine | ribbed mussel[e] |
| LPR4ZZ[f] | 585426 | 701527 | 4 | 6.3 | estuarine | ribbed mussel[g] |
| LPR4AB | 587934 | 706505 | 4 | 7.4 | estuarine | ribbed mussel[g] |
| LPR5XX | 590836 | 713326 | 5 | 8.9 | estuarine | ribbed mussel[g] |
| LPR5YY | 591953 | 718175 | 5 | 9.9 | estuarine | ribbed mussel[g] |
| LPR6UU | 592965 | 723089 | 6 | 10.8 | freshwater | eastern elliptio mussel |
| LPR6VV | 596519 | 725446 | 6 | 11.7 | freshwater | eastern elliptio mussel |
| LPR7ZZ[f] | 596529 | 729250 | 7 | 12.4 | freshwater | eastern elliptio mussel |
| LPR7AB | 597217 | 734829 | 7 | 13.6 | freshwater | eastern elliptio mussel |
| LPR8AC | 597967 | 738260 | 8 | 14.3 | freshwater | eastern elliptio mussel |

[a] For consistency within the database, the location ID is the next sequential trap ID number available in the sequence for that reach after completing the fish tissue collection effort in summer 2010 (Windward 2018b).

[b] New Jersey State Plane (US survey ft).

[c] The LPRSA is divided into seven 2-mile reaches (i.e., RM 0 to RM 2, RM 2 to RM 4, RM 4 to RM 6, RM 6 to RM 8, RM 8 to RM 10, RM 10 to RM 12, RM 12 to RM 14) and one 3.4-mile reach (RM 14 to RM 17.4).

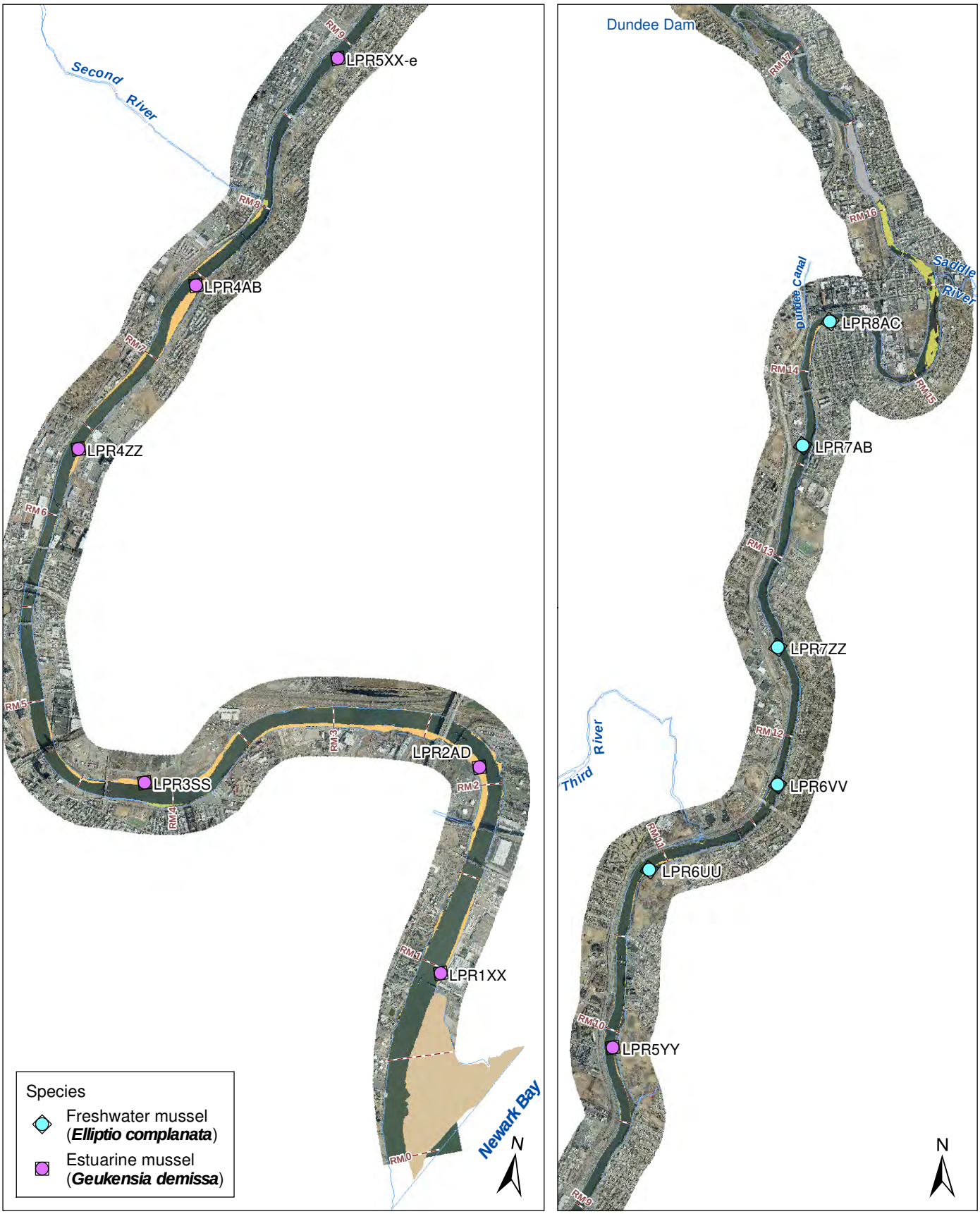
[d] Defined in the Benthic QAPP Addendum No. 4 (Windward 2011) as RM 0 to RM 10 and RM 10 to RM 17.4, for estuarine and freshwater zones, respectively.

[e] Ribbed mussels were acclimated to a salinity of 10 ppth for a period of seven days prior to deployment at this location.

[f] USEPA split sample location.

[g] Ribbed mussels were acclimated to a salinity of 2 ppth for a period of seven days prior to deployment at this location.

ID – identification
LPRSA – Lower Passaic River Study Area
ppth – parts per thousand
QAPP – quality assurance project plan
RM – river mile
USEPA – US Environmental Protection Agency




River mile
Mudflat
Kearney Point mudflat
Gravel flat
No grainsize data
LPRSA

0 2,000 4,000 Feet

Mudflat and gravel flat locations are determined as those areas where the river bottom slope is ≤6° and the depth is ≥-4.5 ft NGVD29 (i.e. -2 ft MLLW). LPRSA bathymetry is taken from the 2007 bathymetric survey conducted by Gahagan & Bryant Associates, Inc. (GBA), except for the area outside Kearny Point; bathymetry in the southeast part of this area is estimated based on NOAA data. In the GBA survey area, multibeam data are used where available and single-beam data are used where they are not.

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**Figure 2-1. Deployment locations for the spring 2011 caged bivalve study**

**FINAL**

Prepared by LSM 12/5/11, MTY 12/29/11, map#4949; W:\Projects\06-58-01 Passaic RI\Data\GIS\Maps_and_Analysis\BenthicChem

Caged bivalves were deployed on March 9 and 10, 2011 (Day 0). In order to provide enough tissue mass for an analytical composite sample, a total of 80 ribbed mussels were divided between two side-by-side cages and placed at each estuarine sampling location; a total of 60 eastern elliptio mussels were divided between two side-by-side cages and placed at each freshwater sampling location.[2] Additional sets of caged bivalves were placed at two locations (i.e., LPR4ZZ and LPR7ZZ) selected by USEPA in order to provide sufficient tissue mass to collect split composite samples. Table 2-2 provides a summary of the caged bivalve deployment and exposure period.

**Table 2-2. Caged bivalve test summary**

| Location ID | Date Deployed (Day 0) | Number of Cages | Number of Bivalves per Cage | Total Number of Bivalves Deployed | Exposure Period (Days) |
|---|---|---|---|---|---|
| LPR1XX | 3/9/2011 | 2 | 40 | 80 | 61 |
| LPR2AD[a] | 3/9/2011 | 2 | 40 | 80 | 61 |
| LPR3SS | 3/9/2011 | 2 | 40 | 80 | 61 |
| LPR4ZZ[b] | 3/9/2011 | 4 | 40 | 160 | 61 |
| LPR4AB | 3/9/2011 | 2 | 40 | 80 | 61 |
| LPR5XX | 3/9/2011 | 2 | 40 | 80 | 61 |
| LPR5YY | 3/9/2011 | 2 | 40 | 80 | 61 |
| LPR6UU | 3/10/2011 | 2 | 30 | 60 | 90 |
| LPR6VV | 3/10/2011 | 2 | 30 | 60 | 90 |
| LPR7ZZ[b] | 3/10/2011 | 4 | 30 | 120 | 90 |
| LPR7AB | 3/10/2011 | 2 | 30 | 60 | 90 |
| LPR8AC | 3/10/2011 | 2 | 30 | 60 | 90 |

[a] One cage at location LPR2AD was left until Day 90 (see Section 2.3 for additional details).
[b] USEPA split sample location.
ID – identification
USEPA – US Environmental Protection Agency

The mussels were suspended from the top of each cage in a single layer to keep the organisms above the bottom of the river as much as possible, and to provide even exposure to all mussels (Figure 2-2). The cages, strapped to cinderblocks, were deployed (Figure 2-3) to the bottom substrate of water with a minimum depth of 4 feet mean lower low water (MLLW) to ensure that the cages remained submerged throughout the duration of the study. The cage depth for each location at the time of deployment is provided in Appendix D.

[2] The actual number of mussels deployed at each sampling location differed from the number calculated in Attachment U: SOP—Deployment, Monitoring and Sample Field Processing for the Caged Bivalve Study of the Benthic QAPP Addendum 4 (Windward 2011), because the mass of each individual mussel was underestimated in the Benthic QAPP Addendum No. 4 at 2.7 g (soft tissue wet weight). Average soft tissue wet weight of ribbed mussels used for pre-deployment health assessments was 5.1 g (n = 10); average soft tissue wet weight of eastern elliptio mussels was 10.5 g (n = 5).

**Figure 2-2. Mussels suspended from cage attached to cinder blocks (location LPR3SS)**

**Figure 2-3. Cages (with mussels) being deployed**

## 2.3 FIELD DATA COLLECTION

After deployment, *in situ* water quality measurements were taken and survival and health assessments were conducted during periodic monitoring events. Periodic monitoring events occurred on Day 14 (March 23 and 24, 2011), Day 35 (April 13 and 14, 2011), Day 56 (May 4 and 5, 2011), and Day 75 (May 24, 2011). On Day 61 (May 9, 2011) and Day 90 (June 8, 2011), water quality measurements were also conducted at locations where cages were retrieved at the end of the study period (see Section 2.3.2 for additional details). Supporting field forms (i.e., LPRSA Caged Bivalve Study Data Forms and Caged Bivalve Examination Forms), logbooks, and photos are provided in Appendices A, B, and C, respectively.

### 2.3.1 *In situ* water quality measurements

Water quality measurements (i.e., turbidity, temperature, dissolved oxygen [DO], salinity, conductivity, and pH) were collected at 1-foot depth intervals with a multi-probe meter at deployment, during periodic monitoring, and upon cage retrieval. The water quality measurements data table is provided in Appendix D.

### 2.3.2 Physical and survival measurements

All individual mussels were measured for length prior to deployment. During each periodic monitoring event, each mussel was examined visually. Mussels with open or severely damaged shells or a siphon tube that did not respond to touch were considered dead, and were removed from the cages and discarded. In addition, a subset of mussels from each sampling location (approximately 10%) was measured for length, and as many as two individuals were sacrificed by prying open their shells and inspecting general tissue health.[3] The survival summary, including the number of mussels sacrificed for health assessment, is provided in Table 2-3.

[3] The inspections for general tissue health documented tissue tone (e.g., firm or loose), general color (e.g., milky or clear and watery), any odors (e.g., rancid smell), and mantle appearance (e.g., color and transparency).

## Table 2-3. Caged bivalve survival summary

| Location ID | Bivalve Type | Total Number Deployed | Number Sacrificed for Health Assessments | | | | Number in Lost Cages[a] | Total Number Sacrificed and Lost[b] | Total Number Retrieved[c] | Mortality | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Day 14 | Day 35 | Day 56 | Day 75 | | | | Number Dead | Percent Dead[d] |
| LPR1XX | ribbed mussel | 80 | 2 | 2 | 2 | 0 | 40 | 46 | 34 | 1 | 3 |
| LPR2AD | ribbed mussel | 80 | 2 | 2 | 2 | 0 | 27 | 33 | 47 | 15 | 32 |
| LPR3SS | ribbed mussel | 80 | 2 | 2 | 0 | 0 | 0 | 4 | 76 | 66 | 87 |
| LPR4ZZ[e,f] | ribbed mussel | 160 | 2 | 2 | 0 | 0 | 0 | 4 | 156 | 155 | 99 |
| LPR4AB[g] | ribbed mussel | 80 | 2 | 2 | 0 | 0 | 0 | 4 | 76 | 76 | 100 |
| LPR5XX[g] | ribbed mussel | 80 | 1 | 0 | 0 | 0 | 40 | 41 | 39 | 39 | 100 |
| LPR5YY[g] | ribbed mussel | 80 | 2 | 2 | 0 | 0 | 0 | 4 | 76 | 76 | 100 |
| LPR6UU | eastern elliptio mussel | 60 | 2 | 2 | 2 | 2 | 0 | 8 | 52 | 0 | 0 |
| LPR6VV | eastern elliptio mussel | 60 | 2 | 2 | 2 | 2 | 0 | 8 | 52 | 1 | 2 |
| LPR7ZZ[e] | eastern elliptio mussel | 120 | 1 | 2 | 2 | 2 | 30 | 37 | 83 | 3 | 4 |
| LPR7AB | eastern elliptio mussel | 60 | 2 | 2 | 2 | 2 | 0 | 8 | 52 | 1 | 2 |

## Table 2-3. Caged bivalve survival summary

| Location ID | Bivalve Type | Total Number Deployed | Number Sacrificed for Health Assessments | | | | Number in Lost Cages[a] | Total Number Sacrificed and Lost[b] | Total Number Retrieved[c] | Mortality | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Day 14 | Day 35 | Day 56 | Day 75 | | | | Number Dead | Percent Dead[d] |
| LPR8AC | eastern elliptio mussel | 60 | 2 | 2 | 0 | 0 | 0 | 4 | 56 | 52 | 93 |

[a] Number of mussels that were in cages that were lost during the test.
[b] Total number of mussels sacrificed and lost was calculated as the total number sacrificed (Days 14 through 75) plus the number in lost cages.
[c] Total number of mussels retrieved was calculated as the number deployed minus the total number sacrificed for health assessment and lost in cages.
[d] Percent mortality of mussels was calculated as the number of mussels that were lost because of mortality divided by the total number of mussels retrieved.
[e] USEPA split sample location.
[f] Insufficient mass was available following the caged bivalve study for chemical analysis; therefore, no bivalve chemistry data are available for this location.
[g] No mass was available following the caged bivalve study for chemical analysis; therefore, no bivalve chemistry data are available for this location.
ID – identification
USEPA – US Environmental Protection Agency

Because of high mortality in the estuarine portion of the river, all surviving ribbed mussels (with the exception of one cage) were retrieved on Day 61 (May 9, 2011). One cage in the estuarine portion of the river (location LPR2AD) was left in place for the remainder of the study period (i.e., until Day 90) to provide information on tissue concentrations of ribbed mussels for comparison to tissue concentrations of eastern elliptio mussels, all of which were left in place for the duration of the 90-day study period. On Day 90 (June 9, 2011), all surviving eastern ellipio mussels were retrieved. The cage left at LPR2AD for the full 90-day study period was determined to be lost.

At test termination, mussels were inspected visually. Those determined to be dead during the visual inspection were discarded and not submitted for tissue chemical analysis. Surviving mussels from each location were brought back to the field laboratory, measured for length, and individually labeled and placed in ziplock bags, prior to packing and shipping to the analytical laboratory. Mussels were shipped whole (i.e., not shucked) and were wrapped in bubble wrap to avoid shell breakage during shipping. Survival measurements and health assessment data tables are presented in Appendices E and F, respectively.

## 2.4 FIELD DEVIATIONS FROM THE QAPP

During the spring 2011 caged bivalve study, several deviations from the Benthic QAPP Addendum No. 4 (Windward 2011) were implemented for sampling, processing, and analytical methods. In addition, sampling locations were re-located or added during the field effort per agreement between CPG and USEPA. Deviations from the Benthic QAPP Addendum No. 4 were documented in the field notebook and on protocol modification forms (PMFs), when necessary. PMFs related to the field sampling effort are discussed below and presented in Appendix G. PMFs for the chemical analyses are addressed in Section 3.3 of this report.

- **PMF No. 1 Benthic QAPP Addendum No. 4 –** Freshwater locations LPR8AC (at RM 15.3) and LPR8AD (at RM 16.1) were relocated down river because the proposed locations were inaccessible at the time of cage deployment. Recent spring storms had led to high water levels and debris and access by boat above the 8th Street bridge at RM 14.9 was not possible. LPR8AC was relocated downriver to RM 14.3. An alternate freshwater location (LPR6VV) was selected further downstream, at RM 11.7, to maintain a relatively equal spatial distribution of freshwater locations in the LPRSA, and to avoid the vicinity of combined sewer overflows (CSOs), tributaries, docks, or other public-access areas.
- **PMF No. 2 Benthic QAPP Addendum No. 4 –** The number of mussels sacrificed for health assessments at the periodic monitoring events was reduced, either in frequency or in number of mussels sacrificed, in favor of obtaining enough tissue mass for chemical analysis. The change was made

because higher than expected losses (i.e., lost cages and/or mortality) were observed at several locations throughout the study period. Cages were lost during monitoring on Day 14 (one cage at LPR5XX, and one cage at LPR7ZZ [USEPA split sample location]); Day 56 (one cage at LPR1XX); and Day 91 (one cage at LPR2AD). Higher than expected mortality occurred at LPR3SS, LPR4ZZ (USEPA split sample location), LPR4AB, LPR5XX, LPR5YY, and LPR8AC.

- **PMF No. 3 Benthic QAPP Addendum No. 4 –** Based on the status of the ribbed mussels during the Day 56 monitoring and follow-up discussions with USEPA on May 6, 2011 (Yeh 2011), mussels from the estuarine zone of the LPRSA were retrieved on Day 61 (May 9, 2011), assessed for survival, measured for length, and sent to the analytical laboratory to be frozen until processing. One cage in the estuarine zone, at LPR2AD, was left in place for the remainder of the study period (i.e., until Day 90) to provide information on tissue concentrations of ribbed mussels for comparison to tissue concentrations of eastern elliptio mussels, all of which were left for the duration of the 90-day study period.[4]

[4] At test termination, the cage left at LPR2AD for the full 90-day study period was determined to be lost; therefore, there were no ribbed mussel samples with an exposure period of 90 days.

# 3 Laboratory Methods

This section provides a summary of the methods used to process the mussels and perform the chemical analyses on the bivalve tissue. This section also summarizes laboratory deviations from the Benthic QAPP (Windward 2009b) and Benthic QAPP Addendum No. 4 (Windward 2011).

## 3.1 Tissue Sample Processing and Homogenization

All mussels retained for chemical analysis were couriered from the CPG field facility in East Rutherford, New Jersey, to Alpha Analytical in Mansfield, Massachusetts, where they were frozen upon receipt and held until processing. Alpha Analytical received the mussels retained at deployment ($T_0$ samples) on March 9, 2011, the ribbed mussel samples on May 9, 2011, and the eastern elliptio mussel samples on June 9, 2011, as documented in the chain of custody (COC) forms (Appendix H).

In accordance with the Benthic QAPP Addendum No. 4 (Windward 2011) and the Caged Bivalve Analysis Plan (Appendix I of this report), tissue from individual mussel specimens from each location were composited. One composite per species was created from the mussels that were set aside at deployment ($T_0$ samples). The valves from each specimen were removed and the soft tissue was homogenized for each composite sample, consistent with the protocols outlined in the Benthic QAPP Addendum No. 4. Windward Environmental LLC personnel oversaw the compositing and initial homogenization of the bivalve tissue on July 12 and 13, 2011.

After homogenization, each tissue sample was partitioned into five containers, one for each of the five analytical laboratories, and stored frozen. One container was retained at Alpha Analytical for analysis; the other four containers of frozen tissue were shipped overnight (to Analytical Perspectives, Brooks Rand Labs, or Columbia Analytical Services) or couriered (to Maxxam Analytics) on wet and dry ice. COC forms (Appendix H) document the transfer of custody for the bivalve composite tissue samples. Samples were batched into sample delivery groups (SDGs) for chemical analysis. Appendix J provides a cross reference for each sample, presented by laboratory, analysis type, and SDG.

## 3.2 Methods for Chemical Analysis

Table 3-1 presents a summary of bivalve tissue samples analyzed. All composite tissue samples that had sufficient mass for analysis were analyzed for polychlorinated biphenyl (PCB) congeners (and homologs), PCB Aroclors, polychlorinated dibenzo-*p*-dioxins (PCDDs)/polychlorinated dibenzofurans (PCDFs), organochlorine (OC) pesticides, polycyclic aromatic hydrocarbons (PAHs), alkylated PAHs, metals

(including total mercury, methyl mercury, and butyltins), semivolatile organic compounds (SVOCs) (including phthalates), percent moisture, and lipids.[5]

### Table 3-1. Summary of bivalve tissue samples analyzed

| Location ID | Sample ID[a] | Reach[b] | RM | Zone[c] | Collection Day | Bivalve Species | Number of Bivalves in Composite Sample |
|---|---|---|---|---|---|---|---|
| $T_0$ | LPRBG-GDST-Comp01 | na | na | na | Day 0 | ribbed mussel | 40 |
| $T_0$ | LPRBG-ECST-Comp01 | na | na | na | Day 0 | eastern elliptio mussel | 40 |
| LPR1XX | LPR1-GDST-Comp01 | 1 | 0.9 | estuarine | Day 61 | ribbed mussel | 33 |
| LPR2AD | LPR2-GDST-Comp02 | 2 | 2.1 | estuarine | Day 61 | ribbed mussel | 32 |
| LPR3SS | LPR3-GDST-Comp03 | 3 | 4.1 | estuarine | Day 61 | ribbed mussel | 10 |
| LPR6UU | LPR6-ECST-Comp01 | 6 | 10.8 | freshwater | Day 90 | eastern elliptio mussel | 52 |
| LPR6VV | LPR6-ECST-Comp02 | 6 | 11.7 | freshwater | Day 90 | eastern elliptio mussel | 51 |
| LPR7ZZ | LPR7-ECST-Comp03 | 7 | 12.4 | freshwater | Day 90 | eastern elliptio mussel | 80 |
| LPR7AB | LPR7-ECST-Comp04 | 7 | 13.6 | freshwater | Day 90 | eastern elliptio mussel | 51 |
| LPR8AC | LPR8-ECST-Comp05 | 8 | 14.3 | freshwater | Day 90 | eastern elliptio mussel | 4 |

[a] Each bivalve composite tissue sample was analyzed for PCB congeners, PCB Aroclors, PCDDs/PCDFs, OC pesticides, PAHs, alkylated PAHs, metals (including total mercury, methyl mercury, and butyltins), SVOCs, percent moisture, and lipids.

[b] The LPRSA is divided into seven 2-mile reaches (i.e., RM 0 to RM 2, RM 2 to RM 4, RM 4 to RM 6, RM 6 to RM 8, RM 8 to RM 10, RM 10 to RM 12, RM 12 to RM 14) and one 3.4-mile reach (RM 14 to RM 17.4).

[c] Defined in the Benthic QAPP Addendum No. 4 (Windward 2011) as RM 0 to RM 10 and RM 10 to RM 17.4, for estuarine and freshwater zones, respectively.

ID – identification
LPRSA – Lower Passaic River Study Area
na – not applicable
OC – organochlorine
PAH – polycyclic aromatic hydrocarbon
PCB – polychlorinated biphenyl
PCDD – polychlorinated dibenzo-*p*-dioxin
PCDF – polychlorinated dibenzofuran
RM – river mile
SVOC – semivolatile organic compound
$T_0$ – time zero

The methods and instruments used to analyze the bivalve tissue samples are identified in Table 3-2; the methods are described in detail in the Benthic QAPP (Windward 2009b). All bivalve tissue samples had sufficient mass to be analyzed for all of the analytes groups listed in Table 3-2.

[5] As documented in the Caged Bivalve Analysis Plan (Appendix I of this report), insufficient tissue mass was available for chemical analysis for location LPR4ZZ; no mass was available for chemical analysis for locations LPR4AB, LPR5XX, and LPR5YY. Each sample analyzed had sufficient mass for all analytes.

**Table 3-2. Analytical methods for bivalve tissue analyses**

| Laboratory | Analyte Groups | Instrument/Method | Method Reference |
|---|---|---|---|
| Alpha Analytical | alkylated PAHs and PAHs | GC/MS-SIM | USEPA SW-846 8270C |
| | PCB Aroclors | GC/ECD | USEPA SW-846 8082 |
| | percent moisture | oven | SM2540G Mod |
| | SVOCs | GC/MS | USEPA SW-846 8270C |
| Analytical Perspectives | PCB congeners | HRGC/HRMS | USEPA 1668B |
| | PCDDs/PCDFs | HRGC/HRMS | USEPA 1613B |
| Brooks Rand Labs | methyl mercury | CVAFS | USEPA 1630 |
| | total mercury | CVAFS | USEPA 1631 |
| Columbia Analytical Services, Kelso | butyltins | GC/MS-SIM | Krone et al. (1989) |
| | lipids | analytical balance | Bligh-Dyer |
| | metals | ICP-AES/ICP-MS/GFAAS | USEPA SW-846 6010B/6020/7742 |
| Maxxam Analytics | OC pesticides | HRGC/HRMS | USEPA 1699 Mod |

AES – atomic emission spectrometry
CVAFS – cold vapor atomic fluorescence spectrometer
ECD – electron capture device
GC – gas chromatograph
GFAAS – graphite furnace atomic absorption spectrometer
HRGC – high-resolution gas chromatograph
HRMS – high-resolution mass spectrometer
ICP– inductively coupled plasma
MS – mass spectrometer
OC – organochlorine
PAH – polycyclic aromatic hydrocarbon
PCB – polychlorinated biphenyl
PCDD – polychlorinated dibenzo-*p*-dioxin
PCDF – polychlorinated dibenzofuran
SIM – selective ion monitoring
SVOC – semivolatile organic compound
USEPA – US Environmental Protection Agency

## 3.3 Laboratory Deviations from the QAPP

Laboratory deviations from the Benthic QAPP (Windward 2009b) for the chemical analysis of the bivalve tissue were documented in PMFs, which were provided to USEPA. The PMFs for the bivalve tissue chemical analyses are as follows:

- **PMF Benthic QAPP No. 14 –** documentation of matrix spike addition procedure for selenium analysis (includes revised standard operating procedure [SOP])
- **PMF Benthic QAPP No. 16 –** clarification of methods used for total metals analysis
- **PMF Benthic QAPP No. 18 –** clarification of metals spiking procedures for tissue analysis
- **PMF Benthic QAPP No. 19 –** clarification of quality control (QC) samples for butyltin analysis

PMFs 14, 16, and 19 apply to both the benthic sediment and benthic tissue (i.e., bioaccumulation tissue and bivalve tissue), and are attached to the 2009 and 2010 sediment chemistry data report (Windward 2015). PMF 18 applies to only benthic tissue and is attached to the 2010 bioaccumulation tissue chemistry data report (Windward 2018a).

# 4 Chemistry Results

This section provides a summary of the chemistry results for the bivalve tissue. Data management rules, including protocol for the calculation of chemical sums and the treatment of non-detected results for presentation in this report, are presented in Appendix K. Data tables that contain all chemistry results by sample are presented in Appendix L. Laboratory data summary forms are presented in Appendix M, and full laboratory data are presented in Appendix N.

A subset of analytes were selected for presentation in this report (Table 4-1); the complete dataset for all analytes is provided in Appendix L. This subset of analytes represents a range of analyte groups that have been the focus of previous reports on the LPRSA, including the *Draft Source Control Early Action Focused Feasibility Study* (Battelle 2007), and the *Low Resolution Coring Characterization Summary* (AECOM 2014), hereafter referred to as the LRC Report.

**Table 4-1. Analytes selected for detailed presentation**

| Analyte Group | Analyte |
|---|---|
| Metals | cadmium |
| | chromium |
| | copper |
| | lead |
| | mercury (total and methyl) |
| PAHs | LPAHs[a] |
| | HPAHs[b] |
| | total PAHs[c,d] |
| PCBs | total PCB congeners[e] |
| | total PCB Aroclors[d, f] |
| PCDDs/PCDFs | 2,3,7,8-TCDD |
| OC pesticides | total DDx[g] |
| | total chlordane[h] |
| | dieldrin |
| General chemistry | lipid[d] |

[a] Calculated as the sum of acenaphthene, acenaphthylene, anthracene, fluorene, naphthalene, and phenanthrene (see Appendix K for more details).

[b] Calculated as the sum of benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(j/k)fluoranthene, chrysene, dibenzo(a,h)anthracene, fluoranthene, indeno(1,2,3-c,d)pyrene, and pyrene (see Appendix K for more details).

[c] Calculated as the sum of acenaphthene, acenaphthylene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(j/k)fluoranthene, chrysene, dibenzo(a,h)anthracene, fluoranthene, fluorene, indeno(1,2,3-c,d)pyrene, naphthalene, phenanthrene, and pyrene (see Appendix K for more details).

[d] Analyte is presented only in tables (i.e., not in figures).

[e] Calculated as the sum of 209 PCB congeners (see Appendix K for more details).

[f] Calculated as the sum of Aroclor 1016, Aroclor 1221, Aroclor 1232, Aroclor 1242, Aroclor 1248, Aroclor 1254, Aroclor 1260, Aroclor 1262, and Aroclor 1268 (see Appendix K for more details).

[g] Calculated as the sum of 2,4′-DDD; 2,4′-DDE; 2,4′-DDT; 4,4′-DDD; 4,4′-DDE; and 4,4′-DDT (see Appendix K for more details).

[h] Calculated as the sum of alpha-chlordane, gamma-chlordane, oxychlordane, cis-nonachlor, and trans-nonachlor (see Appendix K for more details).

DDD – dichlorodiphenyldichloroethane

DDE – dichlorodiphenyldichloroethylene

DDT – dichlorodiphenyltrichloroethane

HPAH – high-molecular-weight polycyclic aromatic hydrocarbon

LPAH – low-molecular-weight polycyclic aromatic hydrocarbon

OC – organochlorine

PAH – polycyclic aromatic hydrocarbon

PCB – polychlorinated biphenyl

PCDD – polychlorinated dibenzo-*p*-dioxin

PCDF – polychlorinated dibenzofuran

TCDD – tetrachlorodibenzo-*p*-dioxin

total DDx – sum of all six DDT isomers (2,4′-DDD, 4,4′-DDD, 2,4′-DDE, 4,4′-DDE, 2,4′-DDT and 4,4′-DDT)

Data for analytes that were detected in tissue are summarized in the following subsections with detailed discussions provided for the analytes identified in Table 4-1. In the summary tables that follow, calculated total concentrations are presented three ways, based on the treatment of non-detected components: non-detected concentrations are set equal to zero, equal to one-half the reporting limit [RL], or equal to the full RL. For the purpose of text summary and graphical presentation, the totals presented are based on non-detected values set equal to zero. The method for calculating totals that will be used in the risk assessments is presented in the *Revised Data Usability and Data Evaluation Plan for the Lower Passaic River Study Area Risk Assessments* (Windward and AECOM 2015). See Appendix K for additional details on summation calculations.

## 4.1 METALS

All 25 metals analyzed were detected in the bivalve tissue samples, with the exception of thallium, which was detected in the eastern elliptio mussel tissue samples but not in the ribbed mussel samples. Table 4-2 presents a summary of metals results for the bivalve samples, including the number of detections, the range of detected concentrations, and the RL or range of RLs for samples reported as non-detects. Data tables that contain the metal concentrations for each sample, including non-detected results, are presented in Appendix L. Cadmium, chromium, copper, lead, and mercury are discussed further in subsections that follow Table 4-2.

## Table 4-2. Summary of detected metals results for LPRSA bivalve tissue samples

| Chemical[a] | Bivalve Type | Sample Type[b] | Unit (ww) | Detection Frequency | | Detected Concentration[c] | | | | RL or Range of RLs[d] |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Ratio | % | Min | Max | Mean | St Dev | |
| Aluminum | eastern elliptio | $T_0$ | mg/kg | 1/1 | 100 | 11.1 | 11.1 | na | na | na |
| | | test | mg/kg | 5/5 | 100 | 11.0 | 27.4 | 17.7 | 6.21 | na |
| | ribbed mussel | $T_0$ | mg/kg | 1/1 | 100 | 5.9 | 5.9 | na | na | na |
| | | test | mg/kg | 3/3 | 100 | 16.6 | 31.8 | 21.8 | 8.69 | na |
| Antimony | eastern elliptio mussel | $T_0$ | mg/kg | 0/1 | 0 | na | na | na | na | 0.002 |
| | | test | mg/kg | 1/5 | 20 | 0.016 J | 0.016 J | na | na | 0.004 – 0.005 |
| | ribbed mussel | $T_0$ | mg/kg | 0/1 | 0 | na | na | na | na | 0.001 |
| | | test | mg/kg | 1/3 | 33 | 0.003 J | 0.003 J | na | na | 0.002 – 0.003 |
| Arsenic | eastern elliptio mussel | $T_0$ | mg/kg | 1/1 | 100 | 0.38 | 0.38 | na | na | na |
| | | test | mg/kg | 5/5 | 100 | 0.28 | 0.37 | 0.34 | 0.035 | na |
| | ribbed mussel | $T_0$ | mg/kg | 1/1 | 100 | 1.5 | 1.5 | na | na | na |
| | | test | mg/kg | 3/3 | 100 | 0.82 | 1.1 | 0.93 | 0.15 | na |
| Barium | eastern elliptio mussel | $T_0$ | mg/kg | 1/1 | 100 | 359 | 359 | na | na | na |
| | | test | mg/kg | 5/5 | 100 | 283 | 355 | 309 | 27.6 | na |
| | ribbed mussel | $T_0$ | mg/kg | 1/1 | 100 | 2.2 | 2.2 | na | na | na |
| | | test | mg/kg | 3/3 | 100 | 0.86 | 3.0 | 1.7 | 1.2 | na |
| Beryllium | eastern elliptio mussel | $T_0$ | mg/kg | 1/1 | 100 | 0.0064 | 0.0064 | na | na | na |
| | | test | mg/kg | 5/5 | 100 | 0.0054 | 0.0066 | 0.0061 | 0.00046 | na |
| | ribbed mussel | $T_0$ | mg/kg | 1/1 | 100 | 0.0007 J | 0.0007 J | na | na | na |
| | | test | mg/kg | 3/3 | 100 | 0.0009 J | 0.0012 | 0.0010 | 0.00015 | na |
| Cadmium | eastern elliptio mussel | $T_0$ | mg/kg | 1/1 | 100 | 0.059 J | 0.059 J | na | na | na |
| | | test | mg/kg | 5/5 | 100 | 0.057 J | 0.068 J | 0.065 | 0.0044 | na |

## Table 4-2. Summary of detected metals results for LPRSA bivalve tissue samples

| Chemical[a] | Bivalve Type | Sample Type[b] | Unit (ww) | Detection Frequency | | Detected Concentration[c] | | | | RL or Range of RLs[d] |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Ratio | % | Min | Max | Mean | St Dev | |
| | ribbed mussel | $T_0$ | mg/kg | 1/1 | 100 | 0.026 J | 0.026 J | na | na | na |
| | | test | mg/kg | 3/3 | 100 | 0.021 J | 0.025 J | 0.022 | 0.0023 | na |
| Calcium | eastern elliptio mussel | $T_0$ | mg/kg | 1/1 | 100 | 3,670 | 3,670 | na | na | na |
| | | test | mg/kg | 5/5 | 100 | 2,980 | 3,510 | 3,180 | 209 | na |
| | ribbed mussel | $T_0$ | mg/kg | 1/1 | 100 | 400 | 400 | na | na | na |
| | | test | mg/kg | 3/3 | 100 | 157 | 271 | 201 | 61.3 | na |
| Chromium | eastern elliptio mussel | $T_0$ | mg/kg | 1/1 | 100 | 0.33 J | 0.33 J | 0.33 | | na |
| | | test | mg/kg | 5/5 | 100 | 0.35 J | 10.8 | 2.6 | 4.6 | na |
| | ribbed mussel | $T_0$ | mg/kg | 1/1 | 100 | 0.20 J | 0.20 J | na | na | na |
| | | test | mg/kg | 3/3 | 100 | 0.16 J | 15.9 | 5.4 | 9.1 | na |
| Cobalt | eastern elliptio mussel | $T_0$ | mg/kg | 1/1 | 100 | 0.080 J | 0.080 J | na | na | na |
| | | test | mg/kg | 5/5 | 100 | 0.076 J | 0.16 J | 0.096 | 0.036 | na |
| | ribbed mussel | $T_0$ | mg/kg | 1/1 | 100 | 0.021 J | 0.021 J | na | na | na |
| | | test | mg/kg | 3/3 | 100 | 0.022 J | 0.097 J | 0.048 | 0.043 | na |
| Copper | eastern elliptio mussel | $T_0$ | mg/kg | 1/1 | 100 | 0.84 J | 0.84 J | na | na | na |
| | | test | mg/kg | 5/5 | 100 | 0.50 J | 1.2 J | 0.79 | 0.27 | na |
| | ribbed mussel | $T_0$ | mg/kg | 1/1 | 100 | 0.62 J | 0.62 J | na | na | na |
| | | test | mg/kg | 3/3 | 100 | 0.63 J | 0.98 J | 0.76 | 0.19 | na |
| Iron | eastern elliptio mussel | $T_0$ | mg/kg | 1/1 | 100 | 1,270 | 1,270 | na | na | na |
| | | test | mg/kg | 5/5 | 100 | 1,070 | 1,310 | 1,150 | 96.2 | na |
| | ribbed mussel | $T_0$ | mg/kg | 1/1 | 100 | 15.1 | 15.1 | na | na | na |
| | | test | mg/kg | 3/3 | 100 | 26.7 | 132 | 63.7 | 59.2 | na |

## Table 4-2. Summary of detected metals results for LPRSA bivalve tissue samples

| Chemical[a] | Bivalve Type | Sample Type[b] | Unit (ww) | Detection Frequency | | Detected Concentration[c] | | | | RL or Range of RLs[d] |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Ratio | % | Min | Max | Mean | St Dev | |
| Lead | eastern elliptio mussel | $T_0$ | mg/kg | 1/1 | 100 | 0.13 J | 0.13 J | na | na | na |
| | | test | mg/kg | 5/5 | 100 | 0.14 J | 0.28 J | 0.22 | 0.054 | na |
| | ribbed mussel | $T_0$ | mg/kg | 1/1 | 100 | 0.041 J | 0.041 J | na | na | na |
| | | test | mg/kg | 3/3 | 100 | 0.12 J | 0.17 J | 0.15 | 0.025 | na |
| Magnesium | eastern elliptio mussel | $T_0$ | mg/kg | 1/1 | 100 | 89 | 89 | na | na | na |
| | | test | mg/kg | 5/5 | 100 | 88 | 115 | 104 | 13.5 | na |
| | ribbed mussel | $T_0$ | mg/kg | 1/1 | 100 | 554 | 554 | na | na | na |
| | | test | mg/kg | 3/3 | 100 | 197 | 251 | 223 | 27.1 | na |
| Manganese | eastern elliptio mussel | $T_0$ | mg/kg | 1/1 | 100 | 1,510 | 1,510 | na | na | na |
| | | test | mg/kg | 5/5 | 100 | 1,170 | 1,410 | 1,260 | 91.1 | na |
| | ribbed mussel | $T_0$ | mg/kg | 1/1 | 100 | 0.89 | 0.89 | na | na | na |
| | | test | mg/kg | 3/3 | 100 | 0.98 | 4.0 | 2.4 | 1.5 | na |
| Mercury | eastern elliptio mussel | $T_0$ | µg/kg | 1/1 | 100 | 28 | 28 | na | na | na |
| | | test | µg/kg | 5/5 | 100 | 24 | 35 | 29 | 4.5 | na |
| | ribbed mussel | $T_0$ | µg/kg | 1/1 | 100 | 11 | 11 | na | na | na |
| | | test | µg/kg | 3/3 | 100 | 8.7 | 19 | 13 | 5.4 | na |
| Methyl mercury | eastern elliptio mussel | $T_0$ | µg/kg | 1/1 | 100 | 18 | 18 | na | na | na |
| | | test | µg/kg | 5/5 | 100 | 12 | 25 | 18 | 5.1 | na |
| | ribbed mussel | $T_0$ | µg/kg | 1/1 | 100 | 3.5 | 3.5 | na | na | na |
| | | test | µg/kg | 3/3 | 100 | 3.3 | 4.7 | 4.2 | 0.76 | na |
| Nickel | eastern elliptio mussel | $T_0$ | mg/kg | 1/1 | 100 | 0.20 J | 0.20 J | na | na | na |
| | | test | mg/kg | 5/5 | 100 | 0.15 J | 7.8 J | 1.8 | 3.4 | na |

## Table 4-2. Summary of detected metals results for LPRSA bivalve tissue samples

| Chemical[a] | Bivalve Type | Sample Type[b] | Unit (ww) | Detection Frequency | | Detected Concentration[c] | | | | RL or Range of RLs[d] |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Ratio | % | Min | Max | Mean | St Dev | |
| | ribbed mussel | $T_0$ | mg/kg | 1/1 | 100 | 0.17 J | 0.17 J | na | na | na |
| | | test | mg/kg | 3/3 | 100 | 0.11 J | 6.1 J | 2.1 | 3.5 | na |
| Potassium | eastern elliptio mussel | $T_0$ | mg/kg | 1/1 | 100 | 209 | 209 | na | na | na |
| | | test | mg/kg | 5/5 | 100 | 143 | 193 | 170 | 23.6 | na |
| | ribbed mussel | $T_0$ | mg/kg | 1/1 | 100 | 622 | 622 | na | na | na |
| | | test | mg/kg | 3/3 | 100 | 427 | 613 | 525 | 93.4 | na |
| Selenium | eastern elliptio mussel | $T_0$ | mg/kg | 1/1 | 100 | 0.13 | 0.13 | na | na | na |
| | | test | mg/kg | 5/5 | 100 | 0.12 | 0.22 | 0.17 | 0.039 | na |
| | ribbed mussel | $T_0$ | mg/kg | 1/1 | 100 | 0.16 | 0.16 | na | na | na |
| | | test | mg/kg | 3/3 | 100 | 0.14 | 0.19 | 0.17 | 0.029 | na |
| Silver | eastern elliptio mussel | $T_0$ | mg/kg | 1/1 | 100 | 0.004 J | 0.004 J | na | na | na |
| | | test | mg/kg | 5/5 | 100 | 0.005 J | 0.006 J | 0.0054 | 0.00055 | na |
| | ribbed mussel | $T_0$ | mg/kg | 1/1 | 100 | 0.025 J | 0.025 J | na | na | na |
| | | test | mg/kg | 3/3 | 100 | 0.022 J | 0.025 J | 0.024 | 0.0015 | na |
| Sodium | eastern elliptio mussel | $T_0$ | mg/kg | 1/1 | 100 | 211 | 211 | na | na | na |
| | | test | mg/kg | 5/5 | 100 | 210 | 277 | 250 | 25.5 | na |
| | ribbed mussel | $T_0$ | mg/kg | 1/1 | 100 | 3,860 | 3,860 | na | na | na |
| | | test | mg/kg | 3/3 | 100 | 1,230 | 1,710 | 1,440 | 246 | na |
| Thallium | eastern elliptio mussel | $T_0$ | mg/kg | 0/1 | 0 | na | na | na | na | 0.0021 |
| | | test | mg/kg | 1/5 | 20 | 0.0060 | 0.0060 | na | na | 0.0017 – 0.002 |
| Titanium | eastern elliptio mussel | $T_0$ | mg/kg | 1/1 | 100 | 0.31 | 0.31 | na | na | na |
| | | test | mg/kg | 5/5 | 100 | 0.33 | 0.85 | 0.54 | 0.20 | na |

## Table 4-2. Summary of detected metals results for LPRSA bivalve tissue samples

| Chemical[a] | Bivalve Type | Sample Type[b] | Unit (ww) | Detection Frequency | | Detected Concentration[c] | | | | RL or Range of RLs[d] |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Ratio | % | Min | Max | Mean | St Dev | |
| | ribbed mussel | $T_0$ | mg/kg | 1/1 | 100 | 0.17 | 0.17 | na | na | na |
| | | test | mg/kg | 3/3 | 100 | 0.45 | 1.2 | 0.71 | 0.43 | na |
| Vanadium | eastern elliptio mussel | $T_0$ | mg/kg | 1/1 | 100 | 6.3 | 6.3 | na | na | na |
| | | test | mg/kg | 5/5 | 100 | 4.9 | 5.8 | 5.3 | 0.34 | na |
| | ribbed mussel | $T_0$ | mg/kg | 1/1 | 100 | 0.12 | 0.12 | na | na | na |
| | | test | mg/kg | 3/3 | 100 | 0.08 | 0.25 | 0.14 | 0.093 | na |
| Zinc | eastern elliptio mussel | $T_0$ | mg/kg | 1/1 | 100 | 16.7 | 16.7 | na | na | na |
| | | test | mg/kg | 5/5 | 100 | 13.5 | 17.3 | 15.6 | 1.74 | na |
| | ribbed mussel | $T_0$ | mg/kg | 1/1 | 100 | 4.2 | 4.2 | na | na | na |
| | | test | mg/kg | 3/3 | 100 | 3.4 | 6.4 | 4.5 | 1.7 | na |

[a] Only chemicals with detected results are presented. If the chemical was not detected in any samples for a given species and sample type, the chemical is not presented in the table. Data tables that contain results for each sample, including non-detected sample results, are presented in Appendix L.

[b] $T_0$ samples were collected at the time of deployment on Day 0 for both mussel species (see Section 2.1 for additional details). Test samples were collected at Day 61 for the ribbed mussels and Day 90 for the eastern elliptio mussels (see Section 2.3 for additional details).

[c] Summary statistics (i.e., minimum, maximum, and mean concentrations and the standard deviation) include data only for detected results. Non-detected data are not included in summary statistics.

[d] RL or RL range for non-detect samples. When the detection frequency is 100% (i.e., no non-detect samples), the RL is not applicable.

J – estimated concentration
LPRSA – Lower Passaic River Study Area
na – not applicable
RL – reporting limit
St Dev – standard deviation
$T_0$ – time zero
ww – wet weight

### 4.1.1 Cadmium

Cadmium was detected in all of the bivalve tissue samples analyzed. For the ribbed mussel test samples, the lowest cadmium concentration (0.021 mg/kg wet weight [ww]) was detected in samples LPR1-GDST-Comp01 and LPR2-GDST-Comp02 from cages placed at RM 0.9 and RM 2.1, respectively. The highest cadmium concentration (0.025 mg/kg ww) was detected in sample LPR3-GDST-Comp03 from cages placed at RM 4.1. The cadmium concentration of the ribbed mussel $T_0$ sample (LPRBG-GDST-Comp01) was 0.026 mg/kg ww.

For the eastern elliptio mussel test samples, the lowest cadmium concentration (0.057 mg/kg ww) was detected in sample LPR6-ECST-Comp01 from cages placed at RM 10.8, and the highest cadmium concentration (0.068 mg/kg ww) was detected in sample LPR7-ECST-Comp03 from cages placed at RM 12.4. The cadmium concentration in the eastern elliptio mussel $T_0$ sample (LPRBG-ECST-Comp01) was 0.059 mg/kg ww. The detected cadmium concentration for each sample is shown by percentile range in Figure 4-1.

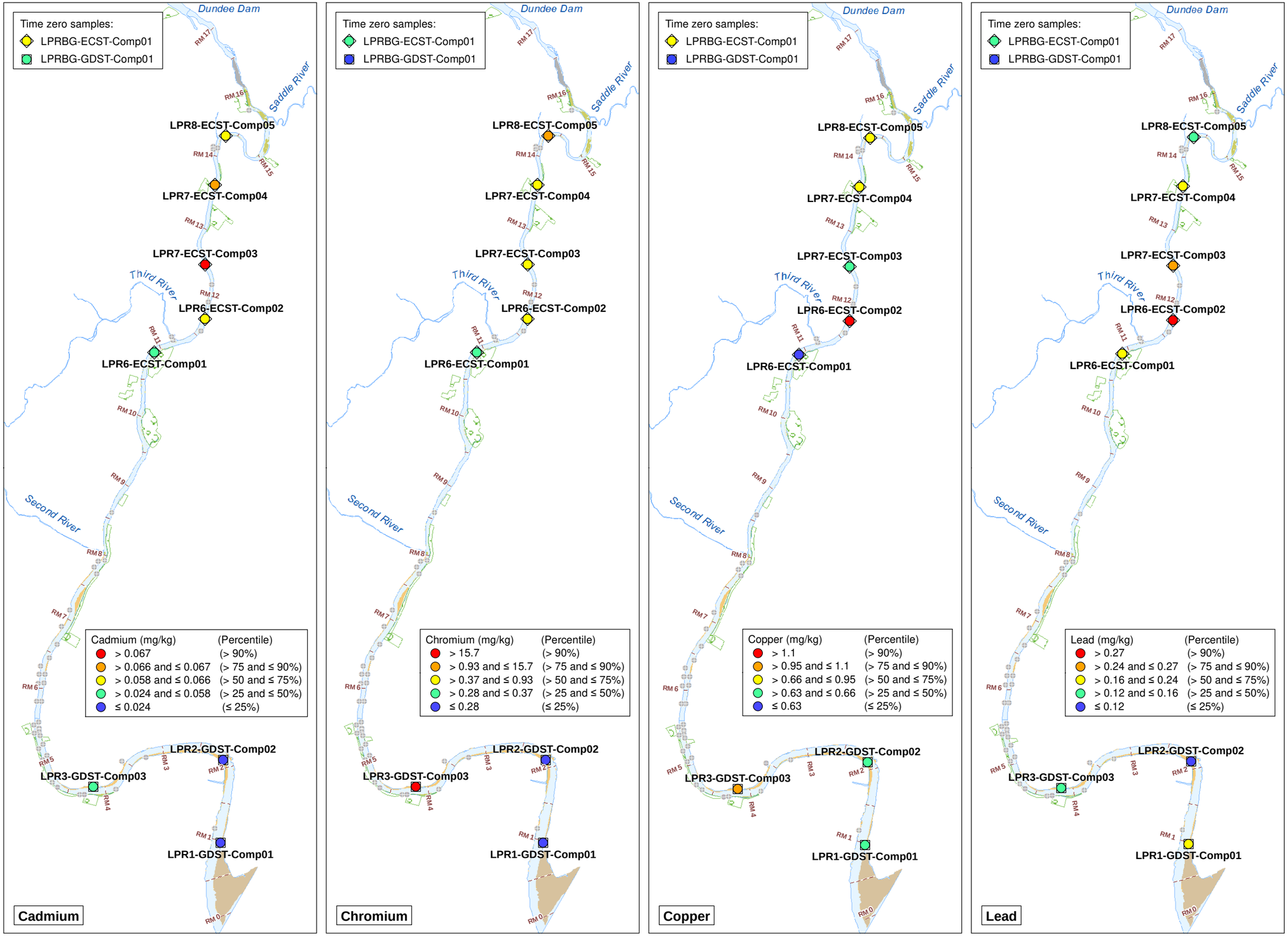


**Figure 4-1. Cadmium, chromium, copper, and lead concentrations for the LPRSA bivalve tissue samples**

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### 4.1.2 Chromium

Chromium was detected in all of the bivalve tissue samples analyzed. For the ribbed mussel test samples, the lowest chromium concentration (0.16 mg/kg ww) was detected in sample LPR1-GDST-Comp01 from cages placed at RM 0.9, and the highest chromium concentration (15.9 mg/kg ww) was detected in sample LPR3-GDST-Comp03 from cages placed at RM 4.1. The chromium concentration of the ribbed mussel $T_0$ sample (LPRBG-GDST-Comp01) was 0.20 mg/kg ww.

For the eastern elliptio mussel test samples, the lowest chromium concentration (0.35 mg/kg ww) was detected in sample LPR6-ECST-Comp01 from cages placed at RM 10.8, and the highest chromium concentration (10.8 mg/kg ww) was detected in sample LPR8-ECST-Comp05 from cages placed at RM 14.3. The chromium concentration in the eastern elliptio mussel $T_0$ sample (LPRBG-ECST-Comp01) was 0.33 mg/kg ww. The detected chromium concentration for each sample is shown by percentile range in Figure 4-1.

### 4.1.3 Copper

Copper was detected in all of the bivalve tissue samples analyzed. For the ribbed mussel test samples, the lowest copper concentration (0.63 mg/kg ww) was detected in sample LPR2-GDST-Comp02 from cages placed at RM 2.1, and the highest copper concentration (0.98 mg/kg ww) was detected in sample LPR3-GDST-Comp03 from cages placed at RM 4.1. The copper concentration of the ribbed mussel $T_0$ sample (LPRBG-GDST-Comp01) was 0.62 mg/kg ww.

For eastern elliptio mussel test samples, the lowest copper concentration (0.50 mg/kg ww) was detected in sample LPR6-ECST-Comp01 from cages placed at RM 10.8, and the highest copper concentration (1.2 mg/kg ww) was detected in sample LPR6-ECST-Comp02 from cages placed at RM 11.7. The copper concentration in the eastern elliptio mussel $T_0$ sample (LPRBG-ECST-Comp01) was 0.84 mg/kg ww. The detected copper concentration for each sample is shown by percentile range in Figure 4-1.

### 4.1.4 Lead

Lead was detected in all of the bivalve tissue samples analyzed. For ribbed mussel test samples, the lowest lead concentration (0.12 mg/kg ww) was detected in sample LPR2-GDST-Comp02 from cages placed at RM 2.1, and the highest lead concentration (0.17 mg/kg ww) was detected in sample LPR1-GDST-Comp01 from cages placed at RM 0.9. The lead concentration of the ribbed mussel $T_0$ sample (LPRBG-GDST-Comp01) was 0.041 mg/kg ww.

For the eastern elliptio mussel test samples, the lowest lead concentration (0.14 mg/kg ww) was detected in sample LPR8-ECST-Comp05 from cages placed at RM 14.3, and the highest lead concentration (0.28 mg/kg ww) was detected in sample LPR6-ECST-Comp02 from cages placed at RM 11.7. The lead concentration in the eastern elliptio mussel $T_0$ sample (LPRBG-ECST-Comp01) was 0.13 mg/kg ww. The detected lead concentration for each sample is shown by percentile range in Figure 4-1.

### 4.1.5 Total mercury and methyl mercury

Total mercury was detected in all of bivalve tissue samples analyzed. For the ribbed mussel test samples, the lowest total mercury concentration (8.7 µg/kg ww) was detected in sample LPR2-GDST-Comp02 from cages placed at RM 2.1, and the highest total mercury concentration (19 µg/kg ww) was detected in sample LPR3-GDST-Comp03 from cages placed at RM 4.1. The total mercury concentration in the ribbed mussel $T_0$ sample (LPRBG-GDST-Comp01) was 11 µg/kg ww.

For the eastern elliptio mussel test samples, the lowest total mercury concentration (24 µg/kg ww) was detected in sample LPR6-ECST-Comp02 from cages placed at RM 11.7, and the highest total mercury concentration (35 µg/kg ww) was detected in sample LPR8-ECST-Comp05 from cages placed at RM 14.3. The total mercury concentration in the eastern elliptio mussel $T_0$ sample was 28 µg/kg ww. The detected total mercury concentration for each sample is shown by percentile range in Figure 4-2.

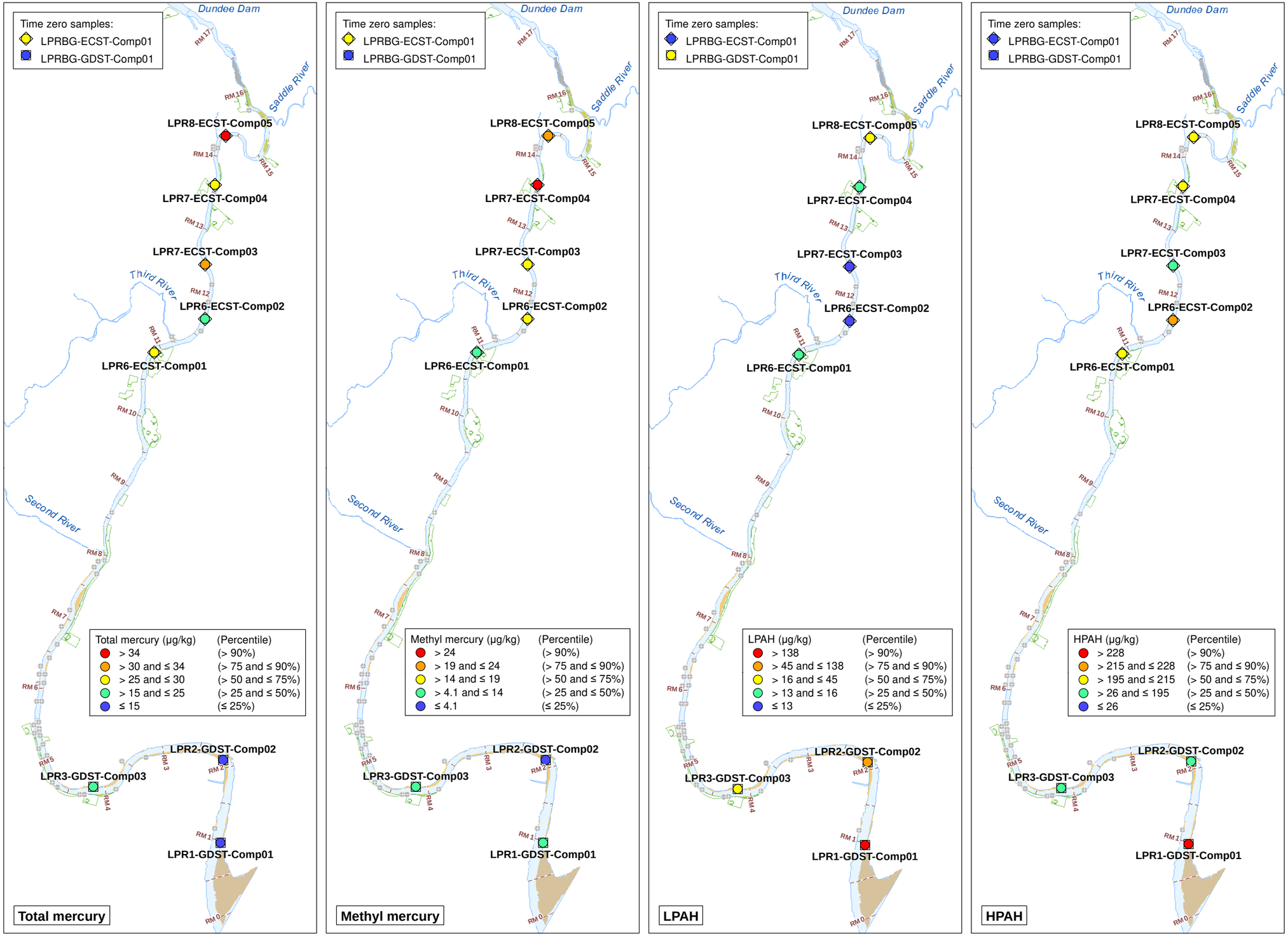


**Figure 4-2. Total mercury, methyl mercury, LPAH, and HPAH concentrations for the LPRSA bivalve tissue samples**

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Methyl mercury was detected in all of bivalve tissue samples analyzed. For the ribbed mussel test samples, the lowest methyl mercury concentration (3.3 µg/kg ww) was detected in sample LPR2-GDST-Comp02 from cages placed at RM 2.1, and the highest methyl mercury concentration (4.7µg/kg ww) was detected in sample LPR1-GDST-Comp01 from cages placed at RM 0.9. The methyl mercury concentration of the ribbed mussel $T_0$ sample (LPRBG-GDST-Comp01) was 3.5 µg/kg ww.

For the eastern elliptio mussel test samples, the lowest methyl mercury concentration (12 µg/kg ww) was detected in sample LPR6-ECST-Comp01 from cages placed at RM 10.8, and the highest methyl mercury concentration (25 µg/kg ww) was detected in sample LPR7-ECST-Comp04 from cages placed at RM 13.6. The methyl mercury concentration in the eastern elliptio mussel $T_0$ sample was 18 µg/kg ww. The detected methyl mercury concentration for each sample is shown by percentile range in Figure 4-2.

## 4.2 BUTYLTINS

Table 4-3 presents a summary of butyltin results for the bivalve tissue samples, including the number of detections, the range of detected concentrations, and the RL or range of RLs for samples reported as non-detects. Butyltins were detected in all $T_0$ samples, except dibutyltin and tributyltin were not detected in the eastern elliptio mussel $T_0$ sample. Butyltin detection frequencies ranged from ranged from 67 to 100% for the ribbed mussel test samples, and from 60 to 80% for the eastern elliptio mussel test samples. Data tables that contain butyltin concentrations for each sample, including non-detected results, are presented in Appendix L.

**Table 4-3. Summary of butyltin results for LPRSA bivalve tissue samples**

| Analyte | Bivalve Type | Type[a] | Unit (ww) | Detection Frequency | | Detected Concentration[b] | | | | RL[c] |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Ratio | % | Min | Max | Mean | St Dev | |
| Monobutyltin | eastern elliptio mussel | $T_0$ | µg/kg | 1/1 | 100 | 1.4 | 1.4 | 1.4 | na | na |
| | | test | µg/kg | 3/5 | 60 | 1.6 | 2.0 | 1.7 | 0.23 | 1.0 |
| | ribbed mussel | $T_0$ | µg/kg | 1/1 | 100 | 4.0 | 4.0 | 4.0 | na | na |
| | | test | µg/kg | 2/3 | 67 | 2.1 | 3.6 | 2.9 | 1.1 | 1.0 |
| Dibutyltin | eastern elliptio mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 1.0 |
| | | test | µg/kg | 4/5 | 80 | 0.16 J | 0.74 J | 0.38 | 0.26 | 1.0 |
| | ribbed mussel | $T_0$ | µg/kg | 1/1 | 100 | 0.15 J | 0.15 J | 0.15 | na | na |
| | | test | µg/kg | 3/3 | 100 | 0.13 J | 0.37 J | 0.22 | 0.13 | na |

**Table 4-3. Summary of butyltin results for LPRSA bivalve tissue samples**

| Analyte | Bivalve Type | Type[a] | Unit (ww) | Detection Frequency | | Detected Concentration[b] | | | | RL[c] |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Ratio | % | Min | Max | Mean | St Dev | |
| Tributyltin | eastern elliptio mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 1.0 |
| | | test | µg/kg | 4/5 | 80 | 0.16 J | 0.45 J | 0.29 | 0.12 | 1.0 |
| | ribbed mussel | $T_0$ | µg/kg | 1/1 | 100 | 0.58 J | 0.58 J | 0.58 | na | na |
| | | test | µg/kg | 3/3 | 100 | 0.50 J | 0.90 J | 0.66 | 0.21 | na |

[a] $T_0$ samples were collected at the time of deployment on Day 0 for both mussel species (see Section 2.1 for additional details). Test samples were collected on Day 61 for the ribbed mussels and Day 90 for the eastern elliptio mussels (see Section 2.3 for additional details).

[b] Summary statistics (i.e., minimum, maximum, mean concentration, and standard deviation) include data only for detected results; non-detected data are not included in summary statistics.

[c] RL for non-detect samples. When the detection frequency is 100% (i.e., no non-detect samples), the RL is not applicable.

J – estimated concentration
LPRSA – Lower Passaic River Study Area
na – not applicable
RL – reporting limit
St Dev – standard deviation
$T_0$ – time zero
ww – wet weight

## 4.3 PAHs

A total of 24 individual PAHs were analyzed in the bivalve tissue samples. All PAHs were detected in the ribbed mussel test samples, except for 2,3,5-trimethylnaphthalene, dibenzo(a,c+a,h)anthracene, indeno(1,2,3-cd)pyrene, and perylene. All PAHs were detected in the eastern elliptio mussel test samples, except for 1-methylnaphthalene, 2,3,5-trimethylnaphthalene, 2-methylnaphthalene, and acenaphthylene. In the $T_0$ samples, 14 PAHs were detected in the ribbed mussel, and 5 PAHs were detected in the eastern elliptio mussel.

Table 4-4 presents a summary of the PAH results for the bivalve tissue samples, including the number of detections, the range of detected concentrations, and the RL or range of RLs for samples reported as non-detects. Results for low-molecular-weight PAHs (LPAHs) and high-molecular-weight PAHs (HPAHs) are discussed further in the subsections that follow Table 4-4. Data tables that contain PAH concentrations for each sample, including non-detected results, are presented in Appendix L.

## Table 4-4. Summary of detected PAH results for LPRSA bivalve tissue samples

| Chemical | Bivalve Type | Sample Type[a] | Unit (ww) | Detection Frequency[b] | | Detected Concentration[c] | | | | RLs[d] |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Ratio | % | Min | Max | Mean | St Dev | |
| 1-Methylnaphthalene | eastern elliptio mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 0.9 |
| | | test | µg/kg | 3/5 | 60 | 0.5 J | 1 | 0.7 | 0.3 | 0.9 |
| | ribbed mussel | $T_0$ | µg/kg | 1/1 | 100 | 8 | 8 | na | na | na |
| | | test | µg/kg | 3/3 | 100 | 9 | 21 | 14 | 6 | na |
| 1-Methylphenanthrene | eastern elliptio mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 0.9 |
| | | test | µg/kg | 5/5 | 100 | 4 | 7 | 5 | 1 | na |
| | ribbed mussel | $T_0$ | µg/kg | 1/1 | 100 | 0.8 J | 0.8 J | na | na | na |
| | | test | µg/kg | 3/3 | 100 | 1 | 6 | 3 | 3 | na |
| 2,3,5-Trimethylnaphthalene | eastern elliptio mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 0.9 |
| | | test | µg/kg | 3/5 | 60 | 0.5 J | 0.6 J | 0.5 | 0.06 | 0.9 |
| | ribbed mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 0.9 |
| | | test | µg/kg | 2/3 | 67 | 1 J | 1 J | na | na | 1 |
| 2,6-Dimethylnaphthalene | eastern elliptio mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 0.9 |
| | | test | µg/kg | 5/5 | 100 | 0.5 J | 0.9 J | 0.6 | 0.2 | na |
| | ribbed mussel | $T_0$ | µg/kg | 1/1 | 100 | 0.6 J | 0.6 J | na | na | na |
| | | test | µg/kg | 3/3 | 100 | 1 | 2 | 2 | 0.6 | na |
| 2-Methylnaphthalene | eastern elliptio mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 0.9 |
| | | test | µg/kg | 4/5 | 80 | 0.5 J | 0.9 J | 0.6 | 0.2 | 0.9 |
| | ribbed mussel | $T_0$ | µg/kg | 1/1 | 100 | 6 | 6 | na | na | na |
| | | test | µg/kg | 3/3 | 100 | 8 | 15 | 11 | 3.6 | na |

## Table 4-4. Summary of detected PAH results for LPRSA bivalve tissue samples

| Chemical | Bivalve Type | Sample Type[a] | Unit (ww) | Detection Frequency[b] | | Detected Concentration[c] | | | | RLs[d] |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Ratio | % | Min | Max | Mean | St Dev | |
| Acenaphthene | eastern elliptio mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 0.9 |
| | | test | µg/kg | 5/5 | 100 | 1 | 2 | 1 | 0.5 | na |
| | ribbed mussel | $T_0$ | µg/kg | 1/1 | 100 | 3 | 3 | na | na | na |
| | | test | µg/kg | 3/3 | 100 | 6 | 28 | 16 | 11 | na |
| Acenaphthylene | eastern elliptio mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 0.9 |
| | | test | µg/kg | 1/5 | 20 | 0.5 J | 0.5 J | na | na | 0.9 |
| | ribbed mussel | $T_0$ | µg/kg | 1/1 | 100 | 0.9 J | 0.9 J | na | na | na |
| | | test | µg/kg | 3/3 | 100 | 1 | 2 | 1 | 0.6 | na |
| Anthracene | eastern elliptio mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 0.9 |
| | | test | µg/kg | 5/5 | 100 | 1 | 2 | 2 | 0.5 | na |
| | ribbed mussel | $T_0$ | µg/kg | 1/1 | 100 | 0.5 J | 0.5 J | na | na | na |
| | | test | µg/kg | 3/3 | 100 | 1 | 3 | 2 | 1 | na |
| Benzo(a)anthracene | eastern elliptio mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 0.9 |
| | | test | µg/kg | 5/5 | 100 | 9 | 11 | 10 | 0.9 | na |
| | ribbed mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 0.9 |
| | | test | µg/kg | 3/3 | 100 | 2 | 19 | 10 | 9 | na |
| Benzo(a)pyrene | eastern elliptio mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 0.9 |
| | | test | µg/kg | 5/5 | 100 | 5 | 8 | 7 | 1 | na |
| | ribbed mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 0.9 |
| | | test | µg/kg | 3/3 | 100 | 1 | 9 | 4 | 4 | na |

## Table 4-4. Summary of detected PAH results for LPRSA bivalve tissue samples

| Chemical | Bivalve Type | Sample Type[a] | Unit (ww) | Detection Frequency[b] | | Detected Concentration[c] | | | | RLs[d] |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Ratio | % | Min | Max | Mean | St Dev | |
| Benzo(b)fluoranthene | eastern elliptio mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 0.9 |
| | | test | µg/kg | 5/5 | 100 | 14 | 18 | 17 | 2 | na |
| | ribbed mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 0.9 |
| | | test | µg/kg | 3/3 | 100 | 1 | 21 | 9 | 11 | na |
| Benzo(e)pyrene | eastern elliptio mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 0.9 |
| | | test | µg/kg | 5/5 | 100 | 22 | 24 | 23 | 1.1 | na |
| | ribbed mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 0.9 |
| | | test | µg/kg | 3/3 | 100 | 1 | 15 | 7 | 7 | na |
| Benzo(g,h,i)perylene | eastern elliptio mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 0.9 |
| | | test | µg/kg | 5/5 | 100 | 6 | 8 | 7 | 1 | na |
| | ribbed mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 0.9 |
| | | test | µg/kg | 3/3 | 100 | 0.5 J | 5 | 2 | 3 | na |
| Benzo(j,k)fluoranthene | eastern elliptio mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 0.9 |
| | | test | µg/kg | 5/5 | 100 | 7 | 8 | 8 | 0.5 | na |
| | ribbed mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 0.9 |
| | | test | µg/kg | 3/3 | 100 | 1 | 9 | 5 | 4 | na |
| Chrysene | eastern elliptio mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 0.9 |
| | | test | µg/kg | 5/5 | 100 | 44 | 49 | 46 | 2.2 | na |
| | ribbed mussel | $T_0$ | µg/kg | 1/1 | 100 | 0.6 J | 0.6 J | na | na | na |
| | | test | µg/kg | 3/3 | 100 | 3 | 31 | 16 | 14 | na |

## Table 4-4. Summary of detected PAH results for LPRSA bivalve tissue samples

| Chemical | Bivalve Type | Sample Type[a] | Unit (ww) | Detection Frequency[b] | | Detected Concentration[c] | | | | RLs[d] |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Ratio | % | Min | Max | Mean | St Dev | |
| Dibenzo(a,c+a,h)anthracene | eastern elliptio mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 0.9 |
| | | test | µg/kg | 5/5 | 100 | 0.8 J | 1 | 0.9 | 0.08 | na |
| | ribbed mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 0.9 |
| | | test | µg/kg | 1/3 | 33 | 0.9 J | 0.9 J | na | na | 0.8 - 1 |
| Dibenzothiophene | eastern elliptio mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 0.9 |
| | | test | µg/kg | 5/5 | 100 | 0.5 J | 0.9 | 0.7 | 0.2 | na |
| | ribbed mussel | $T_0$ | µg/kg | 1/1 | 100 | 0.8 J | 0.8 J | na | na | na |
| | | test | µg/kg | 3/3 | 100 | 1 | 3 | 2 | 1 | na |
| Fluoranthene | eastern elliptio mussel | $T_0$ | µg/kg | 1/1 | 100 | 0.8 J | 0.8 J | na | na | na |
| | | test | µg/kg | 5/5 | 100 | 35 | 43 | 40 | 3.0 | na |
| | ribbed mussel | $T_0$ | µg/kg | 1/1 | 100 | 4 | 4 | na | na | na |
| | | test | µg/kg | 3/3 | 100 | 8 | 54 | 30 | 23 | na |
| Fluorene | eastern elliptio mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 0.9 |
| | | test | µg/kg | 5/5 | 100 | 0.8 J | 1 | 0.9 | 0.08 | na |
| | ribbed mussel | $T_0$ | µg/kg | 1/1 | 100 | 3 | 3 | na | na | na |
| | | test | µg/kg | 3/3 | 100 | 3 | 10 | 6 | 4 | na |
| Indeno(1,2,3-cd)pyrene | eastern elliptio mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 0.9 |
| | | test | µg/kg | 5/5 | 100 | 2 | 2 | na | na | na |
| | ribbed mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 0.9 |
| | | test | µg/kg | 2/3 | 67 | 0.9 | 3 | 2 | 2 | 1 |

## Table 4-4. Summary of detected PAH results for LPRSA bivalve tissue samples

| Chemical | Bivalve Type | Sample Type[a] | Unit (ww) | Detection Frequency[b] | | Detected Concentration[c] | | | | RLs[d] |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Ratio | % | Min | Max | Mean | St Dev | |
| Naphthalene | eastern elliptio mussel | $T_0$ | µg/kg | 1/1 | 100 | 0.6 J | 0.6 J | na | na | na |
| | | test | µg/kg | 5/5 | 100 | 0.5 J | 2 | 1 | 0.6 | na |
| | ribbed mussel | $T_0$ | µg/kg | 1/1 | 100 | 16 | 16 | na | na | na |
| | | test | µg/kg | 3/3 | 100 | 20 | 60 | 38 | 20 | na |
| Perylene | eastern elliptio mussel | $T_0$ | µg/kg | 1/1 | 100 | 0.7 J | 0.7 J | na | na | na |
| | | test | µg/kg | 5/5 | 100 | 2 | 2 | na | na | na |
| | ribbed mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 0.9 |
| | | test | µg/kg | 2/3 | 67 | 0.6 J | 3 | 2 | 2 | 1 |
| Phenanthrene | eastern elliptio mussel | $T_0$ | µg/kg | 1/1 | 100 | 0.5 J | 0.5 J | na | na | na |
| | | test | µg/kg | 5/5 | 100 | 7 | 10 | 8 | 1 | na |
| | ribbed mussel | $T_0$ | µg/kg | 1/1 | 100 | 11 | 11 | na | na | na |
| | | test | µg/kg | 3/3 | 100 | 13 | 36 | 24 | 12 | na |
| Pyrene | eastern elliptio mussel | $T_0$ | µg/kg | 1/1 | 100 | 0.9 | 0.9 | na | na | na |
| | | test | µg/kg | 5/5 | 100 | 63 | 70 | 67 | 3.2 | na |
| | ribbed mussel | $T_0$ | µg/kg | 1/1 | 100 | 5 | 5 | na | na | na |
| | | test | µg/kg | 3/3 | 100 | 11 | 82 | 45 | 36 | na |
| Total HPAHs (ND = 0)[e, f] | eastern elliptio mussel | $T_0$ | µg/kg | 1/1 | 100 | 1.7 J | 1.7 J | na | na | na |
| | | test | µg/kg | 5/5 | 100 | 190 J | 220 | 210 | 11 | na |
| | ribbed mussel | $T_0$ | µg/kg | 1/1 | 100 | 9.6 J | 9.6 J | na | na | na |
| | | test | µg/kg | 3/3 | 100 | 28 J | 230 J | 120 | 100 | na |

## Table 4-4. Summary of detected PAH results for LPRSA bivalve tissue samples

| Chemical | Bivalve Type | Sample Type[a] | Unit (ww) | Detection Frequency[b] | | Detected Concentration[c] | | | | RLs[d] |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Ratio | % | Min | Max | Mean | St Dev | |
| Total HPAHs (ND = 0.5RL)[e, g] | eastern elliptio mussel | $T_0$ | µg/kg | 1/1 | 100 | 5.3 J | 5.3 J | na | na | na |
| | | test | µg/kg | 5/5 | 100 | 190 J | 220 | 210 | 11 | na |
| | ribbed mussel | $T_0$ | µg/kg | 1/1 | 100 | 13 J | 13 J | na | na | na |
| | | test | µg/kg | 3/3 | 100 | 29 J | 230 J | 120 | 100 | na |
| Total HPAHs (ND = RL)[e, h] | eastern elliptio mussel | $T_0$ | µg/kg | 1/1 | 100 | 8.9 J | 8.9 J | na | na | na |
| | | test | µg/kg | 5/5 | 100 | 190 J | 220 | 210 | 11 | na |
| | ribbed mussel | $T_0$ | µg/kg | 1/1 | 100 | 16 J | 16 J | na | na | na |
| | | test | µg/kg | 3/3 | 100 | 30 J | 230 J | 120 | 100 | na |
| Total LPAHs(ND = 0)[f, i] | eastern elliptio mussel | $T_0$ | µg/kg | 1/1 | 100 | 1.1 J | 1.1 J | na | na | na |
| | | test | µg/kg | 5/5 | 100 | 12 J | 17 | 13 | 2.1 | na |
| | ribbed mussel | $T_0$ | µg/kg | 1/1 | 100 | 34 J | 34 J | na | na | na |
| | | test | µg/kg | 3/3 | 100 | 44 | 140 | 87 | 49 | na |
| Total LPAHs (ND = 0.5RL)[g, i] | eastern elliptio mussel | $T_0$ | µg/kg | 1/1 | 100 | 2.9 J | 2.9 J | na | na | na |
| | | test | µg/kg | 5/5 | 100 | 12 J | 17 | 13 | 2.1 | na |
| | ribbed mussel | $T_0$ | µg/kg | 1/1 | 100 | 34 J | 34 J | na | na | na |
| | | test | µg/kg | 3/3 | 100 | 44 | 140 | 87 | 49 | na |
| Total LPAHs (ND = RL)[h, i] | eastern elliptio mussel | $T_0$ | µg/kg | 1/1 | 100 | 4.7 J | 4.7 J | na | na | na |
| | | test | µg/kg | 5/5 | 100 | 13 J | 18 | 14 | 2.2 | na |
| | ribbed mussel | $T_0$ | µg/kg | 1/1 | 100 | 34 J | 34 J | na | na | na |
| | | test | µg/kg | 3/3 | 100 | 44 | 140 | 87 | 49 | na |

## Table 4-4. Summary of detected PAH results for LPRSA bivalve tissue samples

| Chemical | Bivalve Type | Sample Type[a] | Unit (ww) | Detection Frequency[b] | | Detected Concentration[c] | | | | RLs[d] |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Ratio | % | Min | Max | Mean | St Dev | |
| Total PAHs (ND = 0)[f, j] | eastern elliptio mussel | $T_0$ | µg/kg | 1/1 | 100 | 2.8 J | 2.8 J | na | na | na |
| | | test | µg/kg | 5/5 | 100 | 200 J | 230 J | 220 | 11 | na |
| | ribbed mussel | $T_0$ | µg/kg | 1/1 | 100 | 44 J | 44 J | na | na | na |
| | | test | µg/kg | 3/3 | 100 | 72 J | 370 J | 210 | 150 | na |
| Total PAHs (ND = 0.5RL)[g, j] | eastern elliptio mussel | $T_0$ | µg/kg | 1/1 | 100 | 8.2 J | 8.2 J | na | na | na |
| | | test | µg/kg | 5/5 | 100 | 200 J | 230 J | 220 | 13 | na |
| | ribbed mussel | $T_0$ | µg/kg | 1/1 | 100 | 47 J | 47 J | na | na | na |
| | | test | µg/kg | 3/3 | 100 | 73 J | 370 J | 210 | 150 | na |
| Total PAHs (ND = RL)[h, j] | eastern elliptio mussel | $T_0$ | µg/kg | 1/1 | 100 | 14 J | 14 J | na | na | na |
| | | test | µg/kg | 5/5 | 100 | 200 J | 230 J | 220 | 13 | na |
| | ribbed mussel | $T_0$ | µg/kg | 1/1 | 100 | 50 J | 50 J | na | na | na |
| | | test | µg/kg | 3/3 | 100 | 74 J | 370 J | 210 | 150 | na |

a $T_0$ samples were collected at the time of deployment on Day 0 for both species (see Section 2.1 for additional details). Test samples were collected on Day 61 for the ribbed mussels and Day 90 for the eastern elliptio mussels (see Section 2.3 for additional details).

b A calculated sum was considered detected if one or more of the components of the sum were detected.

c Summary statistics (i.e., minimum, maximum, mean concentration, and standard deviation) include data only for detected results. Non-detected data are not included in summary statistics.

d RL or RL range for non-detect samples. When the detection frequency is 100% (i.e., no non-detect samples), the RL is not applicable.

e Total HPAHs were calculated as the sum of benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(j/k)fluoranthene, chrysene, dibenzo(a,h)anthracene, fluoranthene, indeno(1,2,3-c,d)pyrene, and pyrene (see Appendix K for more details).

f Non-detected results were set equal to zero when the total concentration was calculated (see Appendix K for more details).

g Non-detected results were set equal to one-half the RL when the total concentration was calculated (see Appendix K for more details).

h Non-detected results were set equal to the RL when the total concentration was calculated (see Appendix K for more details).

i Total LPAHs were calculated as the sum of acenaphthene, acenaphthylene, anthracene, fluorene, naphthalene, and phenanthrene (see Appendix K for more details).

[j] Total PAHs were calculated as the sum of acenaphthene, acenaphthylene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(j/k)fluoranthene, chrysene, dibenzo(a,h)anthracene, fluoranthene, fluorene, indeno(1,2,3-c,d)pyrene, naphthalene, phenanthrene, and pyrene (see Appendix K for more details).

HPAH – high-molecular-weight polycyclic aromatic hydrocarbon
J – estimated concentration
LPRSA – Lower Passaic River Study Area
LPAH – low-molecular-weight polycyclic aromatic hydrocarbon
na – not applicable
ND – non-detected concentration
PAH – polycyclic aromatic hydrocarbon
RL – reporting limit
St Dev – standard deviation
$T_0$ – time zero
ww – wet weight

### 4.3.1 LPAHs

All individual LPAH compounds (i.e., acenaphthene, acenaphthylene, anthracene, fluorene, naphthalene, and phenanthrene) were detected in the ribbed mussel test samples and $T_0$ sample. All individual LPAH compounds, except for acenaphthylene, were detected in all eastern elliptio mussel test samples. Acenaphthylene had a detection frequency of 20% in eastern elliptio mussel test samples. Acenaphthene, acenaphthylene, fluorene, and anthracene were not detected in the eastern elliptio mussel $T_0$ sample, while naphthalene and phenanthrene were detected in the eastern elliptio mussel $T_0$ sample. For the ribbed mussel test samples, the lowest total LPAH concentration (44 µg/kg ww) was detected in sample LPR3-GDST-Comp03 from cages placed at RM 4.1, and the highest total LPAH concentration (140 µg/kg ww) was detected in sample LPR1-GDST-Comp01 from cages placed at RM 0.9. The LPAH concentration in the ribbed mussel $T_0$ sample (LPRBG-GDST-Comp01) was 34 µg/kg ww. For the eastern elliptio mussel test samples, the lowest total LPAH concentration (12 µg/kg ww) was detected in samples LPR6-ECST-Comp02 and LPR7-ECST-Comp03 from cages placed at RM 11.7 and RM 12.4, respectively. The highest total LPAH concentration (17 µg/kg ww) was detected in sample LPR8-ECST-Comp05 from cages placed at RM 14.3. The LPAH concentration in the eastern elliptio mussel $T_0$ sample (LPRBG-ECST-Comp01) was 1.1 µg/kg ww. The detected total LPAH concentration for each sample is shown by percentile range in Figure 4-2.

### 4.3.2 HPAHs

All individual HPAH compounds (i.e., benzo(a)anthrecene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(j/k)fluoranthene, chrysene, dibenzo(a,c+a,h)anthracene, fluoranthene, indeno(1,2,3-cd)pyrene, and pyrene) were detected in the ribbed and eastern elliptio mussel test samples, except for dibenzo(a,c+a,h)anthracene and indeno(1,2,3-cd)pyrene, which were detected in 33 and 67%, respectively. Individual HPAH compounds were not detected in the $T_0$ samples, except for fluoranthene and pyrene, which were detected in the ribbed mussel and eastern elliptio mussel $T_0$ samples, and chrysene, which was detected in the ribbed mussel $T_0$ sample. For the ribbed mussel test samples, the lowest total HPAH concentration (28 µg/kg ww) was detected in sample LPR3-GDST-Comp03 from cages placed at RM 4.1, and the highest total HPAH concentration (230 µg/kg ww) was detected in sample LPR1-GDST-Comp01 from cages placed at RM 0.9. The total HPAH concentration in the ribbed mussel $T_0$ sample (LPRBG-GDST-Comp01) was 9.6 µg/kg ww. For the eastern elliptio mussel test samples, the lowest total HPAH concentration (190 µg/kg ww) was detected in sample LPR7-ECST-Comp03 from cages placed at RM 12.4, and the highest total HPAH concentration (220 µg/kg ww) was detected in sample LPR6-ECST-Comp02 from cages placed at RM 11.7. The total HPAH concentration in the eastern elliptio

mussel $T_0$ sample (LPRBG-ECST-Comp01) was 1.7 µg/kg ww. The detected total HPAH concentration for each sample is shown by percentile range in Figure 4-2.

### 4.3.3 Alkylated PAHs

Table 4-5 presents a summary of detected alkylated PAH results for bivalve tissue samples, including the number of detections, the range of detected concentrations, and the RL or range of RLs for samples reported as non-detects. Data tables that contain alkylated PAH results for each sample, including non-dectected results, are presented in Appendix L.

## Table 4-5. Summary of detected alkylated PAH results for LPRSA bivalve tissue samples

| Chemical[a] | Bivalve Type | Sample Type[b] | Unit (ww) | Detection Frequency | | Detected Concentration[c] | | | | RLs or Range of RLs[d] |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Ratio | % | Min | Max | Mean | St Dev | |
| C1-Benzanthracene/chrysenes | eastern elliptio mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 0.9 |
| | | test | µg/kg | 5/5 | 100 | 14 | 18 | 16 | 1.9 | na |
| | ribbed mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 0.9 |
| | | test | µg/kg | 3/3 | 100 | 0.9 J | 16 | 7 | 8 | na |
| C1-Dibenzothiophenes | eastern elliptio mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 0.9 |
| | | test | µg/kg | 5/5 | 100 | 2 | 3 | 3 | 0.6 | na |
| | ribbed mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 0.9 |
| | | test | µg/kg | 3/3 | 100 | 0.7 J | 3 | 2 | 1 | na |
| C1-Fluorenes | eastern elliptio mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 0.9 |
| | | test | µg/kg | 5/5 | 100 | 2 | 3 | 3 | 0.5 | na |
| | ribbed mussel | $T_0$ | µg/kg | 1/1 | 100 | 0.6 J | 0.6 J | na | na | na |
| | | test | µg/kg | 3/3 | 100 | 1 | 4 | 3 | 2 | na |
| C1-Phenanthrene/anthracenes | eastern elliptio mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 0.9 |
| | | test | µg/kg | 5/5 | 100 | 16 | 22 | 18 | 2.8 | na |
| | ribbed mussel | $T_0$ | µg/kg | 1/1 | 100 | 2 | 2 | na | na | na |
| | | test | µg/kg | 3/3 | 100 | 4 | 22 | 13 | 9.0 | na |
| C1-Pyrene/fluoranthenes | eastern elliptio mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 0.9 |
| | | test | µg/kg | 5/5 | 100 | 49 | 60 | 55 | 4.9 | na |
| | ribbed mussel | $T_0$ | µg/kg | 1/1 | 100 | 1 | 1 | na | na | na |
| | | test | µg/kg | 3/3 | 100 | 4 | 47 | 23 | 22 | na |

## Table 4-5. Summary of detected alkylated PAH results for LPRSA bivalve tissue samples

| Chemical[a] | Bivalve Type | Sample Type[b] | Unit (ww) | Detection Frequency | | Detected Concentration[c] | | | | RLs or Range of RLs[d] |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Ratio | % | Min | Max | Mean | St Dev | |
| C2-Benzanthracene/chrysenes | eastern elliptio mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 0.9 |
| | | test | µg/kg | 5/5 | 100 | 6 | 7 | 6 | 0.6 | na |
| | ribbed mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 0.9 |
| | | test | µg/kg | 2/3 | 67 | 2 | 8 | 5 | 4 | 1 |
| C2-Dibenzothiophenes | eastern elliptio mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 0.9 |
| | | test | µg/kg | 5/5 | 100 | 9 | 11 | 10 | 0.8 | na |
| | ribbed mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 0.9 |
| | | test | µg/kg | 3/3 | 100 | 1 | 11 | 6 | 5 | na |
| C2-Fluorenes | eastern elliptio mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 0.9 |
| | | test | µg/kg | 5/5 | 100 | 6 | 8 | 7 | 0.7 | na |
| | ribbed mussel | $T_0$ | µg/kg | 1/1 | 100 | 0.9 J | 0.9 J | na | na | na |
| | | test | µg/kg | 3/3 | 100 | 2 | 9 | 5 | 4 | na |
| C2-Naphthalenes | eastern elliptio mussel | $T_0$ | µg/kg | 1/1 | 100 | 0.5 J | 0.5 J | na | na | na |
| | | test | µg/kg | 5/5 | 100 | 2 | 3 | 2 | 0.6 | na |
| | ribbed mussel | $T_0$ | µg/kg | 1/1 | 100 | 5 | 5 | na | na | na |
| | | test | µg/kg | 3/3 | 100 | 6 | 17 | 11 | 6 | na |
| C2-Phenanthrene/anthracenes | eastern elliptio mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 0.9 |
| | | test | µg/kg | 5/5 | 100 | 25 | 30 | 28 | 2.3 | na |
| | ribbed mussel | $T_0$ | µg/kg | 1/1 | 100 | 2 | 2 | na | na | na |
| | | test | µg/kg | 3/3 | 100 | 3 | 27 | 14 | 12 | na |

## Table 4-5. Summary of detected alkylated PAH results for LPRSA bivalve tissue samples

| Chemical[a] | Bivalve Type | Sample Type[b] | Unit (ww) | Detection Frequency | | Detected Concentration[c] | | | | RLs or Range of RLs[d] |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Ratio | % | Min | Max | Mean | St Dev | |
| C3-Benzanthracene/chrysenes | eastern elliptio mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 0.9 |
| | | test | µg/kg | 4/5 | 80 | 6 | 8 | 7 | 1 | 0.9 |
| | ribbed mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 0.9 |
| | | test | µg/kg | 1/3 | 33 | 6 | 6 | na | na | 0.8 – 1 |
| C3-Dibenzothiophenes | eastern elliptio mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 0.9 |
| | | test | µg/kg | 5/5 | 100 | 10 | 12 | 11 | 1.0 | na |
| | ribbed mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 0.9 |
| | | test | µg/kg | 3/3 | 100 | 1 | 13 | 6 | 6 | na |
| C3-Fluorenes | eastern elliptio mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 0.9 |
| | | test | µg/kg | 5/5 | 100 | 10 | 12 | 11 | 0.84 | na |
| | ribbed mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 0.9 |
| | | test | µg/kg | 2/3 | 67 | 6 | 13 | 9.5 | 4.9 | 1 |
| C3-Naphthalenes | eastern elliptio mussel | $T_0$ | µg/kg | 1/1 | 100 | 0.5 J | 0.5 J | na | na | na |
| | | test | µg/kg | 5/5 | 100 | 4 | 6 | 5 | 0.8 | na |
| | ribbed mussel | $T_0$ | µg/kg | 1/1 | 100 | 4 | 4 | na | na | na |
| | | test | µg/kg | 3/3 | 100 | 4 | 15 | 9 | 6 | na |
| C3-Phenanthrene/anthracenes | eastern elliptio mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 0.9 |
| | | test | µg/kg | 5/5 | 100 | 16 | 20 | 18 | 1.5 | na |
| | ribbed mussel | $T_0$ | µg/kg | 1/1 | 100 | 0.9 J | 0.9 J | na | na | na |
| | | test | µg/kg | 3/3 | 100 | 1 | 23 | 10 | 11 | na |

## Table 4-5. Summary of detected alkylated PAH results for LPRSA bivalve tissue samples

| Chemical[a] | Bivalve Type | Sample Type[b] | Unit (ww) | Detection Frequency | | Detected Concentration[c] | | | | RLs or Range of RLs[d] |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Ratio | % | Min | Max | Mean | St Dev | |
| C4-Dibenzothiophenes | eastern elliptio mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 0.9 |
| | | test | µg/kg | 5/5 | 100 | 5 | 6 | 6 | 0.6 | na |
| | ribbed mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 0.9 |
| | | test | µg/kg | 2/3 | 67 | 2 | 9 | 6 | 5 | 1 |
| C4-Naphthalenes | eastern elliptio mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 0.9 |
| | | test | µg/kg | 5/5 | 100 | 7 | 7 | na | na | na |
| | ribbed mussel | $T_0$ | µg/kg | 1/1 | 100 | 2 | 2 | na | na | na |
| | | test | µg/kg | 3/3 | 100 | 2 | 12 | 7 | 5 | na |
| C4-Phenanthrene/anthracenes | eastern elliptio mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 0.9 |
| | | test | µg/kg | 5/5 | 100 | 7 | 9 | 8 | 0.7 | na |
| | ribbed mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 0.9 |
| | | test | µg/kg | 2/3 | 67 | 3 | 11 | 7 | 6 | 1 |

[a] Only chemicals with detected results are presented. If the chemical was not detected in any samples for a given species and sample type, the chemical is not presented in the table. Data tables that contain results for each sample, including non-detected sample results, are presented in Appendix L.

[b] $T_0$ samples were collected at the time of deployment on Day 0 for both mussel species (see Section 2.1 for additional details). Test samples were collected on Day 61 for the ribbed mussels and Day 90 for the eastern elliptio mussels (see Section 2.3 for additional details).

[c] Summary statistics (i.e., minimum, maximum, mean concentrations, and standard deviation) include data only for detected results. Non-detected data are not included in summary statistics.

[d] RL or RL range for non-detect samples. When the detection frequency is 100% (i.e., no non-detect samples), the RL is not applicable.

J – estimated concentration
LPRSA – Lower Passaic River Study Area
na – not applicable
PAH – polycyclic aromatic hydrocarbon
RL – reporting limit
St Dev – standard deviation
$T_0$ – time zero
ww – wet weight

## 4.4 SVOCs

Table 4-5 presents a summary of detected SVOC results for the bivalve tissue samples, including the number of detections, the range of detected concentrations, and the RL or range of RLs. The majority of the SVOCs were not detected in the bivalve tissue samples. No SVOCs were detected in the ribbed mussel samples. Benzaldehyde and bis(2-ethylhexyl) phthalate were the only two (of 47) SVOCs that were detected in the eastern elliptio mussel samples. Data tables that contain SVOC concentrations for each sample, including non-detected results, are presented in Appendix L.

## Table 4-6. Summary of detected SVOC results for LPRSA bivalve tissue samples

| Chemical[a] | Bivalve Type | Sample Type[b] | Unit (ww) | Detection Frequency | | Detected Concentration[c] | | | | RLs or Range of RLs[d] |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Ratio | % | Min | Max | Mean | St Dev | |
| Benzaldehyde | eastern elliptio mussel | $T_0$ | µg/kg | 1/1 | 100 | 14,000 | 14,000 | na | na | na |
| | | test | µg/kg | 5/5 | 100 | 9,000 | 16,000 | 13,000 | 2,900 | na |
| Bis(2-ethylhexyl) phthalate | eastern elliptio mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 920 |
| | | test | µg/kg | 1/5 | 20 | 1,600 | 1,600 | na | na | 920 – 950 |

[a] Only chemicals with detected results are presented. If the chemical was not detected in any samples for a given species and sample type, the chemical is not presented in the table. Data tables that contain results for each sample, including non-detected sample results, are presented in Appendix L.

[b] $T_0$ samples were collected at the time of deployment on Day 0 for both mussel species (see Section 2.1 for additional details). Test samples were collected on Day 61 for the ribbed mussels and Day 90 for the eastern elliptio mussels (see Section 2.3 for additional details).

[c] Summary statistics (i.e., minimum, maximum, mean concentration, and standard deviation) include data only for detected results. Non-detected data are not included in summary statistics.

[d] RL or RL range for non-detect samples. When the detection frequency is 100% (i.e., no non-detect samples), the RL is not applicable.

LPRSA – Lower Passaic River Study Area
na – not applicable
RL – reporting limit
St Dev – standard deviation
SVOC – semivolatile organic compound
ww – wet weight

## 4.5 PCBs

Table 4-6 presents a summary of PCB Aroclors and total PCBs (as Aroclors and as congeners) detected in bivalve tissue samples, including the number of detections, the range of detected concentrations, and the RL or range of RLs for samples reported as non-detects. Data tables that contain PCB results for each sample, including individual PCB congener and PCB Aroclor results and non-detected results, are presented in Appendix L.

## Table 4-7. Summary of detected PCB results for LPRSA bivalve tissue samples

| Chemical[a] | Bivalve Type | Sample Type[b] | Unit (ww) | Detection Frequency[c] | | Detected Concentration[d] | | | | RLs or Range of RLs[e] |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Ratio | % | Min | Max | Mean | St Dev | |
| Aroclor 1242 | eastern elliptio mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 7.5 |
| | | test | µg/kg | 5/5 | 100 | 24 J | 39 | 31 | 6.6 | na |
| | ribbed mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 7.5 |
| | | test | µg/kg | 2/3 | 67 | 20 | 22 | 21 | 1.4 | 7.4 |
| Aroclor 1254 | eastern elliptio mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 7.5 |
| | | test | µg/kg | 5/5 | 100 | 13 | 24 | 17 | 4.2 | na |
| | ribbed mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 7.5 |
| | | test | µg/kg | 1/3 | 33 | 14 | 14 | na | na | 7.4 – 7.5 |
| Total PCB Aroclors (ND = 0)[f, g] | eastern elliptio mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 7.5 |
| | | test | µg/kg | 5/5 | 100 | 37 J | 63 | 48 | 10 | na |
| | ribbed mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 7.5 |
| | | test | µg/kg | 2/3 | 67 | 20 | 36 | 28 | 11 | 7.4 |
| Total PCB Aroclors (ND = 0.5 RL)[f, g] | eastern elliptio mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 7.5 |
| | | test | µg/kg | 5/5 | 100 | 64 J | 89 | 74 | 10 | na |
| | ribbed mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 7.5 |
| | | test | µg/kg | 2/3 | 67 | 50 | 62 | 56 | 8.5 | 7.4 |
| Total PCB Aroclors (ND = RL)[f, i] | eastern elliptio mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 7.5 |
| | | test | µg/kg | 5/5 | 100 | 89 | 120 | 100 | 12 | na |
| | ribbed mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 7.5 |
| | | test | µg/kg | 2/3 | 67 | 80 | 89 | 85 | 6.4 | 7.4 |

## Table 4-7. Summary of detected PCB results for LPRSA bivalve tissue samples

| Chemical[a] | Bivalve Type | Sample Type[b] | Unit (ww) | Detection Frequency[c] | | Detected Concentration[d] | | | | RLs or Range of RLs[e] |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Ratio | % | Min | Max | Mean | St Dev | |
| Total PCB congeners (ND = 0)[g, j] | eastern elliptio mussel | $T_0$ | µg/kg | 1/1 | 100 | 0.41 J | 0.41 J | na | na | na |
| | | test | µg/kg | 5/5 | 100 | 17 J | 30 J | 23 | 5.6 | na |
| | ribbed mussel | $T_0$ | µg/kg | 1/1 | 100 | 0.77 J | 0.77 J | na | na | na |
| | | test | µg/kg | 3/3 | 100 | 2.6 J | 18 J | 9.3 | 7.9 | na |
| Total PCB congeners (ND = 0.5RL)[h, j] | eastern elliptio mussel | $T_0$ | µg/kg | 1/1 | 100 | 0.43 J | 0.43 J | na | na | na |
| | | test | µg/kg | 5/5 | 100 | 17 J | 30 J | 23 | 5.6 | na |
| | ribbed mussel | $T_0$ | µg/kg | 1/1 | 100 | 0.78 J | 0.78 J | na | na | na |
| | | test | µg/kg | 3/3 | 100 | 2.6 J | 18 J | 9.3 | 7.9 | na |
| Total PCB congeners (ND = RL)[i, j] | eastern elliptio mussel | $T_0$ | µg/kg | 1/1 | 100 | 0.44 J | 0.44 J | na | na | na |
| | | test | µg/kg | 5/5 | 100 | 17 J | 30 J | 23 | 5.6 | na |
| | ribbed mussel | $T_0$ | µg/kg | 1/1 | 100 | 0.79 J | 0.79 J | na | na | na |
| | | test | µg/kg | 3/3 | 100 | 2.7 J | 18 J | 9.4 | 7.8 | na |

a Only chemicals with detected results are presented. If the chemical was not detected in any samples for a given species and sample type, the chemical is not presented in the table. Data tables that contain results for each sample, including non-detected sample results, are presented in Appendix L.

b $T_0$ samples were collected at the time of deployment on Day 0 for both mussel species (see Section 2.1 for additional details). Test samples were collected on Day 61 for the ribbed mussels and Day 90 for the eastern elliptio mussels (see Section 2.3 for additional details).

c A calculated total concentration was considered detected if one or more of the components of the sum were detected. If all components of the sum were not detected, the calculated total concentration was considered not detected.

d Summary statistics (i.e., minimum, maximum, mean concentration, and standard deviation) include data only for detected results. Non-detected data are not included in summary statistics.

e RL or RL range for non-detect samples. When the detection frequency is 100% (i.e., no non-detect samples), the RL is not applicable.

f Total PCB Aroclors were calculated as the sum of Aroclor 1016, Aroclor 1221, Aroclor 1232, Aroclor 1242, Aroclor 1248, Aroclor 1254, Aroclor 1260, Aroclor 1262, and Aroclor 1268 (see Appendix K for further details).

g Non-detected results were set equal to zero when the total concentration was calculated (see Appendix K for more details).

h Non-detected results were set to equal to one-half the RL when the total concentration was calculated (see Appendix K for more details).

i Non-detected results were set equal to the RL when the total concentration was calculated (see Appendix K for more details).

[j] Total PCB congeners were calculated as the sum of 209 PCB congeners. (see Appendix K for further details).

J – estimated concentration
LPRSA – Lower Passaic River Study Area
na – not applicable
ND – non-detected concentration
PCB – polychlorinated biphenyl
RL – reporting limit
St Dev – standard deviation
$T_0$ – time zero
ww – wet weight

On average, 79% of PCB congeners were detected in ribbed mussel test samples, and 86% of PCB congeners were detected in eastern elliptio mussel test samples. In the ribbed mussel $T_0$ sample, 58% of PCB congeners were detected; 42% of PCB congeners were detected in the eastern elliptio mussel $T_0$ sample. For the ribbed mussel test samples, the lowest total PCB congener concentration (2.6 µg/kg ww) was detected in sample LPR3-GDST-Comp03 from cages placed at RM 4.1, and the highest total PCB congener concentration (18 µg/kg ww) was detected in sample LPR1-GDST-Comp01 from cages placed at RM 0.9. The total PCB congener concentration in the ribbed mussel $T_0$ sample (LPRBG-GDST-Comp01) was 0.77 µg/kg ww. For the eastern elliptio mussel test samples, the lowest total PCB congener concentration (17 µg/kg ww) was detected in sample LPR8-ECST-Comp05 from cages placed at RM 14.3, and the highest total PCB congener concentration (30 µg/kg ww) was detected in sample LPR7-ECST-Comp03 from cages placed at RM 12.4. The total PCB congener concentration in the eastern elliptio mussel $T_0$ sample (LPRBG-ECST-Comp01) was 0.41 µg/kg ww. The detected total PCB congener concentration for each sample is shown by percentile range in Figure 4-3.

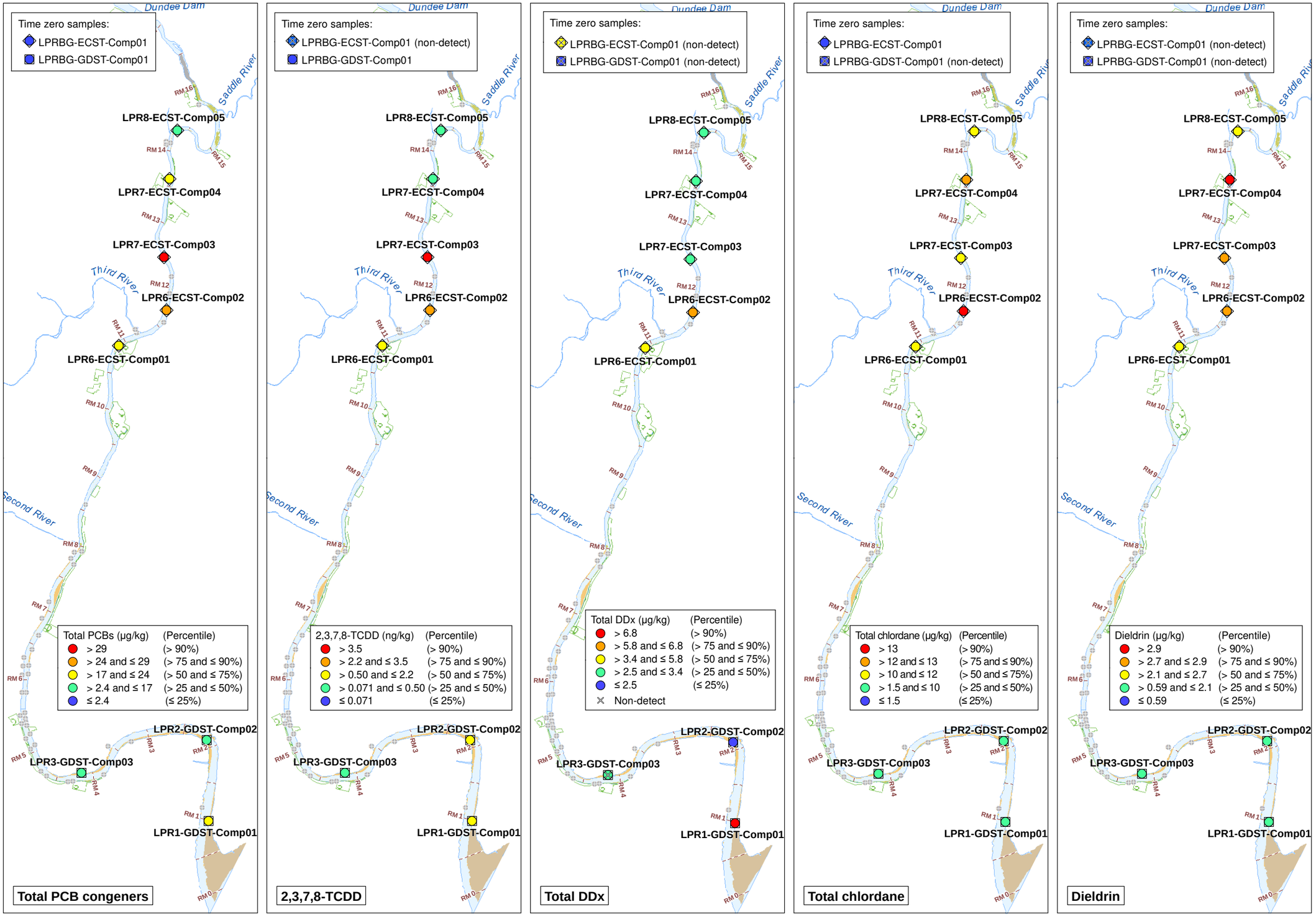


**Figure 4-3. Total PCB congener, 2,3,7,8-TCDD, total DDx, total chlordane, and dieldrin concentrations for the LPRSA bivalve tissue samples**

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Prepared by LSM 12/5/2011, map 4952: W:\Projects\06-58-01 Passaic RI\Data\GIS\Maps_and_Analysis\BenthicChem

## 4.6 PCDDs/PCDFs

A total of 17 PCDDs/PCDFs were analyzed for the bivalve tissue samples. 1,2,3,4,7,8,9- heptachlorodibenzofuran (HpCDF) and 1,2,3,7,8,9-hexachloro-dibenzofuran (HxCDF) were not detected in the ribbed or eastern elliptio mussel samples. Twelve PCDDs/PCDFs were detected in the ribbed mussel test samples and 14 PCDDs/PCDFs were detected in the eastern elliptio mussel test sample. Nine PCDDs/PCDFs were detected in the ribbed mussel $T_0$ sample and seven PCDDs/PCDFs were detected in the eastern elliptio mussel $T_0$ sample. Table 4-8 presents a summary of the PCDDs/PCDFs results for the bivalve samples, including the number of detections, the range of detected concentrations, and the RL or range of RLs for samples reported as non-detects. The subsection that follows Table 4-8 discusses 2,3,7,8-tetrachlorodibenzo-*p*-dioxin (TCDD). Data tables that contain PCDD/PCDF concentrations for each sample, including non-detected results, are presented in Appendix L.

## Table 4-8. Summary of detected PCDD/PCDF results for LPRSA bivalve tissue samples

| Chemical[a] | Bivalve Type | Sample Type[b] | Unit (ww) | Detection Frequency[c] | | Detected Concentration[d] | | | | RLs or Range of RLs[e] |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Ratio | % | Min | Max | Mean | St Dev | |
| 2,3,7,8-TCDD | eastern elliptio mussel | $T_0$ | ng/kg | 0/1 | 0 | na | na | na | na | 0.047 |
| | | test | ng/kg | 5/5 | 100 | 0.077 EMPC-J | 3.6 | 1.8 | 1.6 | na |
| | ribbed mussel | $T_0$ | ng/kg | 1/1 | 100 | 0.031 EMPC-J | 0.031 EMPC-J | na | na | na |
| | | test | ng/kg | 3/3 | 100 | 0.25 J | 1.2 | 0.66 | 0.49 | na |
| 1,2,3,7,8-PeCDD | eastern elliptio mussel | $T_0$ | ng/kg | 1/1 | 100 | 0.032 EMPC-J | 0.032 EMPC-J | na | na | na |
| | | test | ng/kg | 5/5 | 100 | 0.050 EMPC-J | 0.071 J | 0.060 | 0.0076 | na |
| | ribbed mussel | $T_0$ | ng/kg | 1/1 | 100 | 0.059 J | 0.059 J | na | na | na |
| | | test | ng/kg | 2/3 | 67 | 0.045 J | 0.046 EMPC-J | 0.046 | 0.00071 | 0.044 |
| 1,2,3,4,7,8-HxCDD | eastern elliptio mussel | $T_0$ | ng/kg | 0/1 | 0 | na | na | na | na | 0.035 |
| | | test | ng/kg | 1/5 | 20 | 0.035 J | 0.035 J | na | na | 0.042 – 0.067 |
| | ribbed mussel | $T_0$ | ng/kg | 0/1 | 0 | na | na | na | na | 0.036 |
| | | test | ng/kg | 0/3 | 0 | na | na | na | na | 0.04 – 0.052 |
| 1,2,3,6,7,8-HxCDD | eastern elliptio mussel | $T_0$ | ng/kg | 1/1 | 100 | 0.055 EMPC-J | 0.055 EMPC-J | na | na | na |
| | | test | ng/kg | 5/5 | 100 | 0.081 EMPC-J | 0.12 J | 0.10 | 0.015 | na |
| | ribbed mussel | $T_0$ | ng/kg | 1/1 | 100 | 0.066 J | 0.066 J | na | na | na |
| | | test | ng/kg | 1/3 | 33 | 0.079 J | 0.079 J | na | na | 0.043 – 0.052 |
| 1,2,3,7,8,9-HxCDD | eastern elliptio mussel | $T_0$ | ng/kg | 0/1 | 0 | na | na | na | na | 0.087 |
| | | test | ng/kg | 0/5 | 0 | na | na | na | na | 0.11 – 0.13 |
| | ribbed mussel | $T_0$ | ng/kg | 0/1 | 0 | na | na | na | na | 0.12 |
| | | test | ng/kg | 0/3 | 0 | na | na | na | na | 0.11 |

## Table 4-8. Summary of detected PCDD/PCDF results for LPRSA bivalve tissue samples

| Chemical[a] | Bivalve Type | Sample Type[b] | Unit (ww) | Detection Frequency[c] | | Detected Concentration[d] | | | | RLs or Range of RLs[e] |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Ratio | % | Min | Max | Mean | St Dev | |
| 1,2,3,4,6,7,8-HpCDD | eastern elliptio mussel | $T_0$ | ng/kg | 1/1 | 100 | 0.37 J | 0.37 J | na | na | na |
| | | test | ng/kg | 5/5 | 100 | 0.51 J | 0.85 J | 0.64 | 0.13 | na |
| | ribbed mussel | $T_0$ | ng/kg | 1/1 | 100 | 0.36 J | 0.36 J | na | na | na |
| | | test | ng/kg | 3/3 | 100 | 0.25 EMPC-J | 0.30 J | 0.28 | 0.025 | na |
| OCDD | eastern elliptio mussel | $T_0$ | ng/kg | 1/1 | 100 | 5.4 | 5.4 | na | na | na |
| | | test | ng/kg | 5/5 | 100 | 4.1 J | 12 | 6.5 | 3.2 | na |
| | ribbed mussel | $T_0$ | ng/kg | 1/1 | 100 | 3.3 J | 3.3 J | na | na | na |
| | | test | ng/kg | 3/3 | 100 | 3.0 J | 3.9 J | 3.6 | 0.52 | na |
| 2,3,7,8-TCDF | eastern elliptio mussel | $T_0$ | ng/kg | 0/1 | 0 | na | na | na | na | 0.057 |
| | | test | ng/kg | 5/5 | 100 | 0.36 J | 0.44 J | 0.40 | 0.036 | na |
| | ribbed mussel | $T_0$ | ng/kg | 1/1 | 100 | 0.049 J | 0.049 J | na | na | na |
| | | test | ng/kg | 3/3 | 100 | 0.065 J | 0.22 J | 0.13 | 0.083 | na |
| 1,2,3,7,8-PeCDF | eastern elliptio mussel | $T_0$ | ng/kg | 0/1 | 0 | na | na | na | na | 0.026 |
| | | test | ng/kg | 4/5 | 80 | 0.043 J | 0.066 J | 0.057 | 0.0097 | 0.04 |
| 2,3,4,7,8-PeCDF | eastern elliptio mussel | $T_0$ | ng/kg | 1/1 | 100 | 0.035 EMPC-J | 0.035 EMPC-J | na | na | na |
| | | test | ng/kg | 5/5 | 100 | 0.15 EMPC-J | 0.21 J | 0.18 | 0.023 | na |
| | ribbed mussel | $T_0$ | ng/kg | 0/1 | 0 | na | na | na | na | 0.019 |
| | | test | ng/kg | 1/3 | 33 | 0.17 J | 0.17 J | na | na | 0.025 – 0.037 |

## Table 4-8. Summary of detected PCDD/PCDF results for LPRSA bivalve tissue samples

| Chemical[a] | Bivalve Type | Sample Type[b] | Unit (ww) | Detection Frequency[c] | | Detected Concentration[d] | | | | RLs or Range of RLs[e] |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Ratio | % | Min | Max | Mean | St Dev | |
| 1,2,3,4,7,8-HxCDF | eastern elliptio mussel | $T_0$ | ng/kg | 1/1 | 100 | 0.027 J | 0.027 J | na | na | na |
| | | test | ng/kg | 5/5 | 100 | 0.049 J | 0.13 J | 0.086 | 0.035 | na |
| | ribbed mussel | $T_0$ | ng/kg | 1/1 | 100 | 0.015 EMPC-J | 0.015 EMPC-J | na | na | na |
| | | test | ng/kg | 3/3 | 100 | 0.061 J | 0.077 EMPC-J | 0.069 | 0.0080 | na |
| 1,2,3,6,7,8-HxCDF | eastern elliptio mussel | $T_0$ | ng/kg | 0/1 | 0 | na | na | na | na | 0.021 |
| | | test | ng/kg | 5/5 | 100 | 0.046 J | 0.062 EMPC-J | 0.053 | 0.0059 | na |
| | ribbed mussel | $T_0$ | ng/kg | 1/1 | 100 | 0.013 J | 0.013 J | na | na | na |
| | | test | ng/kg | 3/3 | 100 | 0.023 EMPC-J | 0.036 J | 0.029 | 0.0067 | na |
| 2,3,4,6,7,8-HxCDF | eastern elliptio mussel | $T_0$ | ng/kg | 1/1 | 100 | 0.027 EMPC-J | 0.027 EMPC-J | na | na | na |
| | | test | ng/kg | 5/5 | 100 | 0.050 EMPC-J | 0.076 J | 0.063 | 0.012 | na |
| | ribbed mussel | $T_0$ | ng/kg | 1/1 | 100 | 0.018 J | 0.018 J | na | na | na |
| | | test | ng/kg | 2/3 | 67 | 0.033 J | 0.047 J | 0.040 | 0.0099 | 0.025 |
| 1,2,3,4,6,7,8-HpCDF | eastern elliptio mussel | $T_0T_0$ | ng/kg | 0/1 | 0 | na | na | na | na | 0.086 |
| | | test | ng/kg | 5/5 | 100 | 0.20 J | 0.51 J | 0.32 | 0.12 | na |
| | ribbed mussel | $T_0$ | ng/kg | 0/1 | 0 | na | na | na | na | 0.029 |
| | | test | ng/kg | 3/3 | 100 | 0.20 EMPC-J | 0.37 J | 0.28 | 0.085 | na |
| OCDF | eastern elliptio mussel | $T_0$ | ng/kg | 0/1 | 0 | na | na | na | na | 0.11 |
| | | test | ng/kg | 5/5 | 100 | 0.29 J | 0.62 J | 0.43 | 0.12 | na |
| | ribbed mussel | $T_0$ | ng/kg | 0/1 | 0 | na | na | na | na | 0.063 |
| | | test | ng/kg | 3/3 | 100 | 0.35 J | 0.58 J | 0.46 | 0.12 | na |

[a] Only chemicals with detected results are presented. If the chemical was not detected in any samples for a given species and sample type, the chemical is not presented in the table. Data tables that contain results for each sample, including non-detected sample results, are presented in Appendix L.

[b] $T_0$ samples were collected at the time of deployment on Day 0 for both mussel species (see Section 2.1 for additional details). Test samples were collected on Day 61 for the ribbed mussels and Day 90 for the eastern elliptio mussels (see Section 2.3 for additional details).

[c] A calculated total concentration was considered detected if one or more of the components of the sum were detected. If all components of the sum were not detected, the calculated total concentration was considered not detected.

[d] Summary statistics (i.e., minimum, maximum, mean concentration, and standard deviation) include data only for detected results. Non-detected data are not included in summary statistics.

[e] RL or RL range for non-detect samples. When the detection frequency is 100% (i.e., no non-detect samples), the RL is not applicable.

EMPC – estimated maximum possible concentration
HpCDD – heptachlorodibenzo-*p*-dioxin
HpCDF – heptachlorodibenzofuran
HxCDD – hexachlorodibenzo-*p*-dioxin
HxCDF – hexachlorodibenzofuran
J – estimated concentration
LPRSA – Lower Passaic River Study Area
na – not applicable
OCDD – octachlorodibenzo-*p*-dioxin
OCDF – octachlorodibenzofuran
PCDD – polychlorinated dibenzo-*p*-dioxin
PCDF – polychlorinated dibenzofuran
PeCDD – pentachlorodibenzo-*p*-dioxin
PeCDF – pentachlorodibenzofuran
RL – reporting limit
St Dev – standard deviation
$T_0$ – time zero
TCDD – tetrachlorodibenzo-*p*-dioxin
TCDF – tetrachlorodibenzofuran
ww – wet weight

### 4.6.1 2,3,7,8-TCDD

2,3,7,8-TCDD was detected in all bivalve tissue samples, except for the eastern elliptio mussel $T_0$ sample. For the ribbed mussel test samples, the lowest 2,3,7,8-TCDD concentration (0.25 ng/kg ww) was detected in sample LPR3-GDST-Comp03 from cages placed at RM 4.1, and the highest 2,3,7,8-TCDD concentration (1.2 ng/kg ww) was detected in sample LPR1-GDST-Comp01 from cages placed at RM 0.9. The 2,3,7,8-TCDD concentration in the ribbed mussel $T_0$ sample (LPRBG-GDST-Comp01) was 0.031 ng/kg ww. For the eastern elliptio mussel test samples, the lowest 2,3,7,8-TCDD concentration (0.077 ng/kg ww) was detected in sample LPR8-ECST-Comp05 from cages placed at RM 14.3, and the highest 2,3,7,8-TCDD concentration (3.6 ng/kg ww) was detected in sample LPR7-ECST-Comp03 from cages placed at RM 12.4. The 2,3,7,8-TCDD concentration in the eastern elliptio mussel $T_0$ sample (LPRBG-ECST-Comp01) was not detected at a RL of 0.047 ng/kg ww. The detected 2,3,7,8-TCDD concentration for each sample is shown by percentile range in Figure 4-3.

## 4.7 ORGANOCHLORINE PESTICIDES

A total of 27 OC pesticides were analyzed in the bivalve tissue samples; 11 OC pesticides were detected in ribbed mussel test samples, and 14 OC pesticides were detected in eastern elliptio mussel test samples. No OC pesticides were detected in the ribbed mussel $T_0$ sample, and four OC pesticides were detected in the eastern elliptio mussel $T_0$ sample. Table 4-9 presents a summary of the detected OC pesticide results for the bivalve tissue samples, including the number of detections, the range of detected concentrations, and the RL or range of RLs for samples reported as non-detects. Results for total DDx (sum of all six dichlorodiphenyltrichloroethane [DDT] isomers (2,4′-dichlorodiphenyldichloroethane [DDD], 4,4′-DDD, 2,4′-dichlorodiphenyldichloroethylene [DDE], 4,4′-DDE, 2,4′-DDT, and 4,4′-DDT), total chlordane (sum of alpha-chlordane, gamma-chlordane, oxychlordane, cis-nonachlor, and trans-nonachlor), and dieldrin are discussed further in subsections that follow Table 4-9. Data tables that contain OC pesticide concentrations for each sample, including non-detected results, are presented in Appendix L.

## Table 4-9. Summary of detected OC pesticide results for LPRSA bivalve tissue samples

| Chemical[a] | Bivalve Type | Sample Type[b] | Unit (ww) | Detection Frequency[c] | | Detected Concentration[d] | | | | RL or Range of RLs[e] |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Ratio | % | Min | Max | Mean | St Dev | |
| 4,4'-DDD | eastern elliptio mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 2.4 |
| | | test | µg/kg | 2/5 | 40 | 1.7 | 2.1 | 1.9 | 0.28 | 1.4 – 2.8 |
| | ribbed mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 1.7 |
| | | test | µg/kg | 1/3 | 33 | 3.0 | 3.0 | na | na | 1.7 – 2.7 |
| 4,4'-DDE | eastern elliptio mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 3.5 |
| | | test | µg/kg | 5/5 | 100 | 2.6 | 4.0 | 3.4 | 0.54 | na |
| | ribbed mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 2.2 |
| | | test | µg/kg | 2/3 | 67 | 2.3 | 3.9 | 3.1 | 1.1 | 2.5 |
| Aldrin | eastern elliptio mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 0.03 |
| | | test | µg/kg | 3/5 | 60 | 0.026 J | 0.070 J | 0.045 | 0.023 | 0.029 – 0.032 |
| | ribbed mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 0.027 |
| | | test | µg/kg | 2/3 | 67 | 0.031 J | 0.033 J | 0.032 | 0.0014 | 0.046 |
| alpha-Chlordane | eastern elliptio mussel | $T_0$ | µg/kg | 1/1 | 100 | 0.54 J | 0.54 J | na | na | na |
| | | test | µg/kg | 5/5 | 100 | 3.8 | 5.3 | 4.4 | 0.61 | na |
| | ribbed mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 0.15 |
| | | test | µg/kg | 3/3 | 100 | 0.80 J | 2.9 | 1.7 | 1.1 | na |
| cis-Nonachlor | eastern elliptio mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 0.34 |
| | | test | µg/kg | 5/5 | 100 | 0.89 J | 1.1 | 1.0 | 0.087 | na |
| | ribbed mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 0.21 |
| | | test | µg/kg | 1/3 | 33 | 0.62 J | 0.62 J | na | na | 0.26 – 0.34 |

## Table 4-9. Summary of detected OC pesticide results for LPRSA bivalve tissue samples

| Chemical[a] | Bivalve Type | Sample Type[b] | Unit (ww) | Detection Frequency[c] | | Detected Concentration[d] | | | | RL or Range of RLs[e] |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Ratio | % | Min | Max | Mean | St Dev | |
| delta-BHC | eastern elliptio mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 0.16 |
| | | test | µg/kg | 1/5 | 20 | 0.56 J | 0.56 J | na | na | 0.11 – 0.21 |
| | ribbed mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 0.14 |
| | | test | µg/kg | 1/3 | 33 | 0.63 J | 0.63 J | na | na | 0.2 – 0.42 |
| Dieldrin | eastern elliptio mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 0.11 |
| | | test | µg/kg | 5/5 | 100 | 2.3 | 3.0 | 2.7 | 0.30 | na |
| | ribbed mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 0.27 |
| | | test | µg/kg | 3/3 | 100 | 0.64 J | 1.8 | 1.2 | 0.58 | na |
| Endosulfan sulfate | eastern elliptio mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 0.63 |
| | | test | µg/kg | 2/5 | 40 | 0.17 J | 0.37 J | 0.27 | 0.14 | 0.12 – 0.77 |
| gamma-Chlordane | eastern elliptio mussel | $T_0$ | µg/kg | 1/1 | 100 | 0.17 J | 0.17 J | na | na | na |
| | | test | µg/kg | 5/5 | 100 | 2.7 | 3.6 | 3.0 | 0.34 | na |
| | ribbed mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 0.14 |
| | | test | µg/kg | 3/3 | 100 | 0.29 J | 2.3 | 1.3 | 1.0 | na |
| Heptachlor | eastern elliptio mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 0.059 |
| | | test | µg/kg | 1/5 | 20 | 0.060 J | 0.060 J | na | na | 0.039 – 0.1 |
| Heptachlor epoxide | eastern elliptio mussel | $T_0$ | µg/kg | 1/1 | 100 | 0.11 J | 0.11 J | na | na | na |
| | | test | µg/kg | 5/5 | 100 | 0.96 J | 1.3 | 1.1 | 0.14 | na |
| | ribbed mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 0.28 |
| | | test | µg/kg | 3/3 | 100 | 0.15 J | 0.43 J | 0.34 | 0.16 | na |
| Hexachlorobenzene | eastern elliptio mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 0.042 |
| | | test | µg/kg | 5/5 | 100 | 0.13 J | 0.24 J | 0.18 | 0.041 | na |

## Table 4-9. Summary of detected OC pesticide results for LPRSA bivalve tissue samples

| Chemical[a] | Bivalve Type | Sample Type[b] | Unit (ww) | Detection Frequency[c] | | Detected Concentration[d] | | | | RL or Range of RLs[e] |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Ratio | % | Min | Max | Mean | St Dev | |
| Oxychlordane | eastern elliptio mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 0.32 |
| | | test | µg/kg | 5/5 | 100 | 0.35 J | 0.51 J | 0.40 | 0.065 | na |
| | ribbed mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 0.35 |
| | | test | µg/kg | 2/3 | 67 | 0.064 J | 0.089 J | 0.077 | 0.018 | 0.13 |
| Total 2,4' and 4,4' DDD (ND = 0)[f] | eastern elliptio mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 2.4 |
| | | test | µg/kg | 2/5 | 40 | 1.7 | 2.1 | 1.9 | 0.28 | 1.5 – 2.8 |
| | ribbed mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 1.7 |
| | | test | µg/kg | 1/3 | 33 | 3.0 | 3.0 | na | na | 1.7 – 2.7 |
| Total 2,4' and 4,4' DDD (ND = 0.5 RL)[g] | eastern elliptio mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 2.4 |
| | | test | µg/kg | 2/5 | 40 | 2.4 | 3.4 | 2.9 | 0.71 | 1.5 – 2.8 |
| | ribbed mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 1.7 |
| | | test | µg/kg | 1/3 | 33 | 4.3 | 4.3 | na | na | 1.7 – 2.7 |
| Total 2,4' and 4,4' DDD (ND = RL)[h] | eastern elliptio mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 2.4 |
| | | test | µg/kg | 2/5 | 40 | 3.0 | 4.6 | 3.8 | 1.1 | 1.5 – 2.8 |
| | ribbed mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 1.7 |
| | | test | µg/kg | 1/3 | 33 | 5.6 | 5.6 | na | na | 1.7 – 2.7 |
| Total 2,4' and 4,4' DDE (ND = 0)[f] | eastern elliptio mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 3.5 |
| | | test | µg/kg | 5/5 | 100 | 2.6 J | 4.0 J | 3.4 | 0.54 | na |
| | ribbed mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 2.2 |
| | | test | µg/kg | 2/3 | 67 | 2.3 J | 3.9 J | 3.1 | 1.1 | 2.5 |

## Table 4-9. Summary of detected OC pesticide results for LPRSA bivalve tissue samples

| Chemical[a] | Bivalve Type | Sample Type[b] | Unit (ww) | Detection Frequency[c] | | Detected Concentration[d] | | | | RL or Range of RLs[e] |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Ratio | % | Min | Max | Mean | St Dev | |
| Total 2,4' and 4,4' DDE (ND = 0.5 RL)[g] | eastern elliptio mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 3.5 |
| | | test | µg/kg | 5/5 | 100 | 3.3 J | 4.7 J | 4.2 | 0.55 | na |
| | ribbed mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 2.2 |
| | | test | µg/kg | 2/3 | 67 | 2.9 J | 4.7 J | 3.8 | 1.3 | 2.5 |
| Total 2,4' and 4,4' DDE (ND = RL)[h] | eastern elliptio mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 3.5 |
| | | test | µg/kg | 5/5 | 100 | 3.9 J | 5.5 J | 4.9 | 0.60 | na |
| | ribbed mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 2.2 |
| | | test | µg/kg | 2/3 | 67 | 3.5 J | 5.4 J | 4.5 | 1.3 | 2.5 |
| Total 4,4' DDT (ND = 0)[f, i] | eastern elliptio mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 3.5 |
| | | test | µg/kg | 5/5 | 100 | 2.6 J | 5.9 J | 4.2 | 1.5 | na |
| | ribbed mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 2.2 |
| | | test | µg/kg | 2/3 | 67 | 2.3 J | 6.9 J | 4.6 | 3.3 | 2.7 |
| Total 4,4' DDT (ND = 0.5 RL)[f, i] | eastern elliptio mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 3.5 |
| | | test | µg/kg | 5/5 | 100 | 4.0 J | 6.9 J | 5.8 | 1.1 | na |
| | ribbed mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 2.2 |
| | | test | µg/kg | 2/3 | 67 | 4.0 J | 7.7 J | 5.9 | 2.6 | 2.7 |
| Total 4,4' DDT (ND = RL)[h, i] | eastern elliptio mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 3.5 |
| | | test | µg/kg | 5/5 | 100 | 5.4 J | 8.9 J | 7.2 | 1.3 | na |
| | ribbed mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 2.2 |
| | | test | µg/kg | 2/3 | 67 | 5.6 J | 8.5 J | 7.1 | 2.1 | 2.7 |

## Table 4-9. Summary of detected OC pesticide results for LPRSA bivalve tissue samples

| Chemical[a] | Bivalve Type | Sample Type[b] | Unit (ww) | Detection Frequency[c] | | Detected Concentration[d] | | | | RL or Range of RLs[e] |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Ratio | % | Min | Max | Mean | St Dev | |
| Total DDx (ND = 0)[f, j] | eastern elliptio mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 3.5 |
| | | test | µg/kg | 5/5 | 100 | 2.6 J | 5.9 J | 4.2 | 1.5 | na |
| | ribbed mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 2.2 |
| | | test | µg/kg | 2/3 | 67 | 2.3 J | 6.9 J | 4.6 | 3.3 | 2.7 |
| Total DDx (ND = 0.5 RL)[g, j] | eastern elliptio mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 3.5 |
| | | test | µg/kg | 5/5 | 100 | 6.1 J | 10 J | 8.3 | 1.5 | na |
| | ribbed mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 2.2 |
| | | test | µg/kg | 2/3 | 67 | 6.1 J | 11 J | 8.6 | 3.5 | 2.7 |
| Total DDx (ND = RL)[h, j] | eastern elliptio mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 3.5 |
| | | test | µg/kg | 5/5 | 100 | 9.6 J | 16 J | 13 | 2.7 | na |
| | ribbed mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 2.2 |
| | | test | µg/kg | 2/3 | 67 | 9.9 J | 14 J | 12 | 2.9 | 2.7 |
| Total chlordane (ND = 0)[f, k] | eastern elliptio mussel | $T_0$ | µg/kg | 1/1 | 100 | 0.86 J | 0.86 J | na | na | na |
| | | test | µg/kg | 5/5 | 100 | 11 J | 14 J | 12 | 1.3 | na |
| | ribbed mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 0.35 |
| | | test | µg/kg | 3/3 | 100 | 1.6 J | 8.3 J | 4.6 | 3.4 | na |
| Total chlordane (ND = 0.5 RL)[g, k] | eastern elliptio mussel | $T_0$ | µg/kg | 1/1 | 100 | 1.2 J | 1.2 J | na | na | na |
| | | test | µg/kg | 5/5 | 100 | 11 J | 14 J | 12 | 1.3 | na |
| | ribbed mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 0.35 |
| | | test | µg/kg | 3/3 | 100 | 1.7 J | 8.3 J | 4.7 | 3.4 | na |

## Table 4-9. Summary of detected OC pesticide results for LPRSA bivalve tissue samples

| Chemical[a] | Bivalve Type | Sample Type[b] | Unit (ww) | Detection Frequency[c] | | Detected Concentration[d] | | | | RL or Range of RLs[e] |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Ratio | % | Min | Max | Mean | St Dev | |
| Total chlordane (ND = RL)[h, k] | eastern elliptio mussel | $T_0$ | µg/kg | 1/1 | 100 | 1.5 J | 1.5 J | na | na | na |
| | | test | µg/kg | 5/5 | 100 | 11 J | 14 J | 12 | 1.3 | na |
| | ribbed mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 0.35 |
| | | test | µg/kg | 3/3 | 100 | 1.8 J | 8.3 J | 4.8 | 3.3 | na |
| Total endosulfan (ND = 0)[f, l] | eastern elliptio mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 2.6 |
| | | test | µg/kg | 2/5 | 40 | 0.17 J | 0.37 J | 0.27 | 0.14 | 1.1 – 3 |
| Total endosulfan (ND = 0.5 RL)[g, l] | eastern elliptio mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 2.6 |
| | | test | µg/kg | 2/5 | 40 | 2.0 J | 2.2 J | 2.1 | 0.14 | 1.1 – 3 |
| Total endosulfan (ND = RL)[h, l] | eastern elliptio mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 2.6 |
| | | test | µg/kg | 2/5 | 40 | 3.6 J | 4.2 J | 3.9 | 0.42 | 1.1 – 3 |
| trans-Nonachlor | eastern elliptio mussel | $T_0$ | µg/kg | 1/1 | 100 | 0.15 J | 0.15 J | na | na | na |
| | | test | µg/kg | 5/5 | 100 | 3.3 | 4.0 | 3.5 | 0.29 | na |
| | ribbed mussel | $T_0$ | µg/kg | 0/1 | 0 | na | na | na | na | 0.28 |
| | | test | µg/kg | 3/3 | 100 | 0.43 J | 2.4 | 1.3 | 0.99 | na |

a Only chemicals with detected results are presented. If the chemical was not detected in any samples for a given species and sample type, the chemical is not presented in the table. Data tables that contain results for each sample, including non-detected sample results, are presented in Appendix L.

b $T_0$ samples were collected at the time of deployment on Day 0 for both mussel species (see Section 2.1 for additional details). Test samples were collected on Day 61 for the ribbed mussels and Day 90 for the eastern elliptio mussels (see Section 2.3 for additional details).

c A calculated total concentration was considered detected if one or more of the components of the sum were detected. If all components of the sum were not detected, the calculated total concentration was considered not detected.

d Summary statistics (i.e., minimum, maximum, mean concentration, and standard deviation) include data only for detected results. Non-detected data are not included in summary statistics.

e RL or RL range for non-detect samples. When the detection frequency is 100% (i.e., no non-detect samples), the RL is not applicable.

f Non-detected results were set equal to zero when the total concentration was calculated (see Appendix K for more details).

g Non-detected results were set equal to one-half the RL when the total concentration was calculated (see Appendix K for more details).

h Non-detected results were set equal to the RL when the total concentration was calculated (see Appendix K for more details).

[i] Total 4,4'-DDT was calculated as the sum of 4,4′-DDD; 4,4′-DDE; and 4,4′-DDT (see Appendix K for more details).

[j] Total DDx was calculated as the sum of 2,4′-DDD; 2,4′-DDE; 2,4′-DDT; 4,4′-DDD; 4,4′-DDE; and 4,4′-DDT (see Appendix K for more details).

[k] Total chlordane was calculated as the sum of alpha-chlordane, gamma-chlordane, oxychlordane, cis-nonachlor, and trans-nonachlor (see Appendix K for more details).

[l] Total endosulfan was calculated as the sum of endosulfan I, endosulfan II, and endosulfan sulfate (see Appendix K for more details).

BHC – benzene hexachloride
DDD – dichlorodiphenyldichloroethane
DDE – dichlorodiphenyldichloroethylene
DDT – dichlorodiphenyltrichloroethane
J – estimated concentration
LPRSA – Lower Passaic River Study Area
na – not applicable
ND – non-detected concentration
OC – organochlorine
RL – reporting limit
St Dev – standard deviation
$T_0$ – time zero
total DDx – sum of all six DDT isomers (2,4′-DDD, 4,4′-DDD, 2,4′-DDE, 4,4′-DDE, 2,4′-DDT and 4,4′-DDT)
ww – wet weight

### 4.7.1 Total DDx

Two of the six DDT-related compounds (4,4′-DDD and 4,4′-DDE) were detected in the ribbed and eastern elliptio mussel test samples, with a detection frequency that ranged from 33% (4,4′-DDD) to 67% (4,4′-DDE) for ribbed mussels, and from 40% (4,4′-DDD) to 100% (4,4′-DDE) for eastern elliptio mussels. None of the DDT compounds were detected in the ribbed or eastern elliptio mussel $T_0$ samples. For the ribbed mussel test samples, the lowest total DDx concentration (2.3 µg/kg ww) was detected in sample LPR2-GDST-Comp02 from cages placed at RM 2.1, and the highest total DDx concentration (6.9 µg/kg ww) was in sample LPR1-GDST-Comp01 from cages placed at RM 0.9. The total DDx was not detected in the ribbed mussel $T_0$ sample at a RL of 2.2 µg/kg ww. For the eastern elliptio mussel test samples, the lowest total DDx concentration (2.6 µg/kg ww) was detected in sample LPR8-ECST-Comp05 from cages placed at RM 14.3, and the highest total DDx concentration (5.9 µg/kg ww) was detected in sample LPR6-ECST-Comp02 from cages placed at RM 11.7. Total DDx was not detected in the eastern elliptio mussel $T_0$ sample at a RL of 3.5 µg/kg ww. The detected total DDx concentration for each sample is shown by percentile range in Figure 4-3.

### 4.7.2 Total chlordane

The detection frequency for individual chlordane compounds (i.e., alpha-chlordane, gamma-chlordane, oxychlordane, cis-nonachlor, and trans-nonachlor) ranged from 33 to 100% for ribbed mussel test samples. All individual chlordane compounds were detected in the eastern elliptio mussel test samples. None of the individual chlordane compounds were detected in the ribbed mussel $T_0$ sample, and three chlordane compounds (i.e., alpha-chlordane, gamma-chlordane, and trans-nonachlor) were detected in the eastern elliptio mussel $T_0$ sample. For the ribbed mussel test samples, the lowest detected total chlordane concentration (1.6 µg/kg ww) was detected in sample LPR3-GDST-Comp03 from cages placed at RM 4.1, and the highest total chlordane concentration (8.3 µg/kg ww) was detected in sample LPR1-GDST-Comp01 from cages placed at RM 0.9. Total chlordane was not detected in the ribbed mussel $T_0$ sample at a RL of 0.35 µg/kg ww. For the eastern elliptio mussel test samples, the lowest total chlordane concentration was detected in samples LPR6-ECST-Comp01 and LPR8-ECST-Comp05 from cages placed at RM 10.8 and RM 14.3, respectively. The highest total chlordane concentration (14 µg/kg ww) for the ribbed mussel test samples was detected in sample LPR6-ECST-Comp02 from cages placed at RM 11.7. The total chlordane concentration in the eastern elliptio mussel $T_0$ sample (LPRBG-ECST-Comp01) was 0.86 µg/kg ww. The detected total chlordane concentration for each sample is shown by percentile range in Figure 4-3.

### 4.7.3 Dieldrin

Dieldrin was detected in all of the ribbed and eastern elliptio mussel test samples, but was not detected in the $T_0$ samples. For the ribbed mussel test samples, the lowest dieldrin concentration (0.64 µg/kg ww) was detected in sample LPR3-GDST-Comp03 from cages placed at RM 4.1, and the highest dieldrin concentration (1.8 µg/kg ww) was detected in sample LPR1-GDST-Comp01 from cages placed at RM 0.9. Dieldrin was not detected in the ribbed mussel $T_0$ sample at a RL of 0.27 µg/kg ww. For the eastern elliptio mussel test samples, the lowest dieldrin concentration (2.3 µg/kg ww) was detected in sample LPR6-ECST-Comp01 from cages placed at RM 10.8, and the highest dieldrin concentration (3.0 µg/kg ww) was detected in sample LPR7-ECST-Comp04 from cages placed at RM 13.6. Dieldrin was not detected in the eastern elliptio mussel $T_0$ sample at a RL of 0.11 µg/kg ww. The detected dieldrin concentration for each sample is shown by percentile range in Figure 4-3.

## 4.8 LIPIDS AND PERCENT MOISTURE

Table 4-10 presents a summary of the lipid and percent moisture results for the bivalve tissue samples, including the number of detections, the range of detected concentrations, and the RL or range of RLs for samples reported as non-detects. Data tables that contain lipid and percent moisture results for each sample, including non-detected results, are presented in Appendix L.

**Table 4-10. Summary of lipid and percent moisture results for LPRSA bivalve tissue samples**

| Analyte | Bivalve Type | Sample Type[a] | Unit (ww) | Detection Frequency | | Detected Concentration | | | | RL or Range of RLs[b] |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Ratio | % | Min | Max | Mean | St Dev | |
| Lipids | eastern elliptio mussel | $T_0$ | % | 1/1 | 100 | 0.76 | 0.76 | na | na | na |
| | | test | % | 5/5 | 100 | 0.36 | 0.77 | 0.54 | 0.16 | na |
| | ribbed mussel | $T_0$ | % | 1/1 | 100 | 0.96 | 0.96 | na | na | na |
| | | test | % | 3/3 | 100 | 0.24 | 0.49 | 0.37 | 0.13 | na |
| Percent moisture | eastern elliptio mussel | $T_0$ | % | 1/1 | 100 | 90.1 | 90.1 | na | na | na |
| | | test | % | 5/5 | 100 | 89.9 | 91.3 | 90.8 | 0.536 | na |
| | ribbed mussel | $T_0$ | % | 1/1 | 100 | 92.6 | 92.6 | na | na | na |
| | | test | % | 3/3 | 100 | 94.1 | 95.2 | 94.5 | 0.635 | na |

a $T_0$ samples were collected at the time of deployment on Day 0 for both mussel species (see Section 2.1 for additional details). Test samples were collected on Day 61 for the ribbed mussels and Day 90 for the eastern elliptio mussels (see Section 2.3 for additional details).

b RL or RL range for non-detect samples. When the detection frequency is 100% (i.e., no non-detect samples), the RL is not applicable.

LPRSA – Lower Passaic River Study Area
na – not applicable
RL – reporting limit
St Dev – standard deviation
$T_0$ – time zero
ww – wet weight

For the ribbed mussel test samples, the lowest percent lipids (0.24%) was measured in sample LPR2-GDST-Comp02 from cages placed at RM 2.1, and the highest percent lipids (0.49%) was measured in sample LPR1-GDST-Comp01 from cages placed at RM 0.9. The percent lipids in the ribbed mussel $T_0$ sample (LPRBG-GDST-Comp01) was 0.96%. For the eastern elliptio mussel test samples, the lowest percent lipids (0.36%) was measured in sample LPR6-ECST-Comp01 from cages placed at RM 10.8, and the highest percent lipids (0.77%) was measured in sample LPR8-ECST-Comp05 from cages placed at RM 14.3. The percent lipids in the eastern elliptio mussel $T_0$ sample (LPRBG-ECST-Comp01) was 0.76%.

# 5 Data Validation

Independent data validation of all chemistry results was conducted by Laboratory Data Consultants (LDC) in accordance with the Benthic QAPP (Windward 2009b), USEPA Region 2 SOPs described in the Benthic QAPP, and USEPA National Functional Guidelines (USEPA 2017). The following sections summarize the results of the validation but do not list every sample affected by a qualification. Detailed information regarding all qualified samples can be found in the data validation reports provided in Appendix O.

Table 5-1 provides a summary of the number of samples in each SDG and the level of data validation. Both summary and full data validation included a review of all QC summary forms, including initial calibration, continuing calibration verification, internal standard, surrogate, laboratory control sample (LCS), laboratory control sample duplicate (LCSD), matrix spike, matrix spike duplicate, certified reference material (CRM), and interference check sample summary forms. Full validation also included the re-calculation of results.

**Table 5-1. Data validation performed for each sample delivery group**

| Laboratory | SDG | Validation Level | Validator | Sample Type | No. of Samples | Analyses |
|---|---|---|---|---|---|---|
| Alpha Analytical | L1110328 | full | LDC | tissue | 10 | PAHs, alkylated PAHs, SVOCs, percent moisture |
| | | | LDC | rinsate blank | 1 | PAHs, alkylated PAHs, SVOCs |
| Analytical Perspectives | A3380 | full | LDC | rinsate blank | 1 | PCB congeners, PCDDs/PCDFs |
| | A3406 | full | LDC | tissue | 10 | |
| Brooks Rand Labs | 1132006 | full | LDC | tissue | 10 | methyl mercury, total mercury |
| | | | | rinsate blank | 1 | |
| Columbia Analytical Services, Kelso | K1106643 | full | LDC | tissue | 10 | metals, butyltins, lipids |
| | K1107026 | reduced | | rinsate blank | 1 | metals, butyltins |
| Maxxam Analytics | B1A8699 | full | LDC | tissue | 10 | OC pesticides |
| | | | | rinsate blank | 1 | |

LDC – Laboratory Data Consultants
OC – organochlorine
PAH – polycyclic aromatic hydrocarbon
PCB – polychlorinated biphenyl
PCDD – polychlorinated dibenzo-*p*-dioxin
PCDF – polychlorinated dibenzofuran
SDG – sample delivery group
SVOC – semivolatile organic compound

## 5.1 Overall Data Quality

The data were considered acceptable for use in the RI/FS process, as qualified. Issues that resulted in the qualification of data are summarized below by analyte group. For

bivalve tissue samples with non-detected concentrations, a comparison of RLs with data quality levels, which were provided in Worksheet No. 15 of the Benthic QAPP (Windward 2009b) and the Benthic QAPP Addendum No. 4 (Windward 2011), is provided in Appendix P.

## 5.2 METALS

### 5.2.1 Mercury and methyl mercury

All mercury and methyl mercury data were considered acceptable for use in the RI/FS process. No mercury or methyl mercury data were qualified.

### 5.2.2 Total metals

All metals data were considered acceptable for use in the RI/FS process, as qualified. The issues associated with the qualification of total metals results are summarized in Table 5-2.

**Table 5-2. Summary of metals validation results**

| Metal | Reason for Qualification | Qualification | Percentage of Samples Qualified |
|---|---|---|---|
| Antimony | ICP interference | J/UJ | 80% |
| | method blank contamination | UJ | 60% |
| Cadmium | ICP interference | J | 100% |
| | ICP serial dilution | J | 100% |
| Chromium | rinsate blank contamination | J | 80% |
| Cobalt | ICP interference | J | 100% |
| | low matrix spike recovery | J | 100% |
| | ICP serial dilution | J | 100% |
| Copper | poor precision with lab duplicate | J | 100% |
| | ICP serial dilution | J | 100% |
| Lead | ICP interference | J | 100% |
| Nickel | rinsate blank contamination | J | 20% |
| | ICP interference | J | 100% |
| | ICP serial dilution | J | 100% |
| Silver | ICP interference | J | 100% |

ICP – inductively coupled plasma
J – estimated concentration
U – not detected at given concentration

## 5.3 BUTYLTINS

All butyltin data were considered acceptable for use in the RI/FS process, as qualified. Because the results of the two columns had relative percent differences (RPDs) that exceeded the 25% control limit, 10% of the monbutyltin samples, 60% of the dibutyltin samples, and 20% of the tributyltin samples had results qualified as estimated (J- or UJ-qualified). All samples had dibutyltin results qualified as estimated (J- or UJ-qualified) because the CRM recovery did not meet the percent difference control limit of 25%.

## 5.4 PAHS

All PAH data were considered acceptable for use in the RI/FS process, as qualified. As a result of a chromatographic interference, 50% of the samples had 2,3,5-trimethylnaphthalene results qualified as estimated (J-qualified).

## 5.5 ALKYLATED PAHS

All PAH data were considered acceptable for use in the RI/FS process, as qualified. All samples had at least one alklyated PAH result qualified as non-detected (U-qualified), and at least 10% of the samples had one alkylated PAH result qualified as estimated (J-qualified) because the detected results were lower than the lowest calibration standard.

## 5.6 SVOCS

All SVOC data were considered acceptable for use in the RI/FS process, as qualified. All samples had 2,4-dinitrophenol results qualified as estimated (UJ-qualified) because the LCS recovery was below the lower control limit of 30%. All samples had di-n-octylphthalate results qualified as estimated (UJ-qualified) because the percent difference between the initial calibration and a continuing calibration check standard was outside of the control limit of 20%.

## 5.7 PCBS

### 5.7.1 PCB Aroclors

All PCB Aroclor data were considered acceptable for use in the RI/FS process, as qualified. Because the results of the two columns had RPDs that exceeded the 25% control limit, 30% of the samples had Aroclor 1242 results that were qualified as estimated (J-qualified).

### 5.7.2 PCB congeners

The overall quality of the PCB congener data was considered acceptable for use in the RI/FS process, as qualified. All results that had ion abundance ratios that did not meet the theoretical criteria were flagged as estimated maximum possible concentrations

(EMPCs) by the laboratory and received an EMPC J-qualification during validation. Because of the EMPC flag, 50% of the samples had at least one congener result qualified as estimated (EMPC J-qualified). Because of target compound identification (i.e., secondary ion interference), which primarily affected the dichlorobiphenyl congeners, 20% of the samples had at least one result qualified as estimated (J-qualified). All samples had one PCB congener result (i.e., PCB-37) qualified as estimated (J- or UJ-qualified), because the percent difference between the initial calibration and the routine calibration was outside of the control limit. Because an associated CRM recovery was outside of the control limits, 90% of the samples had one PCB congener result (i.e., PCB-206) qualified as estimated (J- or UJ-qualified).

## 5.8 PCDDs/PCDFs

The overall quality of the PCDD/PCDF data was considered acceptable for use in the RI/FS process, as qualified. All results that had ion abundance ratios that did not meet the theoretical criteria were flagged as EMPCs by the laboratory and received an EMPC J-qualification during validation. Because of the EMPC flag, 30% of the samples had at least one result that was qualified as estimated (EMPC J-qualification). Because the percent difference between the initial calibration and the routine calibration was outside of the control limit, 40% of the samples had one PCDF result (i.e., 1,2,3,4,6,7,8-HpCDF) qualified as estimated (J- or UJ-qualified). Because concentrations in the samples were less than five times the concentrations in the method blank, 70% of the samples had at least one PCDD/PCDF result qualified as non-detected (U-qualified).

## 5.9 Organochlorine Pesticides

All OC pesticide data were considered acceptable for use in the RI/FS process, as qualified. All samples had at least one pesticide (i.e., 2,4'-DDE, 2,4'-DDT, 4,4'-DDT, heptachlor, or oxychlordane) result qualified as estimated (J- or UJ-qualified) because of CRM recoveries that were outside of the control limits. Because concentrations in the samples were less than five times the concentrations in the method blank, 50% of the samples had hexachlorobenzene results and 20% of the samples had cis-nonachlor results qualified as non-detected (U-qualified).

## 5.10 Lipids and Percent Moisture

All lipid and percent moisture data were considered acceptable for use in the RI/FS process; no results were qualified.

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# APPENDIX A. FIELD FORMS

# Data Forms

# LPRSA Caged Bivalve Study Data Form

| | |
|---|---|
| **Project Name:** LPR RI/FS Caged Bivalve Study | **Project No.:** Task 23.2 |
| **Date/Time:** 3/9/11 8:45 | **Field Crew Initials:** KT, AR, JH, TD |
| **Cage ID:** n/a | **Species:** Estuarine mussel (*Geukensia demissa*) |
| **Pre-deployment** | |
| **Comments:** Day 0 for Reaches 1-5 | |

| Specimen ID | Shell Length (cm) | Comments |
|---|---|---|
| LPR1XX-GD001 | 91 | |
| LPR1XX-GD002 | 88 | |
| LPR1XX-GD003 | 103 | |
| LPR1XX-GD004 | 107 | |
| LPR1XX-GD005 | 81 | |
| LPR1XX-GD006 | 95 | |
| LPR1XX-GD007 | 74 | |
| LPR1XX-GD008 | 82.5 | |
| LPR1XX-GD009 | 76 | |
| LPR1XX-GD010 | 88 | |
| LPR1XX-GD011 | 79.5 | |
| LPR1XX-GD012 | 78 | |
| LPR1XX-GD013 | 96.5 | |
| LPR1XX-GD014 | 77.5 | |
| LPR1XX-GD015 | 96 | |
| LPR1XX-GD016 | 101.5 | |
| LPR1XX-GD017 | 97 | |
| LPR1XX-GD018 | 85 | |
| LPR1XX-GD019 | 77 | |
| LPR1XX-GD020 | 85 | |
| LPR1XX-GD021 | 81 | |
| LPR1XX-GD022 | 83 | |
| LPR1XX-GD023 | 84 | |
| LPR1XX-GD024 | 83 | |
| LPR1XX-GD025 | 84 | |
| LPR1XX-GD026 | 96 | |
| LPR1XX-GD027 | 82.5 | |
| LPR1XX-GD028 | 84 | |
| LPR1XX-GD029 | 85 | |

| | |
|---|---|
| **Project Name:** LPR RI/FS Caged Bivalve Study | **Project No.:** Task 23.2 |
| **Date/Time:** 3/9/11 8:45 | **Field Crew Initials:** KT, AR, JH, TD |
| **Cage ID:** n/a | **Species:** Estuarine mussel (*Geukensia demissa*) |
| **Pre-deployment** | |
| **Comments:** Day 0 for Reaches 1-5 | |

| Specimen ID | Shell Length (cm) | Comments |
|---|---|---|
| LPR1XX-GD030 | 87 | |
| LPR1XX-GD031 | 90 | |
| LPR1XX-GD032 | 88 | |
| LPR1XX-GD033 | 76 | |
| LPR1XX-GD034 | 76.5 | |
| LPR1XX-GD035 | 82 | |
| LPR1XX-GD036 | 81 | |
| LPR1XX-GD037 | 80 | |
| LPR1XX-GD038 | 85.5 | |
| LPR1XX-GD039 | 90 | |
| LPR1XX-GD040 | 72 | |
| LPR1XX-GD041 | 85 | |
| LPR1XX-GD042 | 78 | |
| LPR1XX-GD043 | 93 | |
| LPR1XX-GD044 | 87 | |
| LPR1XX-GD045 | 92 | |
| LPR1XX-GD046 | 91 | |
| LPR1XX-GD047 | 76.5 | |
| LPR1XX-GD048 | 92 | |
| LPR1XX-GD049 | 88 | |
| LPR1XX-GD050 | 91 | |
| LPR1XX-GD051 | 91 | |
| LPR1XX-GD052 | 79 | |
| LPR1XX-GD053 | 82 | |
| LPR1XX-GD054 | 76 | |
| LPR1XX-GD055 | 85 | |
| LPR1XX-GD056 | 88 | |
| LPR1XX-GD057 | 80 | |
| LPR1XX-GD058 | 80 | |
| LPR1XX-GD059 | 99 | |
| LPR1XX-GD060 | 79 | |
| LPR1XX-GD061 | 96 | |

| | |
|---|---|
| **Project Name:** LPR RI/FS Caged Bivalve Study | **Project No.:** Task 23.2 |
| **Date/Time:** 3/9/11 8:45 | **Field Crew Initials:** KT, AR, JH, TD |
| **Cage ID:** n/a | **Species:** Estuarine mussel (*Geukensia demissa*) |
| **Pre-deployment** | |
| **Comments:** Day 0 for Reaches 1-5 | |

| Specimen ID | Shell Length (cm) | Comments |
|---|---|---|
| LPR1XX-GD062 | 82 | |
| LPR1XX-GD063 | 85 | |
| LPR1XX-GD064 | 72 | |
| LPR1XX-GD065 | 76 | |
| LPR1XX-GD066 | 84 | |
| LPR1XX-GD067 | 92 | |
| LPR1XX-GD068 | 71 | |
| LPR1XX-GD069 | 100.5 | |
| LPR1XX-GD070 | 89 | |
| LPR1XX-GD071 | 93.5 | |
| LPR1XX-GD072 | 74 | |
| LPR1XX-GD073 | 81 | |
| LPR1XX-GD074 | 85.5 | |
| LPR1XX-GD075 | 87 | |
| LPR1XX-GD076 | 92 | |
| LPR1XX-GD077 | 82.5 | |
| LPR1XX-GD078 | 94 | |
| LPR1XX-GD079 | 89 | |
| LPR1XX-GD080 | 97.5 | |
| LPR2AD-GD081 | 75 | |
| LPR2AD-GD082 | 96 | |
| LPR2AD-GD083 | 95.5 | |
| LPR2AD-GD084 | 85 | |
| LPR2AD-GD085 | 83 | |
| LPR2AD-GD086 | 97 | |
| LPR2AD-GD087 | 97 | |
| LPR2AD-GD088 | 93 | |
| LPR2AD-GD089 | 90 | |
| LPR2AD-GD090 | 80.5 | |
| LPR2AD-GD091 | 77 | |
| LPR2AD-GD092 | 77 | |
| LPR2AD-GD093 | 76.5 | |

| | |
|---|---|
| **Project Name:** LPR RI/FS Caged Bivalve Study | **Project No.:** Task 23.2 |
| **Date/Time:** 3/9/11 8:45 | **Field Crew Initials:** KT, AR, JH, TD |
| **Cage ID:** n/a | **Species:** Estuarine mussel (*Geukensia demissa*) |
| **Pre-deployment** | |
| **Comments:** Day 0 for Reaches 1-5 | |

| Specimen ID | Shell Length (cm) | Comments |
|---|---|---|
| LPR2AD-GD094 | 77.5 | |
| LPR2AD-GD095 | 76 | |
| LPR2AD-GD096 | 75.5 | |
| LPR2AD-GD097 | 74 | |
| LPR2AD-GD098 | 76 | |
| LPR2AD-GD099 | 81 | |
| LPR2AD-GD100 | 75 | |
| LPR2AD-GD101 | 103 | |
| LPR2AD-GD102 | 106 | |
| LPR2AD-GD103 | 90.5 | |
| LPR2AD-GD104 | 94.5 | |
| LPR2AD-GD105 | 90 | |
| LPR2AD-GD106 | 95.5 | |
| LPR2AD-GD107 | 90.5 | |
| LPR2AD-GD108 | 88 | |
| LPR2AD-GD109 | 82 | |
| LPR2AD-GD110 | 90.5 | |
| LPR2AD-GD111 | 91 | |
| LPR2AD-GD112 | 89 | |
| LPR2AD-GD113 | 91.5 | |
| LPR2AD-GD114 | 85.5 | |
| LPR2AD-GD115 | 80 | |
| LPR2AD-GD116 | 84 | |
| LPR2AD-GD117 | 92 | |
| LPR2AD-GD118 | 87 | |
| LPR2AD-GD119 | 80 | |
| LPR2AD-GD120 | 89 | |
| LPR2AD-GD121 | 98 | |
| LPR2AD-GD122 | 97 | |
| LPR2AD-GD123 | 95.5 | |
| LPR2AD-GD124 | 94 | |
| LPR2AD-GD125 | 94.5 | |

| | |
|---|---|
| **Project Name:** LPR RI/FS Caged Bivalve Study | **Project No.:** Task 23.2 |
| **Date/Time:** 3/9/11 8:45 | **Field Crew Initials:** KT, AR, JH, TD |
| **Cage ID:** n/a | **Species:** Estuarine mussel (*Geukensia demissa*) |
| **Pre-deployment** | |
| **Comments:** Day 0 for Reaches 1-5 | |

| Specimen ID | Shell Length (cm) | Comments |
|---|---|---|
| LPR2AD-GD126 | 100.5 | |
| LPR2AD-GD127 | 101.5 | |
| LPR2AD-GD128 | 96 | |
| LPR2AD-GD129 | 92 | |
| LPR2AD-GD130 | 94.5 | |
| LPR2AD-GD131 | 91.5 | |
| LPR2AD-GD132 | 91.5 | |
| LPR2AD-GD133 | 82 | |
| LPR2AD-GD134 | 89 | |
| LPR2AD-GD135 | 86.5 | |
| LPR2AD-GD136 | 92 | |
| LPR2AD-GD137 | 86.5 | |
| LPR2AD-GD138 | 90 | |
| LPR2AD-GD139 | 96 | |
| LPR2AD-GD140 | 87.5 | |
| LPR2AD-GD141 | 87.5 | |
| LPR2AD-GD142 | 82 | |
| LPR2AD-GD143 | 92 | |
| LPR2AD-GD144 | 94 | |
| LPR2AD-GD145 | 90.5 | |
| LPR2AD-GD146 | 80.5 | |
| LPR2AD-GD147 | 81 | |
| LPR2AD-GD148 | 84 | |
| LPR2AD-GD149 | 88 | |
| LPR2AD-GD150 | 83.5 | |
| LPR2AD-GD151 | 78 | |
| LPR2AD-GD152 | 74 | |
| LPR2AD-GD153 | 79.5 | |
| LPR2AD-GD154 | 80 | |
| LPR2AD-GD155 | 78 | |
| LPR2AD-GD156 | 80 | |
| LPR2AD-GD157 | 77 | |

| | |
|---|---|
| **Project Name:** LPR RI/FS Caged Bivalve Study | **Project No.:** Task 23.2 |
| **Date/Time:** 3/9/11 8:45 | **Field Crew Initials:** KT, AR, JH, TD |
| **Cage ID:** n/a | **Species:** Estuarine mussel (*Geukensia demissa*) |
| **Pre-deployment** | |
| **Comments:** Day 0 for Reaches 1-5 | |

| Specimen ID | Shell Length (cm) | Comments |
|---|---|---|
| LPR2AD-GD158 | 78 | |
| LPR2AD-GD159 | 80 | |
| LPR2AD-GD160 | 75.5 | |
| LPR3SS-GD161 | 75 | |
| LPR3SS-GD162 | 97 | |
| LPR3SS-GD163 | 83 | |
| LPR3SS-GD164 | 87 | |
| LPR3SS-GD165 | 92.5 | |
| LPR3SS-GD166 | 74 | |
| LPR3SS-GD167 | 78 | |
| LPR3SS-GD168 | 90.5 | |
| LPR3SS-GD169 | 78 | |
| LPR3SS-GD170 | 86 | |
| LPR3SS-GD171 | 102.5 | |
| LPR3SS-GD172 | 85 | |
| LPR3SS-GD173 | 93 | |
| LPR3SS-GD174 | 92 | |
| LPR3SS-GD175 | 88 | |
| LPR3SS-GD176 | 92 | |
| LPR3SS-GD177 | 90 | |
| LPR3SS-GD178 | 86 | |
| LPR3SS-GD179 | 86 | |
| LPR3SS-GD180 | 82 | |
| LPR3SS-GD181 | 74 | |
| LPR3SS-GD182 | 72 | |
| LPR3SS-GD183 | 67.5 | |
| LPR3SS-GD184 | 75 | |
| LPR3SS-GD185 | 70 | |
| LPR3SS-GD186 | 69 | |
| LPR3SS-GD187 | 73 | |
| LPR3SS-GD188 | 73 | |
| LPR3SS-GD189 | 78 | |

| | |
|---|---|
| **Project Name:** LPR RI/FS Caged Bivalve Study | **Project No.:** Task 23.2 |
| **Date/Time:** 3/9/11 8:45 | **Field Crew Initials:** KT, AR, JH, TD |
| **Cage ID:** n/a | **Species:** Estuarine mussel (*Geukensia demissa*) |
| **Pre-deployment** | |
| **Comments:** Day 0 for Reaches 1-5 | |

| Specimen ID | Shell Length (cm) | Comments |
|---|---|---|
| LPR3SS-GD190 | 73 | |
| LPR3SS-GD191 | 69 | |
| LPR3SS-GD192 | 76 | |
| LPR3SS-GD193 | 78 | |
| LPR3SS-GD194 | 73 | |
| LPR3SS-GD195 | 76 | |
| LPR3SS-GD196 | 75 | |
| LPR3SS-GD197 | 76 | |
| LPR3SS-GD198 | 76.5 | |
| LPR3SS-GD199 | 76 | |
| LPR3SS-GD200 | 77 | |
| LPR3SS-GD201 | 84 | |
| LPR3SS-GD202 | 86 | |
| LPR3SS-GD203 | 82.5 | |
| LPR3SS-GD204 | 85 | |
| LPR3SS-GD205 | 91 | |
| LPR3SS-GD206 | 73 | |
| LPR3SS-GD207 | 82 | |
| LPR3SS-GD208 | 82 | |
| LPR3SS-GD209 | 85 | |
| LPR3SS-GD210 | 77 | |
| LPR3SS-GD211 | 78 | |
| LPR3SS-GD212 | 83 | |
| LPR3SS-GD213 | 90 | |
| LPR3SS-GD214 | 90 | |
| LPR3SS-GD215 | 82 | |
| LPR3SS-GD216 | 76.5 | |
| LPR3SS-GD217 | 88 | |
| LPR3SS-GD218 | 85 | |
| LPR3SS-GD219 | 82 | |
| LPR3SS-GD220 | 88 | |
| LPR3SS-GD221 | 79 | |

| | |
|---|---|
| **Project Name:** LPR RI/FS Caged Bivalve Study | **Project No.:** Task 23.2 |
| **Date/Time:** 3/9/11 8:45 | **Field Crew Initials:** KT, AR, JH, TD |
| **Cage ID:** n/a | **Species:** Estuarine mussel (*Geukensia demissa*) |
| **Pre-deployment** | |
| **Comments:** Day 0 for Reaches 1-5 | |

| Specimen ID | Shell Length (cm) | Comments |
|---|---|---|
| LPR3SS-GD222 | 80 | |
| LPR3SS-GD223 | 82 | |
| LPR3SS-GD224 | 92 | |
| LPR3SS-GD225 | 82 | |
| LPR3SS-GD226 | 79 | |
| LPR3SS-GD227 | 91 | |
| LPR3SS-GD228 | 82 | |
| LPR3SS-GD229 | 83.5 | |
| LPR3SS-GD230 | 88 | |
| LPR3SS-GD231 | 91 | |
| LPR3SS-GD232 | 86 | |
| LPR3SS-GD233 | 78 | |
| LPR3SS-GD234 | 81 | |
| LPR3SS-GD235 | 92 | |
| LPR3SS-GD236 | 93 | |
| LPR3SS-GD237 | 109 | |
| LPR3SS-GD238 | 86 | |
| LPR3SS-GD239 | 81.5 | |
| LPR3SS-GD240 | 85 | |
| LPR4AB-GD241 | 112.5 | |
| LPR4AB-GD242 | 94.5 | |
| LPR4AB-GD243 | 87.5 | |
| LPR4AB-GD244 | 91.5 | |
| LPR4AB-GD245 | 91.5 | |
| LPR4AB-GD246 | 89 | |
| LPR4AB-GD247 | 90.5 | |
| LPR4AB-GD248 | 85 | |
| LPR4AB-GD249 | 98 | |
| LPR4AB-GD250 | 95.5 | |
| LPR4AB-GD251 | 84 | |
| LPR4AB-GD252 | 86 | |
| LPR4AB-GD253 | 79 | |

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|---|---|
| **Project Name:** LPR RI/FS Caged Bivalve Study | **Project No.:** Task 23.2 |
| **Date/Time:** 3/9/11 8:45 | **Field Crew Initials:** KT, AR, JH, TD |
| **Cage ID:** n/a | **Species:** Estuarine mussel (*Geukensia demissa*) |
| **Pre-deployment** | |
| **Comments:** Day 0 for Reaches 1-5 | |

| Specimen ID | Shell Length (cm) | Comments |
|---|---|---|
| LPR4AB-GD254 | 78.5 | |
| LPR4AB-GD255 | 84 | |
| LPR4AB-GD256 | 81.5 | |
| LPR4AB-GD257 | 84 | |
| LPR4AB-GD258 | 81 | |
| LPR4AB-GD259 | 78 | |
| LPR4AB-GD260 | 78.5 | |
| LPR4AB-GD261 | 91 | |
| LPR4AB-GD262 | 90.5 | |
| LPR4AB-GD263 | 82 | |
| LPR4AB-GD264 | 86 | |
| LPR4AB-GD265 | 80 | |
| LPR4AB-GD266 | 85 | |
| LPR4AB-GD267 | 89 | |
| LPR4AB-GD268 | 88 | |
| LPR4AB-GD269 | 85 | |
| LPR4AB-GD270 | 84.5 | |
| LPR4AB-GD271 | 80 | |
| LPR4AB-GD272 | 71.5 | |
| LPR4AB-GD273 | 79 | |
| LPR4AB-GD274 | 74 | |
| LPR4AB-GD275 | 73.5 | |
| LPR4AB-GD276 | 74.5 | |
| LPR4AB-GD277 | 79 | |
| LPR4AB-GD278 | 73 | |
| LPR4AB-GD279 | 72 | |
| LPR4AB-GD280 | 75.5 | |
| LPR4AB-GD281 | 111 | |
| LPR4AB-GD282 | 102 | |
| LPR4AB-GD283 | 108 | |
| LPR4AB-GD284 | 96 | |
| LPR4AB-GD285 | 101 | |

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|---|---|
| **Project Name:** LPR RI/FS Caged Bivalve Study | **Project No.:** Task 23.2 |
| **Date/Time:** 3/9/11 8:45 | **Field Crew Initials:** KT, AR, JH, TD |
| **Cage ID:** n/a | **Species:** Estuarine mussel (*Geukensia demissa*) |
| **Pre-deployment** | |
| **Comments:** Day 0 for Reaches 1-5 | |

| Specimen ID | Shell Length (cm) | Comments |
|---|---|---|
| LPR4AB-GD286 | 99 | |
| LPR4AB-GD287 | 97 | |
| LPR4AB-GD288 | 93 | |
| LPR4AB-GD289 | 103 | |
| LPR4AB-GD290 | 94.5 | |
| LPR4AB-GD291 | 87.5 | |
| LPR4AB-GD292 | 90 | |
| LPR4AB-GD293 | 81 | |
| LPR4AB-GD294 | 89 | |
| LPR4AB-GD295 | 84 | |
| LPR4AB-GD296 | 87.5 | |
| LPR4AB-GD297 | 79 | |
| LPR4AB-GD298 | 83 | |
| LPR4AB-GD299 | 88 | |
| LPR4AB-GD300 | 94 | |
| LPR4AB-GD301 | 88 | |
| LPR4AB-GD302 | 85 | |
| LPR4AB-GD303 | 91 | |
| LPR4AB-GD304 | 90 | |
| LPR4AB-GD305 | 89 | |
| LPR4AB-GD306 | 82.5 | |
| LPR4AB-GD307 | 85 | |
| LPR4AB-GD308 | 85 | |
| LPR4AB-GD309 | 86 | |
| LPR4AB-GD310 | 82 | |
| LPR4AB-GD311 | 87 | |
| LPR4AB-GD312 | 79 | |
| LPR4AB-GD313 | 82.5 | |
| LPR4AB-GD314 | 81.5 | |
| LPR4AB-GD315 | 78 | |
| LPR4AB-GD316 | 84 | |
| LPR4AB-GD317 | 80 | |

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|---|---|
| **Project Name:** LPR RI/FS Caged Bivalve Study | **Project No.:** Task 23.2 |
| **Date/Time:** 3/9/11 8:45 | **Field Crew Initials:** KT, AR, JH, TD |
| **Cage ID:** n/a | **Species:** Estuarine mussel (*Geukensia demissa*) |
| **Pre-deployment** | |
| **Comments:** Day 0 for Reaches 1-5 | |

| Specimen ID | Shell Length (cm) | Comments |
|---|---|---|
| LPR4AB-GD318 | 80 | |
| LPR4AB-GD319 | 78 | |
| LPR4AB-GD320 | 75 | |
| LPR4ZZ-GD321 | 99 | |
| LPR4ZZ-GD322 | 88 | |
| LPR4ZZ-GD323 | 87 | |
| LPR4ZZ-GD324 | 96 | |
| LPR4ZZ-GD325 | 97 | |
| LPR4ZZ-GD326 | 99 | |
| LPR4ZZ-GD327 | 103 | |
| LPR4ZZ-GD328 | 95 | |
| LPR4ZZ-GD329 | 94 | |
| LPR4ZZ-GD330 | 100 | |
| LPR4ZZ-GD331 | 89 | |
| LPR4ZZ-GD332 | 92 | |
| LPR4ZZ-GD333 | 87 | |
| LPR4ZZ-GD334 | 107 | |
| LPR4ZZ-GD335 | 104 | |
| LPR4ZZ-GD336 | 85 | |
| LPR4ZZ-GD337 | 83 | |
| LPR4ZZ-GD338 | 84 | |
| LPR4ZZ-GD339 | 88 | |
| LPR4ZZ-GD340 | 99 | |
| LPR4ZZ-GD341 | 92 | |
| LPR4ZZ-GD342 | 98 | |
| LPR4ZZ-GD343 | 103 | |
| LPR4ZZ-GD344 | 95 | |
| LPR4ZZ-GD345 | 108 | |
| LPR4ZZ-GD346 | 88 | |
| LPR4ZZ-GD347 | 94 | |
| LPR4ZZ-GD348 | 88 | |
| LPR4ZZ-GD349 | 95 | |

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|---|---|
| **Project Name:** LPR RI/FS Caged Bivalve Study | **Project No.:** Task 23.2 |
| **Date/Time:** 3/9/11 8:45 | **Field Crew Initials:** KT, AR, JH, TD |
| **Cage ID:** n/a | **Species:** Estuarine mussel (*Geukensia demissa*) |
| **Pre-deployment** | |
| **Comments:** Day 0 for Reaches 1-5 | |

| Specimen ID | Shell Length (cm) | Comments |
|---|---|---|
| LPR4ZZ-GD350 | 88 | |
| LPR4ZZ-GD351 | 76 | |
| LPR4ZZ-GD352 | 73 | |
| LPR4ZZ-GD353 | 88 | |
| LPR4ZZ-GD354 | 83 | |
| LPR4ZZ-GD355 | 80 | |
| LPR4ZZ-GD356 | 81 | |
| LPR4ZZ-GD357 | 75 | |
| LPR4ZZ-GD358 | 81 | |
| LPR4ZZ-GD359 | 87 | |
| LPR4ZZ-GD360 | 80 | |
| LPR4ZZ-GD361 | 95.5 | |
| LPR4ZZ-GD362 | 112.5 | |
| LPR4ZZ-GD363 | 84 | |
| LPR4ZZ-GD364 | 80 | |
| LPR4ZZ-GD365 | 88 | |
| LPR4ZZ-GD366 | 82 | |
| LPR4ZZ-GD367 | 94 | |
| LPR4ZZ-GD368 | 89 | |
| LPR4ZZ-GD369 | 81 | |
| LPR4ZZ-GD370 | 85 | |
| LPR4ZZ-GD371 | 92 | |
| LPR4ZZ-GD372 | 88 | |
| LPR4ZZ-GD373 | 96 | |
| LPR4ZZ-GD374 | 83 | |
| LPR4ZZ-GD375 | 92 | |
| LPR4ZZ-GD376 | 80 | |
| LPR4ZZ-GD377 | 77 | |
| LPR4ZZ-GD378 | 79 | |
| LPR4ZZ-GD379 | 73 | |
| LPR4ZZ-GD380 | 75 | |
| LPR4ZZ-GD381 | 82 | |

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|---|---|
| **Project Name:** LPR RI/FS Caged Bivalve Study | **Project No.:** Task 23.2 |
| **Date/Time:** 3/9/11 8:45 | **Field Crew Initials:** KT, AR, JH, TD |
| **Cage ID:** n/a | **Species:** Estuarine mussel (*Geukensia demissa*) |
| **Pre-deployment** | |
| **Comments:** Day 0 for Reaches 1-5 | |

| Specimen ID | Shell Length (cm) | Comments |
|---|---|---|
| LPR4ZZ-GD382 | 85 | |
| LPR4ZZ-GD383 | 75 | |
| LPR4ZZ-GD384 | 77 | |
| LPR4ZZ-GD385 | 84 | |
| LPR4ZZ-GD386 | 82 | |
| LPR4ZZ-GD387 | 88 | |
| LPR4ZZ-GD388 | 80 | |
| LPR4ZZ-GD389 | 81 | |
| LPR4ZZ-GD390 | 78 | |
| LPR4ZZ-GD391 | 95 | |
| LPR4ZZ-GD392 | 99 | |
| LPR4ZZ-GD393 | 108 | |
| LPR4ZZ-GD394 | 90 | |
| LPR4ZZ-GD395 | 85 | |
| LPR4ZZ-GD396 | 73 | |
| LPR4ZZ-GD397 | 82 | |
| LPR4ZZ-GD398 | 76 | |
| LPR4ZZ-GD399 | 76 | |
| LPR4ZZ-GD400 | 84 | |
| LPR4ZZ-GD401 | 91 | |
| LPR4ZZ-GD402 | 74 | |
| LPR4ZZ-GD403 | 78 | |
| LPR4ZZ-GD404 | 81.5 | |
| LPR4ZZ-GD405 | 79 | |
| LPR4ZZ-GD406 | 76 | |
| LPR4ZZ-GD407 | 85 | |
| LPR4ZZ-GD408 | 83 | |
| LPR4ZZ-GD409 | 76 | |
| LPR4ZZ-GD410 | 91 | |
| LPR4ZZ-GD411 | 92 | |
| LPR4ZZ-GD412 | 86 | |
| LPR4ZZ-GD413 | 97 | |

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|---|---|
| **Project Name:** LPR RI/FS Caged Bivalve Study | **Project No.:** Task 23.2 |
| **Date/Time:** 3/9/11 8:45 | **Field Crew Initials:** KT, AR, JH, TD |
| **Cage ID:** n/a | **Species:** Estuarine mussel (*Geukensia demissa*) |
| **Pre-deployment** | |
| **Comments:** Day 0 for Reaches 1-5 | |

| Specimen ID | Shell Length (cm) | Comments |
|---|---|---|
| LPR4ZZ-GD414 | 91 | |
| LPR4ZZ-GD415 | 87 | |
| LPR4ZZ-GD416 | 88 | |
| LPR4ZZ-GD417 | 100 | |
| LPR4ZZ-GD418 | 92 | |
| LPR4ZZ-GD419 | 84 | |
| LPR4ZZ-GD420 | 85 | |
| LPR4ZZ-GD421 | 90 | |
| LPR4ZZ-GD422 | 84 | |
| LPR4ZZ-GD423 | 83 | |
| LPR4ZZ-GD424 | 75 | |
| LPR4ZZ-GD425 | 86 | |
| LPR4ZZ-GD426 | 79 | |
| LPR4ZZ-GD427 | 78 | |
| LPR4ZZ-GD428 | 73 | |
| LPR4ZZ-GD429 | 85 | |
| LPR4ZZ-GD430 | 73 | |
| LPR4ZZ-GD431 | 77 | |
| LPR4ZZ-GD432 | 91 | |
| LPR4ZZ-GD433 | 75 | |
| LPR4ZZ-GD434 | 71 | |
| LPR4ZZ-GD435 | 73 | |
| LPR4ZZ-GD436 | 83 | |
| LPR4ZZ-GD437 | 80 | |
| LPR4ZZ-GD438 | 74 | |
| LPR4ZZ-GD439 | 76 | |
| LPR4ZZ-GD440 | 73 | |
| LPR4ZZ-GD441 | 90.5 | |
| LPR4ZZ-GD442 | 102 | |
| LPR4ZZ-GD443 | 108 | |
| LPR4ZZ-GD444 | 101 | |
| LPR4ZZ-GD445 | 90 | |

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|---|---|
| **Project Name:** LPR RI/FS Caged Bivalve Study | **Project No.:** Task 23.2 |
| **Date/Time:** 3/9/11 8:45 | **Field Crew Initials:** KT, AR, JH, TD |
| **Cage ID:** n/a | **Species:** Estuarine mussel (*Geukensia demissa*) |
| **Pre-deployment** | |
| **Comments:** Day 0 for Reaches 1-5 | |

| Specimen ID | Shell Length (cm) | Comments |
|---|---|---|
| LPR4ZZ-GD446 | 90.5 | |
| LPR4ZZ-GD447 | 88 | |
| LPR4ZZ-GD448 | 81.5 | |
| LPR4ZZ-GD449 | 81 | |
| LPR4ZZ-GD450 | 75 | |
| LPR4ZZ-GD451 | 98 | |
| LPR4ZZ-GD452 | 92 | |
| LPR4ZZ-GD453 | 82 | |
| LPR4ZZ-GD454 | 86 | |
| LPR4ZZ-GD455 | 78 | |
| LPR4ZZ-GD456 | 84.5 | |
| LPR4ZZ-GD457 | 94 | |
| LPR4ZZ-GD458 | 94 | |
| LPR4ZZ-GD459 | 80 | |
| LPR4ZZ-GD460 | 79 | |
| LPR4ZZ-GD461 | 89 | |
| LPR4ZZ-GD462 | 89.5 | |
| LPR4ZZ-GD463 | 103 | |
| LPR4ZZ-GD464 | 98 | |
| LPR4ZZ-GD465 | 88 | |
| LPR4ZZ-GD466 | 85 | |
| LPR4ZZ-GD467 | 84 | |
| LPR4ZZ-GD468 | 83 | |
| LPR4ZZ-GD469 | 88 | |
| LPR4ZZ-GD470 | 78 | |
| LPR4ZZ-GD471 | 81 | |
| LPR4ZZ-GD472 | 75 | |
| LPR4ZZ-GD473 | 80 | |
| LPR4ZZ-GD474 | 78 | |
| LPR4ZZ-GD475 | 85 | |
| LPR4ZZ-GD476 | 75 | |
| LPR4ZZ-GD477 | 86.5 | |

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|---|---|
| **Project Name:** LPR RI/FS Caged Bivalve Study | **Project No.:** Task 23.2 |
| **Date/Time:** 3/9/11 8:45 | **Field Crew Initials:** KT, AR, JH, TD |
| **Cage ID:** n/a | **Species:** Estuarine mussel (*Geukensia demissa*) |
| **Pre-deployment** | |
| **Comments:** Day 0 for Reaches 1-5 | |

| Specimen ID | Shell Length (cm) | Comments |
|---|---|---|
| LPR4ZZ-GD478 | 79 | |
| LPR4ZZ-GD479 | 81.5 | |
| LPR4ZZ-GD480 | 80 | |
| LPR5XX-GD481 | 106.5 | |
| LPR5XX-GD482 | 98 | |
| LPR5XX-GD483 | 91.5 | |
| LPR5XX-GD484 | 95 | |
| LPR5XX-GD485 | 100 | |
| LPR5XX-GD486 | 88 | |
| LPR5XX-GD487 | 89 | |
| LPR5XX-GD488 | 87 | |
| LPR5XX-GD489 | 90.5 | |
| LPR5XX-GD490 | 99.5 | |
| LPR5XX-GD491 | 87 | |
| LPR5XX-GD492 | 89 | |
| LPR5XX-GD493 | 97.5 | |
| LPR5XX-GD494 | 90 | |
| LPR5XX-GD495 | 89 | |
| LPR5XX-GD496 | 87 | |
| LPR5XX-GD497 | 89 | |
| LPR5XX-GD498 | 89 | |
| LPR5XX-GD499 | 85 | |
| LPR5XX-GD500 | 91 | |
| LPR5XX-GD501 | 84 | |
| LPR5XX-GD502 | 87 | |
| LPR5XX-GD503 | 84.5 | |
| LPR5XX-GD504 | 88.5 | |
| LPR5XX-GD505 | 76.5 | |
| LPR5XX-GD506 | 83.5 | |
| LPR5XX-GD507 | 82 | |
| LPR5XX-GD508 | 86 | |
| LPR5XX-GD509 | 82.5 | |

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|---|---|
| **Project Name:** LPR RI/FS Caged Bivalve Study | **Project No.:** Task 23.2 |
| **Date/Time:** 3/9/11 8:45 | **Field Crew Initials:** KT, AR, JH, TD |
| **Cage ID:** n/a | **Species:** Estuarine mussel (*Geukensia demissa*) |
| **Pre-deployment** | |
| **Comments:** Day 0 for Reaches 1-5 | |

| Specimen ID | Shell Length (cm) | Comments |
|---|---|---|
| LPR5XX-GD510 | 78.5 | |
| LPR5XX-GD511 | 83.5 | |
| LPR5XX-GD512 | 77 | |
| LPR5XX-GD513 | 76 | |
| LPR5XX-GD514 | 79 | |
| LPR5XX-GD515 | 77 | |
| LPR5XX-GD516 | 78 | |
| LPR5XX-GD517 | 74 | |
| LPR5XX-GD518 | 77 | |
| LPR5XX-GD519 | 78.5 | |
| LPR5XX-GD520 | 70 | |
| LPR5XX-GD521 | 111 | |
| LPR5XX-GD522 | 101.5 | |
| LPR5XX-GD523 | 100.5 | |
| LPR5XX-GD524 | 90 | |
| LPR5XX-GD525 | 105 | |
| LPR5XX-GD526 | 99 | |
| LPR5XX-GD527 | 96 | |
| LPR5XX-GD528 | 94.5 | |
| LPR5XX-GD529 | 92 | |
| LPR5XX-GD530 | 90.5 | |
| LPR5XX-GD531 | 94 | |
| LPR5XX-GD532 | 92 | |
| LPR5XX-GD533 | 90 | |
| LPR5XX-GD534 | 91 | |
| LPR5XX-GD535 | 94 | |
| LPR5XX-GD536 | 87.5 | |
| LPR5XX-GD537 | 93 | |
| LPR5XX-GD538 | 85.5 | |
| LPR5XX-GD539 | 85 | |
| LPR5XX-GD540 | 89.5 | |
| LPR5XX-GD541 | 95 | |

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|---|---|
| **Project Name:** LPR RI/FS Caged Bivalve Study | **Project No.:** Task 23.2 |
| **Date/Time:** 3/9/11 8:45 | **Field Crew Initials:** KT, AR, JH, TD |
| **Cage ID:** n/a | **Species:** Estuarine mussel (*Geukensia demissa*) |
| **Pre-deployment** | |
| **Comments:** Day 0 for Reaches 1-5 | |

| Specimen ID | Shell Length (cm) | Comments |
|---|---|---|
| LPR5XX-GD542 | 89 | |
| LPR5XX-GD543 | 90 | |
| LPR5XX-GD544 | 92 | |
| LPR5XX-GD545 | 92 | |
| LPR5XX-GD546 | 88 | |
| LPR5XX-GD547 | 82 | |
| LPR5XX-GD548 | 87.5 | |
| LPR5XX-GD549 | 79 | |
| LPR5XX-GD550 | 81 | |
| LPR5XX-GD551 | 85 | |
| LPR5XX-GD552 | 83 | |
| LPR5XX-GD553 | 86 | |
| LPR5XX-GD554 | 77.5 | |
| LPR5XX-GD555 | 83 | |
| LPR5XX-GD556 | 79 | |
| LPR5XX-GD557 | 88 | |
| LPR5XX-GD558 | 79 | |
| LPR5XX-GD559 | 75.5 | |
| LPR5XX-GD560 | 89 | |
| LPR5YY-GD561 | 86 | |
| LPR5YY-GD562 | 90 | |
| LPR5YY-GD563 | 88 | |
| LPR5YY-GD564 | 80.5 | |
| LPR5YY-GD565 | 85.5 | |
| LPR5YY-GD566 | 87 | |
| LPR5YY-GD567 | 82 | |
| LPR5YY-GD568 | 88 | |
| LPR5YY-GD569 | 76 | |
| LPR5YY-GD570 | 80.5 | |
| LPR5YY-GD571 | 91 | |
| LPR5YY-GD572 | 91 | |
| LPR5YY-GD573 | 107 | |

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|---|---|
| **Project Name:** LPR RI/FS Caged Bivalve Study | **Project No.:** Task 23.2 |
| **Date/Time:** 3/9/11 8:45 | **Field Crew Initials:** KT, AR, JH, TD |
| **Cage ID:** n/a | **Species:** Estuarine mussel (*Geukensia demissa*) |
| **Pre-deployment** | |
| **Comments:** Day 0 for Reaches 1-5 | |

| Specimen ID | Shell Length (cm) | Comments |
|---|---|---|
| LPR5YY-GD574 | 98 | |
| LPR5YY-GD575 | 100 | |
| LPR5YY-GD576 | 90 | |
| LPR5YY-GD577 | 89 | |
| LPR5YY-GD578 | 86 | |
| LPR5YY-GD579 | 85 | |
| LPR5YY-GD580 | 83 | |
| LPR5YY-GD581 | 80 | |
| LPR5YY-GD582 | 82 | |
| LPR5YY-GD583 | 80 | |
| LPR5YY-GD584 | 86 | |
| LPR5YY-GD585 | 77.5 | |
| LPR5YY-GD586 | 82 | |
| LPR5YY-GD587 | 80 | |
| LPR5YY-GD588 | 75.5 | |
| LPR5YY-GD589 | 78 | |
| LPR5YY-GD590 | 74 | |
| LPR5YY-GD591 | 80 | |
| LPR5YY-GD592 | 85 | |
| LPR5YY-GD593 | 82.5 | |
| LPR5YY-GD594 | 82 | |
| LPR5YY-GD595 | 85 | |
| LPR5YY-GD596 | 77.5 | |
| LPR5YY-GD597 | 72.5 | |
| LPR5YY-GD598 | 81 | |
| LPR5YY-GD599 | 81 | |
| LPR5YY-GD600 | 81.5 | |
| LPR5YY-GD601 | 100.5 | |
| LPR5YY-GD602 | 92 | |
| LPR5YY-GD603 | 94.5 | |
| LPR5YY-GD604 | 87 | |
| LPR5YY-GD605 | 95 | |

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|---|---|
| **Project Name:** LPR RI/FS Caged Bivalve Study | **Project No.:** Task 23.2 |
| **Date/Time:** 3/9/11 8:45 | **Field Crew Initials:** KT, AR, JH, TD |
| **Cage ID:** n/a | **Species:** Estuarine mussel (*Geukensia demissa*) |
| **Pre-deployment** | |
| **Comments:** Day 0 for Reaches 1-5 | |

| Specimen ID | Shell Length (cm) | Comments |
|---|---|---|
| LPR5YY-GD606 | 108 | |
| LPR5YY-GD607 | 93 | |
| LPR5YY-GD608 | 86 | |
| LPR5YY-GD609 | 83 | |
| LPR5YY-GD610 | 91.5 | |
| LPR5YY-GD611 | 89 | |
| LPR5YY-GD612 | 85.5 | |
| LPR5YY-GD613 | 88.5 | |
| LPR5YY-GD614 | 99 | |
| LPR5YY-GD615 | 93.5 | |
| LPR5YY-GD616 | 84 | |
| LPR5YY-GD617 | 100 | |
| LPR5YY-GD618 | 86 | |
| LPR5YY-GD619 | 88 | |
| LPR5YY-GD620 | 87 | |
| LPR5YY-GD621 | 89 | |
| LPR5YY-GD622 | 89 | |
| LPR5YY-GD623 | 78 | |
| LPR5YY-GD624 | 93 | |
| LPR5YY-GD625 | 81 | |
| LPR5YY-GD626 | 103.5 | |
| LPR5YY-GD627 | 94.5 | |
| LPR5YY-GD628 | 75 | |
| LPR5YY-GD629 | 80 | |
| LPR5YY-GD630 | 81 | |
| LPR5YY-GD631 | 81.5 | |
| LPR5YY-GD632 | 80 | |
| LPR5YY-GD633 | 79 | |
| LPR5YY-GD634 | 93 | |
| LPR5YY-GD635 | 99 | |
| LPR5YY-GD636 | 89 | |
| LPR5YY-GD637 | 95 | |

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|---|---|
| **Project Name:** LPR RI/FS Caged Bivalve Study | **Project No.:** Task 23.2 |
| **Date/Time:** 3/9/11 8:45 | **Field Crew Initials:** KT, AR, JH, TD |
| **Cage ID:** n/a | **Species:** Estuarine mussel (*Geukensia demissa*) |
| **Pre-deployment** | |
| **Comments:** Day 0 for Reaches 1-5 | |

| Specimen ID | Shell Length (cm) | Comments |
|---|---|---|
| LPR5YY-GD638 | 92 | |
| LPR5YY-GD639 | 99 | |
| LPR5YY-GD640 | 99 | |

# LPRSA Caged Bivalve Study Data Form

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|---|---|
| **Project Name:** LPR RI/FS Caged Bivalve Study | **Project No.:** Task 23.2 |
| **Date/Time:** 03/10/11 07:30 | **Field Crew Initials:** KT, AR, JH, TD |
| **Cage ID:** n/a | **Species:** Freshwater mussel (*Elliptio complanata)* |
| **Pre-deployment** | |
| **Comments:** Day 0 for Reaches 6-8 | |

| Specimen ID | Shell Length (cm) | Comments |
|---|---|---|
| LPR6UU-EC041 | 82 | |
| LPR6UU-EC042 | 87 | |
| LPR6UU-EC043 | 91.5 | |
| LPR6UU-EC044 | 92 | |
| LPR6UU-EC045 | 84 | |
| LPR6UU-EC046 | 97 | |
| LPR6UU-EC047 | 97 | |
| LPR6UU-EC048 | 89.5 | |
| LPR6UU-EC049 | 80 | |
| LPR6UU-EC050 | 89 | |
| LPR6UU-EC051 | 102 | |
| LPR6UU-EC052 | 85 | |
| LPR6UU-EC053 | 81 | |
| LPR6UU-EC054 | 82 | |
| LPR6UU-EC055 | 89 | |
| LPR6UU-EC056 | 90 | |
| LPR6UU-EC057 | 88 | |
| LPR6UU-EC058 | 80 | |
| LPR6UU-EC059 | 79 | |
| LPR6UU-EC060 | 83 | |
| LPR6UU-EC061 | 86 | |
| LPR6UU-EC062 | 90 | |
| LPR6UU-EC063 | 88 | |
| LPR6UU-EC064 | 76 | |
| LPR6UU-EC065 | 87.5 | |
| LPR6UU-EC066 | 89 | |
| LPR6UU-EC067 | 88 | |
| LPR6UU-EC068 | 80 | |
| LPR6UU-EC069 | 77 | |

| | |
|---|---|
| **Project Name:** LPR RI/FS Caged Bivalve Study | **Project No.:** Task 23.2 |
| **Date/Time:** 03/10/11 07:30 | **Field Crew Initials:** KT, AR, JH, TD |
| **Cage ID:** n/a | **Species:** Freshwater mussel (*Elliptio complanata)* |
| **Pre-deployment** | |
| **Comments:** Day 0 for Reaches 6-8 | |

| Specimen ID | Shell Length (cm) | Comments |
|---|---|---|
| LPR6UU-EC070 | 78 | |
| LPR6UU-EC071 | 83 | |
| LPR6UU-EC072 | 91 | |
| LPR6UU-EC073 | 83 | |
| LPR6UU-EC074 | 87 | |
| LPR6UU-EC075 | 79 | |
| LPR6UU-EC076 | 80 | |
| LPR6UU-EC077 | 94 | |
| LPR6UU-EC078 | 85 | |
| LPR6UU-EC079 | 81.5 | |
| LPR6UU-EC080 | 105 | |
| LPR6UU-EC081 | 90 | |
| LPR6UU-EC082 | 90.5 | |
| LPR6UU-EC083 | 82.5 | |
| LPR6UU-EC084 | 81 | |
| LPR6UU-EC085 | 87 | |
| LPR6UU-EC086 | 91 | |
| LPR6UU-EC087 | 77.5 | |
| LPR6UU-EC088 | 78 | |
| LPR6UU-EC089 | 95 | |
| LPR6UU-EC090 | 80 | |
| LPR6UU-EC091 | 90 | |
| LPR6UU-EC092 | 82 | |
| LPR6UU-EC093 | 87 | |
| LPR6UU-EC094 | 87.5 | |
| LPR6UU-EC095 | 98 | |
| LPR6UU-EC096 | 88.5 | |
| LPR6UU-EC097 | 82.5 | |
| LPR6UU-EC098 | 99 | |
| LPR6UU-EC099 | 79 | |
| LPR6UU-EC100 | 83 | |
| LPR7ZZ-EC101 | 94 | |

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|---|---|
| **Project Name:** LPR RI/FS Caged Bivalve Study | **Project No.:** Task 23.2 |
| **Date/Time:** 03/10/11 07:30 | **Field Crew Initials:** KT, AR, JH, TD |
| **Cage ID:** n/a | **Species:** Freshwater mussel (*Elliptio complanata)* |
| **Pre-deployment** | |
| **Comments:** Day 0 for Reaches 6-8 | |

| Specimen ID | Shell Length (cm) | Comments |
|---|---|---|
| LPR7ZZ-EC102 | 90 | |
| LPR7ZZ-EC103 | 84.5 | |
| LPR7ZZ-EC104 | 94 | |
| LPR7ZZ-EC105 | 80.5 | |
| LPR7ZZ-EC106 | 85 | |
| LPR7ZZ-EC107 | 77 | |
| LPR7ZZ-EC108 | 93 | |
| LPR7ZZ-EC109 | 81.5 | |
| LPR7ZZ-EC110 | 80.5 | |
| LPR7ZZ-EC111 | 96.5 | |
| LPR7ZZ-EC112 | 90 | |
| LPR7ZZ-EC113 | 108 | |
| LPR7ZZ-EC114 | 96 | |
| LPR7ZZ-EC115 | 89 | |
| LPR7ZZ-EC116 | 82 | |
| LPR7ZZ-EC117 | 100 | |
| LPR7ZZ-EC118 | 85 | |
| LPR7ZZ-EC119 | 74.5 | |
| LPR7ZZ-EC120 | 76 | |
| LPR7ZZ-EC121 | 85.5 | |
| LPR7ZZ-EC122 | 90 | |
| LPR7ZZ-EC123 | 79 | |
| LPR7ZZ-EC124 | 96 | |
| LPR7ZZ-EC125 | 91 | |
| LPR7ZZ-EC126 | 86 | |
| LPR7ZZ-EC127 | 84 | |
| LPR7ZZ-EC128 | 94.5 | |
| LPR7ZZ-EC129 | 79 | |
| LPR7ZZ-EC130 | 89 | |
| LPR7ZZ-EC131 | 87 | |
| LPR7ZZ-EC132 | 86 | |
| LPR7ZZ-EC133 | 80 | |

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|---|---|
| **Project Name:** LPR RI/FS Caged Bivalve Study | **Project No.:** Task 23.2 |
| **Date/Time:** 03/10/11 07:30 | **Field Crew Initials:** KT, AR, JH, TD |
| **Cage ID:** n/a | **Species:** Freshwater mussel (*Elliptio complanata)* |
| **Pre-deployment** | |
| **Comments:** Day 0 for Reaches 6-8 | |

| Specimen ID | Shell Length (cm) | Comments |
|---|---|---|
| LPR7ZZ-EC134 | 101 | |
| LPR7ZZ-EC135 | 80 | |
| LPR7ZZ-EC136 | 80.5 | |
| LPR7ZZ-EC137 | 85 | |
| LPR7ZZ-EC138 | 90.5 | |
| LPR7ZZ-EC139 | 82.5 | |
| LPR7ZZ-EC140 | 78.5 | |
| LPR7ZZ-EC141 | 85 | |
| LPR7ZZ-EC142 | 87 | |
| LPR7ZZ-EC143 | 85 | |
| LPR7ZZ-EC144 | 93 | |
| LPR7ZZ-EC145 | 91.5 | |
| LPR7ZZ-EC146 | 97 | |
| LPR7ZZ-EC147 | 95.5 | |
| LPR7ZZ-EC148 | 85.5 | |
| LPR7ZZ-EC149 | 84.5 | |
| LPR7ZZ-EC150 | 76 | |
| LPR7ZZ-EC151 | 82 | |
| LPR7ZZ-EC152 | 88 | |
| LPR7ZZ-EC153 | 78 | |
| LPR7ZZ-EC154 | 96 | |
| LPR7ZZ-EC155 | 91 | |
| LPR7ZZ-EC156 | 90 | |
| LPR7ZZ-EC157 | 80 | |
| LPR7ZZ-EC158 | 92 | |
| LPR7ZZ-EC159 | 91 | |
| LPR7ZZ-EC160 | 90 | |
| LPR7ZZ-EC161 | 88 | |
| LPR7ZZ-EC162 | 82 | |
| LPR7ZZ-EC163 | 85 | |
| LPR7ZZ-EC164 | 91 | |
| LPR7ZZ-EC165 | 80 | |

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|---|---|
| **Project Name:** LPR RI/FS Caged Bivalve Study | **Project No.:** Task 23.2 |
| **Date/Time:** 03/10/11 07:30 | **Field Crew Initials:** KT, AR, JH, TD |
| **Cage ID:** n/a | **Species:** Freshwater mussel (*Elliptio complanata)* |
| **Pre-deployment** | |
| **Comments:** Day 0 for Reaches 6-8 | |

| Specimen ID | Shell Length (cm) | Comments |
|---|---|---|
| LPR7ZZ-EC166 | 96.5 | |
| LPR7ZZ-EC167 | 84 | |
| LPR7ZZ-EC168 | 84.5 | |
| LPR7ZZ-EC169 | 78 | |
| LPR7ZZ-EC170 | 82 | |
| LPR7ZZ-EC171 | 91 | |
| LPR7ZZ-EC172 | 86 | |
| LPR7ZZ-EC173 | 87 | |
| LPR7ZZ-EC174 | 82.5 | |
| LPR7ZZ-EC175 | 81 | |
| LPR7ZZ-EC176 | 98 | |
| LPR7ZZ-EC177 | 85 | |
| LPR7ZZ-EC178 | 83 | |
| LPR7ZZ-EC179 | 88 | |
| LPR7ZZ-EC180 | 85.5 | |
| LPR7ZZ-EC181 | 90 | |
| LPR7ZZ-EC182 | 98.5 | |
| LPR7ZZ-EC183 | 84 | |
| LPR7ZZ-EC184 | 86 | |
| LPR7ZZ-EC185 | 91 | |
| LPR7ZZ-EC186 | 83 | |
| LPR7ZZ-EC187 | 91 | |
| LPR7ZZ-EC188 | 85 | |
| LPR7ZZ-EC189 | 83 | |
| LPR7ZZ-EC190 | 83.5 | |
| LPR7ZZ-EC191 | 82.5 | |
| LPR7ZZ-EC192 | 87.5 | |
| LPR7ZZ-EC193 | 102 | |
| LPR7ZZ-EC194 | 89 | |
| LPR7ZZ-EC195 | 100.5 | |
| LPR7ZZ-EC196 | 79 | |
| LPR7ZZ-EC197 | 93 | |

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|---|---|
| **Project Name:** LPR RI/FS Caged Bivalve Study | **Project No.:** Task 23.2 |
| **Date/Time:** 03/10/11 07:30 | **Field Crew Initials:** KT, AR, JH, TD |
| **Cage ID:** n/a | **Species:** Freshwater mussel (*Elliptio complanata)* |
| **Pre-deployment** | |
| **Comments:** Day 0 for Reaches 6-8 | |

| Specimen ID | Shell Length (cm) | Comments |
|---|---|---|
| LPR7ZZ-EC198 | 79 | |
| LPR7ZZ-EC199 | 81 | |
| LPR7ZZ-EC200 | 83 | |
| LPR7ZZ-EC201 | 87.5 | |
| LPR7ZZ-EC202 | 97 | |
| LPR7ZZ-EC203 | 97.5 | |
| LPR7ZZ-EC204 | 81.5 | |
| LPR7ZZ-EC205 | 85 | |
| LPR7ZZ-EC206 | 92.5 | |
| LPR7ZZ-EC207 | 78 | |
| LPR7ZZ-EC208 | 89 | |
| LPR7ZZ-EC209 | 82 | |
| LPR7ZZ-EC210 | 86 | |
| LPR7ZZ-EC211 | 98 | |
| LPR7ZZ-EC212 | 86 | |
| LPR7ZZ-EC213 | 83 | |
| LPR7ZZ-EC214 | 89 | |
| LPR7ZZ-EC215 | 82 | |
| LPR7ZZ-EC216 | 90 | |
| LPR7ZZ-EC217 | 83 | |
| LPR7ZZ-EC218 | 90.5 | |
| LPR7ZZ-EC219 | 86 | |
| LPR7ZZ-EC220 | 84 | |
| LPR7AB-EC221 | 81 | |
| LPR7AB-EC222 | 85 | |
| LPR7AB-EC223 | 95 | |
| LPR7AB-EC224 | 82.5 | |
| LPR7AB-EC225 | 78.5 | |
| LPR7AB-EC226 | 98 | |
| LPR7AB-EC227 | 84 | |
| LPR7AB-EC228 | 88 | |
| LPR7AB-EC229 | 81 | |

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|---|---|
| **Project Name:** LPR RI/FS Caged Bivalve Study | **Project No.:** Task 23.2 |
| **Date/Time:** 03/10/11 07:30 | **Field Crew Initials:** KT, AR, JH, TD |
| **Cage ID:** n/a | **Species:** Freshwater mussel (*Elliptio complanata)* |
| **Pre-deployment** | |
| **Comments:** Day 0 for Reaches 6-8 | |

| Specimen ID | Shell Length (cm) | Comments |
|---|---|---|
| LPR7AB-EC230 | 89.5 | |
| LPR7AB-EC231 | 98.5 | |
| LPR7AB-EC232 | 89 | |
| LPR7AB-EC233 | 87.5 | |
| LPR7AB-EC234 | 83 | |
| LPR7AB-EC235 | 89 | |
| LPR7AB-EC236 | 84 | |
| LPR7AB-EC237 | 96.5 | |
| LPR7AB-EC238 | 82 | |
| LPR7AB-EC239 | 88.5 | |
| LPR7AB-EC240 | 84.5 | |
| LPR7AB-EC241 | 89.5 | |
| LPR7AB-EC242 | 88 | |
| LPR7AB-EC243 | 80 | |
| LPR7AB-EC244 | 88 | |
| LPR7AB-EC245 | 95 | |
| LPR7AB-EC246 | 90 | |
| LPR7AB-EC247 | 85 | |
| LPR7AB-EC248 | 77 | |
| LPR7AB-EC249 | 82.5 | |
| LPR7AB-EC250 | 93.5 | |
| LPR7AB-EC251 | 88 | |
| LPR7AB-EC252 | 93 | |
| LPR7AB-EC253 | 109.5 | |
| LPR7AB-EC254 | 79.5 | |
| LPR7AB-EC255 | 87 | |
| LPR7AB-EC256 | 97.5 | |
| LPR7AB-EC257 | 88.5 | |
| LPR7AB-EC258 | 88 | |
| LPR7AB-EC259 | 87.5 | |
| LPR7AB-EC260 | 77 | |
| LPR7AB-EC261 | 78 | |

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|---|---|
| **Project Name:** LPR RI/FS Caged Bivalve Study | **Project No.:** Task 23.2 |
| **Date/Time:** 03/10/11 07:30 | **Field Crew Initials:** KT, AR, JH, TD |
| **Cage ID:** n/a | **Species:** Freshwater mussel (*Elliptio complanata)* |
| **Pre-deployment** | |
| **Comments:** Day 0 for Reaches 6-8 | |

| Specimen ID | Shell Length (cm) | Comments |
|---|---|---|
| LPR7AB-EC262 | 85 | |
| LPR7AB-EC263 | 87 | |
| LPR7AB-EC264 | 79 | |
| LPR7AB-EC265 | 86.5 | |
| LPR7AB-EC266 | 82.5 | |
| LPR7AB-EC267 | 80.5 | |
| LPR7AB-EC268 | 79.5 | |
| LPR7AB-EC269 | 87 | |
| LPR7AB-EC270 | 80 | |
| LPR7AB-EC271 | 86 | |
| LPR7AB-EC272 | 84 | |
| LPR7AB-EC273 | 91.5 | |
| LPR7AB-EC274 | 87 | |
| LPR7AB-EC275 | 80.5 | |
| LPR7AB-EC276 | 85 | |
| LPR7AB-EC277 | 82 | |
| LPR7AB-EC278 | 91 | |
| LPR7AB-EC279 | 87.5 | |
| LPR7AB-EC280 | 86 | |
| LPR8AC-EC281 | 92 | |
| LPR8AC-EC282 | 82 | |
| LPR8AC-EC283 | 90 | |
| LPR8AC-EC284 | 93 | |
| LPR8AC-EC285 | 91 | |
| LPR8AC-EC286 | 87 | |
| LPR8AC-EC287 | 83 | |
| LPR8AC-EC288 | 99 | |
| LPR8AC-EC289 | 71.5 | |
| LPR8AC-EC290 | 80 | |
| LPR8AC-EC291 | 97 | |
| LPR8AC-EC292 | 82 | |
| LPR8AC-EC293 | 83 | |

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|---|---|
| **Project Name:** LPR RI/FS Caged Bivalve Study | **Project No.:** Task 23.2 |
| **Date/Time:** 03/10/11 07:30 | **Field Crew Initials:** KT, AR, JH, TD |
| **Cage ID:** n/a | **Species:** Freshwater mussel (*Elliptio complanata)* |
| **Pre-deployment** | |
| **Comments:** Day 0 for Reaches 6-8 | |

| Specimen ID | Shell Length (cm) | Comments |
|---|---|---|
| LPR8AC-EC294 | 84 | |
| LPR8AC-EC295 | 83 | |
| LPR8AC-EC296 | 82 | |
| LPR8AC-EC297 | 83 | |
| LPR8AC-EC298 | 73 | |
| LPR8AC-EC299 | 82 | |
| LPR8AC-EC300 | 94 | |
| LPR8AC-EC301 | 103 | |
| LPR8AC-EC302 | 89 | |
| LPR8AC-EC303 | 118 | |
| LPR8AC-EC304 | 85 | |
| LPR8AC-EC305 | 91 | |
| LPR8AC-EC306 | 90 | |
| LPR8AC-EC307 | 92 | |
| LPR8AC-EC308 | 96 | |
| LPR8AC-EC309 | 85 | |
| LPR8AC-EC310 | 81 | |
| LPR8AC-EC311 | 94 | |
| LPR8AC-EC312 | 83 | |
| LPR8AC-EC313 | 80.5 | |
| LPR8AC-EC314 | 85 | |
| LPR8AC-EC315 | 79 | |
| LPR8AC-EC316 | 83 | |
| LPR8AC-EC317 | 80 | |
| LPR8AC-EC318 | 85 | |
| LPR8AC-EC319 | 83 | |
| LPR8AC-EC320 | 104 | |
| LPR8AC-EC321 | 89 | |
| LPR8AC-EC322 | 83 | |
| LPR8AC-EC323 | 79 | |
| LPR8AC-EC324 | 84 | |
| LPR8AC-EC325 | 90.5 | |

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|---|---|
| **Project Name:** LPR RI/FS Caged Bivalve Study | **Project No.:** Task 23.2 |
| **Date/Time:** 03/10/11 07:30 | **Field Crew Initials:** KT, AR, JH, TD |
| **Cage ID:** n/a | **Species:** Freshwater mussel (*Elliptio complanata)* |
| **Pre-deployment** | |
| **Comments:** Day 0 for Reaches 6-8 | |

| Specimen ID | Shell Length (cm) | Comments |
|---|---|---|
| LPR8AC-EC326 | 87 | |
| LPR8AC-EC327 | 91.5 | |
| LPR8AC-EC328 | 80 | |
| LPR8AC-EC329 | 76.5 | |
| LPR8AC-EC330 | 84 | |
| LPR8AC-EC331 | 95 | |
| LPR8AC-EC332 | 84 | |
| LPR8AC-EC333 | 78 | |
| LPR8AC-EC334 | 80 | |
| LPR8AC-EC335 | 89 | |
| LPR8AC-EC336 | 82.5 | |
| LPR8AC-EC337 | 80 | |
| LPR8AC-EC338 | 77 | |
| LPR8AC-EC339 | 93 | |
| LPR8AC-EC340 | 83 | |
| LPR6VV-EC341 | 84 | |
| LPR6VV-EC342 | 89 | |
| LPR6VV-EC343 | 84.5 | |
| LPR6VV-EC344 | 87.5 | |
| LPR6VV-EC345 | 91 | |
| LPR6VV-EC346 | 84 | |
| LPR6VV-EC347 | 79 | |
| LPR6VV-EC348 | 81 | |
| LPR6VV-EC349 | 88 | |
| LPR6VV-EC350 | 81 | |
| LPR6VV-EC351 | 92 | |
| LPR6VV-EC352 | 95 | |
| LPR6VV-EC353 | 76 | |
| LPR6VV-EC354 | 90 | |
| LPR6VV-EC355 | 94 | |
| LPR6VV-EC356 | 89 | |
| LPR6VV-EC357 | 89 | |

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|---|---|
| **Project Name:** LPR RI/FS Caged Bivalve Study | **Project No.:** Task 23.2 |
| **Date/Time:** 03/10/11 07:30 | **Field Crew Initials:** KT, AR, JH, TD |
| **Cage ID:** n/a | **Species:** Freshwater mussel (*Elliptio complanata)* |
| **Pre-deployment** | |
| **Comments:** Day 0 for Reaches 6-8 | |

| Specimen ID | Shell Length (cm) | Comments |
|---|---|---|
| LPR6VV-EC358 | 82.5 | |
| LPR6VV-EC359 | 93 | |
| LPR6VV-EC360 | 80 | |
| LPR6VV-EC361 | 78.5 | |
| LPR6VV-EC362 | 90 | |
| LPR6VV-EC363 | 95.5 | |
| LPR6VV-EC364 | 95.5 | |
| LPR6VV-EC365 | 89 | |
| LPR6VV-EC366 | 84 | |
| LPR6VV-EC367 | 78 | |
| LPR6VV-EC368 | 89 | |
| LPR6VV-EC369 | 83 | |
| LPR6VV-EC370 | 90 | |
| LPR6VV-EC371 | 76 | |
| LPR6VV-EC372 | 78.5 | |
| LPR6VV-EC373 | 80 | |
| LPR6VV-EC374 | 90 | |
| LPR6VV-EC375 | 81 | |
| LPR6VV-EC376 | 76 | |
| LPR6VV-EC377 | 81.5 | |
| LPR6VV-EC378 | 82.5 | |
| LPR6VV-EC379 | 81 | |
| LPR6VV-EC380 | 81.5 | |
| LPR6VV-EC381 | 81 | |
| LPR6VV-EC382 | 84 | |
| LPR6VV-EC383 | 81 | |
| LPR6VV-EC384 | 82 | |
| LPR6VV-EC385 | 77 | |
| LPR6VV-EC386 | 79.5 | |
| LPR6VV-EC387 | 79.5 | |
| LPR6VV-EC388 | 86 | |
| LPR6VV-EC389 | 81 | |

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|---|---|
| **Project Name:** LPR RI/FS Caged Bivalve Study | **Project No.:** Task 23.2 |
| **Date/Time:** 03/10/11 07:30 | **Field Crew Initials:** KT, AR, JH, TD |
| **Cage ID:** n/a | **Species:** Freshwater mussel (*Elliptio complanata)* |
| **Pre-deployment** | |
| **Comments:** Day 0 for Reaches 6-8 | |

| Specimen ID | Shell Length (cm) | Comments |
|---|---|---|
| LPR6VV-EC390 | 81.5 | |
| LPR6VV-EC391 | 83.5 | |
| LPR6VV-EC392 | 84 | |
| LPR6VV-EC393 | 82 | |
| LPR6VV-EC394 | 81 | |
| LPR6VV-EC395 | 79.5 | |
| LPR6VV-EC396 | 77.5 | |
| LPR6VV-EC397 | 78 | |
| LPR6VV-EC398 | 78.5 | |
| LPR6VV-EC399 | 79 | |
| LPR6VV-EC400 | 88.5 | |

# LPRSA Caged Bivalve Study Data Form

| | |
|---|---|
| **Project Name:** LPR RI/FS Caged Bivalve Study | **Project No.:** Task 23.2 |
| **Date/Time:** 3/23/11 07:00 | **Field Crew Initials:** AR, TD |
| **Cage ID:** n/a | **Species:** Ribbed mussel (*Geukensia demissa*) |
| **Post deployment** | |
| **Comments:** Day 14 for Reaches 1-5 | |

| Specimen ID | Shell Length (cm) | Comments |
|---|---|---|
| LPR1XX-GD001 | 92 | |
| LPR1XX-GD002 | 88 | |
| LPR1XX-GD003 | 103.5 | |
| LPR1XX-GD004 | 106.5 | |
| LPR1XX-GD005 | 81 | |
| LPR1XX-GD006 | 94.5 | |
| LPR1XX-GD007 | 73.5 | |
| LPR1XX-GD008 | 85.5 | |
| LPR1XX-GD009 | 76.5 | Sacrificed for health assessment |
| LPR1XX-GD010 | 87 | Sacrificed for health assessment |
| LPR2AD-GD081 | 75 | |
| LPR2AD-GD082 | 96 | |
| LPR2AD-GD083 | 95 | |
| LPR2AD-GD084 | 84 | |
| LPR2AD-GD085 | 82.5 | |
| LPR2AD-GD086 | 96 | |
| LPR2AD-GD087 | 97 | |
| LPR2AD-GD088 | 92 | |
| LPR2AD-GD089 | 89.5 | Sacrificed for health assessment |
| LPR2AD-GD090 | 80 | Sacrificed for health assessment |
| LPR3SS-GD161 | 78.5 | |
| LPR3SS-GD162 | 101 | |
| LPR3SS-GD163 | 86.5 | |
| LPR3SS-GD164 | 91 | |
| LPR3SS-GD165 | 95 | |
| LPR3SS-GD166 | 77 | |
| LPR3SS-GD167 | 81 | |
| LPR3SS-GD168 | 91 | |
| LPR3SS-GD169 | 81 | Sacrificed for health assessment |
| LPR3SS-GD170 | 88 | Sacrificed for health assessment |
| LPR3SS-GD206 | Dead | |

**Project Name:** LPR RI/FS Caged Bivalve Study | **Project No.:** Task 23.2

**Date/Time:** 3/23/11 07:00 | **Field Crew Initials:** AR, TD

**Cage ID:** n/a | **Species:** Ribbed mussel (*Geukensia demissa*)

**Post deployment**

**Comments:** Day 14 for Reaches 1-5

| | | |
|---|---|---|
| LPR3SS-GD210 | Dead | |
| LPR4AB-GD241 | 112 | |
| LPR4AB-GD242 | 94 | |
| LPR4AB-GD243 | 86 | |
| LPR4AB-GD244 | 91 | |
| LPR4AB-GD245 | 91 | |
| LPR4AB-GD246 | 88 | |
| LPR4AB-GD247 | Dead | |
| LPR4AB-GD248 | 85 | |
| LPR4AB-GD249 | 96.5 | Sacrificed for health assessment |
| LPR4AB-GD250 | 95 | Sacrificed for health assessment |
| LPR4AB-GD251 | 84 | |
| LPR4ZZ-GD321 | 101 | |
| LPR4ZZ-GD322 | 91 | |
| LPR4ZZ-GD323 | 90 | |
| LPR4ZZ-GD324 | 98 | |
| LPR4ZZ-GD325 | 100 | |
| LPR4ZZ-GD326 | 105 | |
| LPR4ZZ-GD327 | 106 | |
| LPR4ZZ-GD328 | 98 | |
| LPR4ZZ-GD329 | 97 | Sacrificed for health assessment |
| LPR4ZZ-GD330 | 104 | Sacrificed for health assessment |
| LPR4ZZ-GD331 | 91 | |
| LPR4ZZ-GD332 | 94 | |
| LPR4ZZ-GD333 | 89 | |
| LPR4ZZ-GD334 | 110 | |
| LPR4ZZ-GD335 | 105 | |
| LPR4ZZ-GD336 | 85 | |
| LPR4ZZ-GD337 | 85 | Sacrificed for health assessment |
| LPR4ZZ-GD338 | 87 | |
| LPR5XX-GD481 | 106 | |
| LPR5XX-GD482 | 97.5 | |
| LPR5XX-GD483 | 90 | |
| LPR5XX-GD484 | 93.5 | |
| LPR5XX-GD490 | 99 | Sacrificed for health assessment |
| LPR5XX-GD501 | Lost | |

**Project Name:** LPR RI/FS Caged Bivalve Study **Project No.:** Task 23.2

**Date/Time:** 3/23/11 07:00 **Field Crew Initials:** AR, TD

**Cage ID:** n/a **Species:** Ribbed mussel (*Geukensia demissa*)

**Post deployment**

**Comments:** Day 14 for Reaches 1-5

| | | |
|---|---|---|
| LPR5XX-GD502 | Lost | |
| LPR5XX-GD503 | Lost | |
| LPR5XX-GD504 | Lost | |
| LPR5XX-GD505 | Lost | |
| LPR5XX-GD506 | Lost | |
| LPR5XX-GD507 | Lost | |
| LPR5XX-GD508 | Lost | |
| LPR5XX-GD509 | Lost | |
| LPR5XX-GD510 | Lost | |
| LPR5XX-GD531 | Lost | |
| LPR5XX-GD532 | Lost | |
| LPR5XX-GD533 | Lost | |
| LPR5XX-GD534 | Lost | |
| LPR5XX-GD535 | Lost | |
| LPR5XX-GD536 | Lost | |
| LPR5XX-GD537 | Lost | |
| LPR5XX-GD538 | Lost | |
| LPR5XX-GD539 | Lost | |
| LPR5XX-GD540 | Lost | |
| LPR5XX-GD541 | Lost | |
| LPR5XX-GD542 | Lost | |
| LPR5XX-GD543 | Lost | |
| LPR5XX-GD544 | Lost | |
| LPR5XX-GD545 | Lost | |
| LPR5XX-GD546 | Lost | |
| LPR5XX-GD547 | Lost | |
| LPR5XX-GD548 | Lost | |
| LPR5XX-GD549 | Lost | |
| LPR5XX-GD550 | Lost | |
| LPR5XX-GD551 | Lost | |
| LPR5XX-GD552 | Lost | |
| LPR5XX-GD553 | Lost | |
| LPR5XX-GD554 | Lost | |
| LPR5XX-GD555 | Lost | |
| LPR5XX-GD556 | Lost | |
| LPR5XX-GD557 | Lost | |

**Project Name:** LPR RI/FS Caged Bivalve Study | **Project No.:** Task 23.2

**Date/Time:** 3/23/11 07:00 | **Field Crew Initials:** AR, TD

**Cage ID:** n/a | **Species:** Ribbed mussel (*Geukensia demissa*)

**Post deployment**

**Comments:** Day 14 for Reaches 1-5

| | | |
|---|---|---|
| LPR5XX-GD558 | Lost | |
| LPR5XX-GD559 | Lost | |
| LPR5XX-GD560 | Lost | |
| LPR5YY-GD561 | 84 | |
| LPR5YY-GD562 | 89 | |
| LPR5YY-GD563 | 87.5 | |
| LPR5YY-GD564 | 83.5 | |
| LPR5YY-GD565 | Dead | |
| LPR5YY-GD566 | 87.5 | |
| LPR5YY-GD567 | 82.5 | |
| LPR5YY-GD568 | 87.5 | |
| LPR5YY-GD569 | 76 | Sacrificed for health assessment |
| LPR5YY-GD570 | 81 | Sacrificed for health assessment |
| LPR5YY-GD581 | 79.5 | |

# LPRSA Caged Bivalve Study Data Form

| | |
|---|---|
| **Project Name:** LPR RI/FS Caged Bivalve Study | **Project No.:** Task 23.2 |
| **Date/Time:** 3/24/11 07:15 | **Field Crew Initials:** AR, TD |
| **Cage ID:** n/a | **Species:** Freshwater mussel (*Elliptio complanata)* |
| **Post deployment** | |
| **Comments:** Day 14 for Reaches 6-8 | |

| Specimen ID | Shell Length (cm) | Comments |
|---|---|---|
| LPR6UU-EC041 | 82 | |
| LPR6UU-EC042 | 86 | |
| LPR6UU-EC043 | 93 | |
| LPR6UU-EC044 | 90.5 | |
| LPR6UU-EC045 | 83.5 | |
| LPR6UU-EC046 | 95 | |
| LPR6UU-EC049 | 78 | Sacrificed for health assessment |
| LPR6UU-EC050 | 90 | Sacrificed for health assessment |
| LPR7ZZ-EC101 | Lost | |
| LPR7ZZ-EC102 | Lost | |
| LPR7ZZ-EC103 | Lost | |
| LPR7ZZ-EC104 | Lost | |
| LPR7ZZ-EC105 | Lost | |
| LPR7ZZ-EC106 | Lost | |
| LPR7ZZ-EC107 | Lost | |
| LPR7ZZ-EC108 | Lost | |
| LPR7ZZ-EC109 | Lost | |
| LPR7ZZ-EC110 | Lost | |
| LPR7ZZ-EC111 | Lost | |
| LPR7ZZ-EC112 | Lost | |
| LPR7ZZ-EC113 | Lost | |
| LPR7ZZ-EC114 | Lost | |
| LPR7ZZ-EC115 | Lost | |
| LPR7ZZ-EC116 | Lost | |
| LPR7ZZ-EC117 | Lost | |
| LPR7ZZ-EC118 | Lost | |
| LPR7ZZ-EC119 | Lost | |
| LPR7ZZ-EC120 | Lost | |
| LPR7ZZ-EC121 | 85 | |
| LPR7ZZ-EC122 | 89 | |
| LPR7ZZ-EC123 | 78 | |
| LPR7ZZ-EC124 | 97 | |

| | |
|---|---|
| **Project Name:** LPR RI/FS Caged Bivalve Study | **Project No.:** Task 23.2 |
| **Date/Time:** 3/24/11 07:15 | **Field Crew Initials:** AR, TD |
| **Cage ID:** n/a | **Species:** Freshwater mussel (*Elliptio complanata)* |
| **Post deployment** | |
| **Comments:** Day 14 for Reaches 6-8 | |

| Specimen ID | Shell Length (cm) | Comments |
|---|---|---|
| LPR7ZZ-EC125 | 91 | |
| LPR7ZZ-EC126 | 85.5 | |
| LPR7ZZ-EC127 | 84 | |
| LPR7ZZ-EC128 | 94 | |
| LPR7ZZ-EC129 | 78 | |
| LPR7ZZ-EC130 | Dead | |
| LPR7ZZ-EC140 | 77.5 | Sacrificed for health assessment |
| LPR7ZZ-EC191 | Lost | |
| LPR7ZZ-EC192 | Lost | |
| LPR7ZZ-EC193 | Lost | |
| LPR7ZZ-EC194 | Lost | |
| LPR7ZZ-EC195 | Lost | |
| LPR7ZZ-EC196 | Lost | |
| LPR7ZZ-EC197 | Lost | |
| LPR7ZZ-EC198 | Lost | |
| LPR7ZZ-EC199 | Lost | |
| LPR7ZZ-EC200 | Lost | |
| LPR7AB-EC221 | 80 | |
| LPR7AB-EC222 | 85.5 | |
| LPR7AB-EC223 | 90 | |
| LPR7AB-EC224 | 83.5 | |
| LPR7AB-EC225 | 79 | |
| LPR7AB-EC226 | 98 | |
| LPR7AB-EC229 | 79 | Sacrificed for health assessment |
| LPR7AB-EC230 | 89 | Sacrificed for health assessment |
| LPR8AC-EC281 | 92 | |
| LPR8AC-EC282 | 82.5 | |
| LPR8AC-EC283 | 89.5 | |
| LPR8AC-EC284 | 92 | |
| LPR8AC-EC285 | 91.5 | |
| LPR8AC-EC286 | 86 | |
| LPR8AC-EC289 | 71 | Sacrificed for health assessment |
| LPR8AC-EC290 | 78 | Sacrificed for health assessment |
| LPR6VV-EC341 | 83 | |

| | |
|---|---|
| **Project Name:** LPR RI/FS Caged Bivalve Study | **Project No.:** Task 23.2 |
| **Date/Time:** 3/24/11 07:15 | **Field Crew Initials:** AR, TD |
| **Cage ID:** n/a | **Species:** Freshwater mussel (*Elliptio complanata)* |
| **Post deployment** | |
| **Comments:** Day 14 for Reaches 6-8 | |

| Specimen ID | Shell Length (cm) | Comments |
|---|---|---|
| LPR6VV-EC342 | 89 | |
| LPR6VV-EC343 | 84 | |
| LPR6VV-EC344 | 87 | |
| LPR6VV-EC345 | 95 | |
| LPR6VV-EC346 | 81 | |
| LPR6VV-EC349 | 86 | Sacrificed for health assessment |
| LPR6VV-EC350 | 81.5 | Sacrificed for health assessment |

# LPRSA Caged Bivalve Study Data Form

| | |
|---|---|
| **Project Name:** LPR RI/FS Caged Bivalve Study | **Project No.:** Task 23.2 |
| **Date/Time:** 4/13/11 07:00 | **Field Crew Initials:** JF, TD |
| **Cage ID:** n/a | **Species:** Ribbed mussel (*Geukensia demissa*) |
| **Post deployment** | |
| **Comments:** Day 35 for Reaches 1-5 | |

| Specimen ID | Shell Length (cm) | Comments |
|---|---|---|
| LPR1XX-GD001 | 93.5 | |
| LPR1XX-GD002 | 87.5 | |
| LPR1XX-GD003 | 102.5 | |
| LPR1XX-GD004 | 107 | |
| LPR1XX-GD005 | 80.5 | |
| LPR1XX-GD006 | 95 | |
| LPR1XX-GD007 | 72 | |
| LPR1XX-GD008 | 86 | |
| LPR1XX-GD011 | 79 | Sacrificed for health assessment |
| LPR1XX-GD012 | 78 | Sacrificed for health assessment |
| LPR2AD-GD081 | 74.5 | |
| LPR2AD-GD082 | 94.5 | |
| LPR2AD-GD083 | 95 | |
| LPR2AD-GD084 | 84.5 | |
| LPR2AD-GD085 | 82 | |
| LPR2AD-GD086 | 96.5 | |
| LPR2AD-GD087 | 96.5 | |
| LPR2AD-GD088 | 92.5 | |
| LPR2AD-GD091 | 76.5 | Sacrificed for health assessment |
| LPR2AD-GD092 | Dead | |
| LPR2AD-GD093 | 76 | Sacrificed for health assessment |
| LPR2AD-GD109 | Dead | |
| LPR3SS-GD161 | 78 | |
| LPR3SS-GD162 | 101 | |
| LPR3SS-GD163 | 86 | |
| LPR3SS-GD164 | Dead | |
| LPR3SS-GD165 | 95.5 | |
| LPR3SS-GD166 | 75.5 | |
| LPR3SS-GD167 | 81 | |
| LPR3SS-GD168 | 92 | |
| LPR3SS-GD171 | 105.5 | Sacrificed for health assessment |

**Project Name:** LPR RI/FS Caged Bivalve Study **Project No.:** Task 23.2

**Date/Time:** 4/13/11 07:00 **Field Crew Initials:** JF, TD

**Cage ID:** n/a **Species:** Ribbed mussel (*Geukensia demissa*)

**Post deployment**

**Comments:** Day 35 for Reaches 1-5

| | | |
|---|---|---|
| LPR3SS-GD172 | 88.5 | Sacrificed for health assessment |
| LPR3SS-GD186 | Dead | |
| LPR3SS-GD220 | Dead | |
| LPR4AB-GD241 | 112 | |
| LPR4AB-GD242 | 94.5 | |
| LPR4AB-GD243 | 85 | |
| LPR4AB-GD244 | 91.5 | |
| LPR4AB-GD245 | 91.5 | |
| LPR4AB-GD246 | 87 | |
| LPR4AB-GD248 | 85 | |
| LPR4AB-GD251 | Dead | |
| LPR4AB-GD252 | 85.5 | Sacrificed for health assessment |
| LPR4AB-GD253 | 79 | Sacrificed for health assessment |
| LPR4AB-GD274 | Dead | |
| LPR4AB-GD283 | Dead | |
| LPR4AB-GD285 | Dead | |
| LPR4AB-GD291 | Dead | |
| LPR4AB-GD298 | Dead | |
| LPR4AB-GD306 | Dead | |
| LPR4ZZ-GD321 | 100 | |
| LPR4ZZ-GD322 | 90.5 | |
| LPR4ZZ-GD323 | 90 | |
| LPR4ZZ-GD324 | Dead | |
| LPR4ZZ-GD325 | 101 | |
| LPR4ZZ-GD326 | Dead | |
| LPR4ZZ-GD327 | 105 | |
| LPR4ZZ-GD328 | 96.5 | |
| LPR4ZZ-GD331 | 91 | |
| LPR4ZZ-GD332 | 96 | |
| LPR4ZZ-GD333 | Dead | |
| LPR4ZZ-GD334 | Dead | |
| LPR4ZZ-GD335 | 106.5 | |
| LPR4ZZ-GD336 | 87 | |
| LPR4ZZ-GD337 | 86 | Sacrificed for health assessment |
| LPR4ZZ-GD338 | Dead | |
| LPR4ZZ-GD339 | 102 | Sacrificed for health assessment |

**Project Name:** LPR RI/FS Caged Bivalve Study **Project No.:** Task 23.2

**Date/Time:** 4/13/11 07:00 **Field Crew Initials:** JF, TD

**Cage ID:** n/a **Species:** Ribbed mussel (*Geukensia demissa*)

**Post deployment**

**Comments:** Day 35 for Reaches 1-5

| | | |
|---|---|---|
| LPR4ZZ-GD340 | Dead | |
| LPR4ZZ-GD345 | Dead | |
| LPR4ZZ-GD355 | Dead | |
| LPR4ZZ-GD410 | Dead | |
| LPR4ZZ-GD412 | Dead | |
| LPR4ZZ-GD429 | Dead | |
| LPR4ZZ-GD457 | Dead | |
| LPR4ZZ-GD478 | Dead | |
| LPR5XX-GD481 | 105.5 | |
| LPR5XX-GD482 | 98 | |
| LPR5XX-GD483 | Dead | |
| LPR5XX-GD484 | 93.5 | |
| LPR5XX-GD488 | Dead | |
| LPR5XX-GD522 | Dead | |
| LPR5XX-GD525 | Dead | |
| LPR5XX-GD526 | Dead | |
| LPR5XX-GD529 | Dead | |
| LPR5YY-GD561 | 84.5 | |
| LPR5YY-GD562 | 88.5 | |
| LPR5YY-GD563 | Dead | |
| LPR5YY-GD564 | Dead | |
| LPR5YY-GD566 | 86 | |
| LPR5YY-GD567 | 82 | |
| LPR5YY-GD568 | 87.5 | |
| LPR5YY-GD571 | 90 | Sacrificed for health assessment |
| LPR5YY-GD572 | 91 | Sacrificed for health assessment |
| LPR5YY-GD575 | Dead | |
| LPR5YY-GD576 | Dead | |
| LPR5YY-GD606 | Dead | |
| LPR5YY-GD612 | Dead | |
| LPR5YY-GD617 | Dead | |
| LPR5YY-GD625 | Dead | |
| LPR5YY-GD629 | Dead | |
| LPR5YY-GD635 | Dead | |

# LPRSA Caged Bivalve Study Data Form

| | |
|---|---|
| **Project Name:** LPR RI/FS Caged Bivalve Study | **Project No.:** Task 23.2 |
| **Date/Time:** 4/14/11 07:00 | **Field Crew Initials:** JF, TD |
| **Cage ID:** n/a | **Species:** Freshwater mussel (*Elliptio complanata)* |
| **Post deployment** | |
| **Comments:** Day 35 for Reaches 6-8 | |

| Specimen ID | Shell Length (cm) | Comments |
|---|---|---|
| LPR6UU-EC041 | 82 | |
| LPR6UU-EC042 | 86 | |
| LPR6UU-EC043 | 93 | |
| LPR6UU-EC044 | 90 | |
| LPR6UU-EC045 | 82 | |
| LPR6UU-EC046 | 95 | |
| LPR6UU-EC047 | 95.5 | Sacrificed for health assessment |
| LPR6UU-EC048 | 88.5 | Sacrificed for health assessment |
| LPR7ZZ-EC121 | 84 | |
| LPR7ZZ-EC122 | 89 | |
| LPR7ZZ-EC123 | 78 | |
| LPR7ZZ-EC124 | 96 | |
| LPR7ZZ-EC125 | 90 | |
| LPR7ZZ-EC126 | 86 | |
| LPR7ZZ-EC127 | 84.5 | |
| LPR7ZZ-EC128 | 94.5 | |
| LPR7ZZ-EC129 | 78 | |
| LPR7ZZ-EC138 | 90.5 | Sacrificed for health assessment |
| LPR7ZZ-EC139 | 81 | Sacrificed for health assessment |
| LPR7AB-EC221 | 79.5 | |
| LPR7AB-EC222 | 85.5 | |
| LPR7AB-EC223 | 90.5 | |
| LPR7AB-EC224 | 83 | |
| LPR7AB-EC225 | 78 | |
| LPR7AB-EC226 | 97 | |
| LPR7AB-EC227 | 84.5 | Sacrificed for health assessment |
| LPR7AB-EC228 | 88 | Sacrificed for health assessment |
| LPR8AC-EC281 | 89.5 | |
| LPR8AC-EC282 | 83 | |
| LPR8AC-EC283 | 88 | |
| LPR8AC-EC284 | 92 | |
| LPR8AC-EC285 | 91 | |

| | |
|---|---|
| **Project Name:** LPR RI/FS Caged Bivalve Study | **Project No.:** Task 23.2 |
| **Date/Time:** 4/14/11 07:00 | **Field Crew Initials:** JF, TD |
| **Cage ID:** n/a | **Species:** Freshwater mussel (*Elliptio complanata)* |
| **Post deployment** | |
| **Comments:** Day 35 for Reaches 6-8 | |

| Specimen ID | Shell Length (cm) | Comments |
|---|---|---|
| LPR8AC-EC286 | 87 | |
| LPR8AC-EC287 | 82 | Sacrificed for health assessment |
| LPR8AC-EC288 | 98 | Sacrificed for health assessment |
| LPR8AC-EC313 | Dead | |
| LPR8AC-EC315 | Dead | |
| LPR8AC-EC316 | Dead | |
| LPR8AC-EC317 | Dead | |
| LPR8AC-EC318 | Dead | |
| LPR8AC-EC327 | Dead | |
| LPR8AC-EC328 | Dead | |
| LPR8AC-EC336 | Dead | |
| LPR8AC-EC339 | Dead | |
| LPR6VV-EC341 | 83 | |
| LPR6VV-EC342 | 89 | |
| LPR6VV-EC343 | 85 | |
| LPR6VV-EC344 | 87 | |
| LPR6VV-EC345 | 91 | |
| LPR6VV-EC346 | 83 | |
| LPR6VV-EC347 | 79 | Sacrificed for health assessment |
| LPR6VV-EC348 | 80 | Sacrificed for health assessment |

# LPRSA Caged Bivalve Study Data Form

| | |
|---|---|
| **Project Name:** LPR RI/FS Caged Bivalve Study | **Project No.:** Task 23.2 |
| **Date/Time:** 5/4/11 07:30 | **Field Crew Initials:** MY,TD |
| **Cage ID:** n/a | **Species:** Ribbed mussel (*Geukensia demissa*) |
| **Post deployment** | |
| **Comments:** Day 56 for Reaches 1-5 | |

| Specimen ID | Shell Length (cm) | Comments |
|---|---|---|
| LPR1XX-GD001 | 93.5 | |
| LPR1XX-GD002 | 88 | |
| LPR1XX-GD003 | 102.5 | |
| LPR1XX-GD004 | 107 | |
| LPR1XX-GD005 | 80.5 | |
| LPR1XX-GD006 | 95 | |
| LPR1XX-GD007 | 73 | |
| LPR1XX-GD008 | 86 | |
| LPR1XX-GD013 | 96.5 | Sacrificed for health assessment |
| LPR1XX-GD014 | 78 | Sacrificed for health assessment |
| LPR1XX-GD015 | Dead | |
| LPR1XX-GD021 | Lost | |
| LPR1XX-GD022 | Lost | |
| LPR1XX-GD023 | Lost | |
| LPR1XX-GD024 | Lost | |
| LPR1XX-GD025 | Lost | |
| LPR1XX-GD026 | Lost | |
| LPR1XX-GD027 | Lost | |
| LPR1XX-GD028 | Lost | |
| LPR1XX-GD029 | Lost | |
| LPR1XX-GD030 | Lost | |
| LPR1XX-GD051 | Lost | |
| LPR1XX-GD052 | Lost | |
| LPR1XX-GD053 | Lost | |
| LPR1XX-GD054 | Lost | |
| LPR1XX-GD055 | Lost | |
| LPR1XX-GD056 | Lost | |
| LPR1XX-GD057 | Lost | |
| LPR1XX-GD058 | Lost | |
| LPR1XX-GD059 | Lost | |
| LPR1XX-GD060 | Lost | |

| | |
|---|---|
| **Project Name:** LPR RI/FS Caged Bivalve Study | **Project No.:** Task 23.2 |
| **Date/Time:** 5/4/11 07:30 | **Field Crew Initials:** MY,TD |
| **Cage ID:** n/a | **Species:** Ribbed mussel (*Geukensia demissa*) |
| **Post deployment** | |
| **Comments:** Day 56 for Reaches 1-5 | |

| Specimen ID | Shell Length (cm) | Comments |
|---|---|---|
| LPR1XX-GD061 | Lost | |
| LPR1XX-GD062 | Lost | |
| LPR1XX-GD063 | Lost | |
| LPR1XX-GD064 | Lost | |
| LPR1XX-GD065 | Lost | |
| LPR1XX-GD066 | Lost | |
| LPR1XX-GD067 | Lost | |
| LPR1XX-GD068 | Lost | |
| LPR1XX-GD069 | Lost | |
| LPR1XX-GD070 | Lost | |
| LPR1XX-GD071 | Lost | |
| LPR1XX-GD072 | Lost | |
| LPR1XX-GD073 | Lost | |
| LPR1XX-GD074 | Lost | |
| LPR1XX-GD075 | Lost | |
| LPR1XX-GD076 | Lost | |
| LPR1XX-GD077 | Lost | |
| LPR1XX-GD078 | Lost | |
| LPR1XX-GD079 | Lost | |
| LPR1XX-GD080 | Lost | |
| LPR2AD-GD081 | 75 | |
| LPR2AD-GD082 | 95 | |
| LPR2AD-GD083 | 95 | |
| LPR2AD-GD084 | 84.5 | |
| LPR2AD-GD085 | 82.5 | |
| LPR2AD-GD086 | 96.5 | |
| LPR2AD-GD087 | 97 | |
| LPR2AD-GD088 | 92 | |
| LPR2AD-GD094 | 77.5 | Sacrificed for health assessment |
| LPR2AD-GD095 | Dead | |
| LPR2AD-GD096 | 75.5 | Sacrificed for health assessment |
| LPR2AD-GD101 | Dead | |
| LPR2AD-GD102 | Dead | |
| LPR2AD-GD104 | Dead | |

| | |
|---|---|
| **Project Name:** LPR RI/FS Caged Bivalve Study | **Project No.:** Task 23.2 |
| **Date/Time:** 5/4/11 07:30 | **Field Crew Initials:** MY,TD |
| **Cage ID:** n/a | **Species:** Ribbed mussel (*Geukensia demissa*) |
| **Post deployment** | |
| **Comments:** Day 56 for Reaches 1-5 | |

| Specimen ID | Shell Length (cm) | Comments |
|---|---|---|
| LPR2AD-GD114 | Dead | |
| LPR2AD-GD149 | Dead | |
| LPR2AD-GD150 | Dead | |
| LPR3SS-GD161 | 78.5 | |
| LPR3SS-GD162 | 100.5 | |
| LPR3SS-GD163 | Dead | |
| LPR3SS-GD165 | 95.5 | |
| LPR3SS-GD166 | Dead | |
| LPR3SS-GD167 | Dead | |
| LPR3SS-GD168 | Dead | Shell eroded |
| LPR3SS-GD181 | Dead | |
| LPR3SS-GD182 | Dead | |
| LPR3SS-GD183 | Dead | |
| LPR3SS-GD185 | Dead | |
| LPR3SS-GD188 | Dead | |
| LPR3SS-GD189 | Dead | |
| LPR3SS-GD190 | Dead | |
| LPR3SS-GD191 | Dead | |
| LPR3SS-GD192 | Dead | |
| LPR3SS-GD195 | Dead | |
| LPR3SS-GD196 | Dead | |
| LPR3SS-GD197 | Dead | |
| LPR3SS-GD198 | Dead | |
| LPR3SS-GD200 | Dead | |
| LPR3SS-GD201 | Dead | |
| LPR3SS-GD202 | Dead | |
| LPR3SS-GD205 | Dead | |
| LPR3SS-GD207 | Dead | |
| LPR3SS-GD208 | Dead | |
| LPR3SS-GD209 | Dead | |
| LPR3SS-GD212 | Dead | |
| LPR3SS-GD213 | Dead | |
| LPR3SS-GD214 | Dead | |
| LPR3SS-GD216 | Dead | |

| | |
|---|---|
| **Project Name:** LPR RI/FS Caged Bivalve Study | **Project No.:** Task 23.2 |
| **Date/Time:** 5/4/11 07:30 | **Field Crew Initials:** MY,TD |
| **Cage ID:** n/a | **Species:** Ribbed mussel (*Geukensia demissa*) |
| **Post deployment** | |
| **Comments:** Day 56 for Reaches 1-5 | |

| Specimen ID | Shell Length (cm) | Comments |
|---|---|---|
| LPR3SS-GD217 | Dead | |
| LPR3SS-GD218 | Dead | |
| LPR3SS-GD219 | Dead | |
| LPR3SS-GD221 | Dead | |
| LPR3SS-GD222 | Dead | |
| LPR3SS-GD223 | Dead | |
| LPR3SS-GD224 | Dead | |
| LPR3SS-GD225 | Dead | |
| LPR3SS-GD226 | Dead | |
| LPR3SS-GD227 | Dead | |
| LPR3SS-GD230 | Dead | |
| LPR3SS-GD231 | Dead | |
| LPR3SS-GD232 | Dead | |
| LPR3SS-GD233 | Dead | |
| LPR3SS-GD235 | Dead | |
| LPR3SS-GD236 | Dead | |
| LPR3SS-GD237 | Dead | |
| LPR3SS-GD238 | Dead | |
| LPR3SS-GD239 | Dead | |
| LPR3SS-GD240 | Dead | |
| LPR4AB-GD241 | Dead | |
| LPR4AB-GD242 | Dead | |
| LPR4AB-GD243 | Dead | |
| LPR4AB-GD244 | Dead | |
| LPR4AB-GD245 | Dead | |
| LPR4AB-GD246 | Dead | |
| LPR4AB-GD248 | Dead | |
| LPR4AB-GD254 | Dead | |
| LPR4AB-GD255 | Dead | |
| LPR4AB-GD256 | Dead | |
| LPR4AB-GD257 | Dead | |
| LPR4AB-GD258 | Dead | |
| LPR4AB-GD259 | Dead | |
| LPR4AB-GD260 | Dead | |

| | |
|---|---|
| **Project Name:** LPR RI/FS Caged Bivalve Study | **Project No.:** Task 23.2 |
| **Date/Time:** 5/4/11 07:30 | **Field Crew Initials:** MY,TD |
| **Cage ID:** n/a | **Species:** Ribbed mussel (*Geukensia demissa*) |
| **Post deployment** | |
| **Comments:** Day 56 for Reaches 1-5 | |

| Specimen ID | Shell Length (cm) | Comments |
|---|---|---|
| LPR4AB-GD261 | Dead | |
| LPR4AB-GD262 | Dead | |
| LPR4AB-GD263 | Dead | |
| LPR4AB-GD264 | Dead | |
| LPR4AB-GD265 | Dead | |
| LPR4AB-GD266 | Dead | |
| LPR4AB-GD267 | Dead | |
| LPR4AB-GD268 | Dead | |
| LPR4AB-GD269 | Dead | |
| LPR4AB-GD270 | Dead | |
| LPR4AB-GD271 | Dead | |
| LPR4AB-GD272 | Dead | |
| LPR4AB-GD273 | Dead | |
| LPR4AB-GD275 | Dead | |
| LPR4AB-GD276 | Dead | |
| LPR4AB-GD277 | Dead | |
| LPR4AB-GD278 | Dead | |
| LPR4AB-GD279 | Dead | |
| LPR4AB-GD280 | Dead | |
| LPR4AB-GD281 | Dead | |
| LPR4AB-GD282 | Dead | |
| LPR4AB-GD284 | Dead | |
| LPR4AB-GD286 | Dead | |
| LPR4AB-GD287 | Dead | |
| LPR4AB-GD288 | Dead | |
| LPR4AB-GD289 | Dead | |
| LPR4AB-GD290 | Dead | |
| LPR4AB-GD292 | Dead | |
| LPR4AB-GD293 | Dead | |
| LPR4AB-GD294 | Dead | |
| LPR4AB-GD295 | Dead | |
| LPR4AB-GD296 | Dead | |
| LPR4AB-GD297 | Dead | |
| LPR4AB-GD299 | Dead | |

| | |
|---|---|
| **Project Name:** LPR RI/FS Caged Bivalve Study | **Project No.:** Task 23.2 |
| **Date/Time:** 5/4/11 07:30 | **Field Crew Initials:** MY,TD |
| **Cage ID:** n/a | **Species:** Ribbed mussel (*Geukensia demissa*) |
| **Post deployment** | |
| **Comments:** Day 56 for Reaches 1-5 | |

| Specimen ID | Shell Length (cm) | Comments |
|---|---|---|
| LPR4AB-GD300 | Dead | |
| LPR4AB-GD301 | Dead | |
| LPR4AB-GD302 | Dead | |
| LPR4AB-GD303 | Dead | |
| LPR4AB-GD304 | Dead | |
| LPR4AB-GD305 | Dead | |
| LPR4AB-GD307 | Dead | |
| LPR4AB-GD308 | Dead | |
| LPR4AB-GD309 | Dead | |
| LPR4AB-GD310 | Dead | |
| LPR4AB-GD311 | Dead | |
| LPR4AB-GD312 | Dead | |
| LPR4AB-GD313 | Dead | |
| LPR4AB-GD314 | Dead | |
| LPR4AB-GD315 | Dead | |
| LPR4AB-GD316 | Dead | |
| LPR4AB-GD317 | Dead | |
| LPR4AB-GD318 | Dead | |
| LPR4AB-GD319 | Dead | |
| LPR4AB-GD320 | Dead | |
| LPR4ZZ-GD321 | Dead | |
| LPR4ZZ-GD322 | Dead | |
| LPR4ZZ-GD323 | Dead | |
| LPR4ZZ-GD325 | Dead | |
| LPR4ZZ-GD327 | Dead | |
| LPR4ZZ-GD328 | Dead | |
| LPR4ZZ-GD331 | Dead | |
| LPR4ZZ-GD332 | Dead | |
| LPR4ZZ-GD335 | Dead | |
| LPR4ZZ-GD336 | Dead | |
| LPR4ZZ-GD341 | Dead | |
| LPR4ZZ-GD342 | Dead | |
| LPR4ZZ-GD343 | Dead | |
| LPR4ZZ-GD344 | Dead | |

| | |
|---|---|
| **Project Name:** LPR RI/FS Caged Bivalve Study | **Project No.:** Task 23.2 |
| **Date/Time:** 5/4/11 07:30 | **Field Crew Initials:** MY,TD |
| **Cage ID:** n/a | **Species:** Ribbed mussel (*Geukensia demissa*) |
| **Post deployment** | |
| **Comments:** Day 56 for Reaches 1-5 | |

| Specimen ID | Shell Length (cm) | Comments |
|---|---|---|
| LPR4ZZ-GD346 | Dead | |
| LPR4ZZ-GD347 | Dead | |
| LPR4ZZ-GD348 | Dead | |
| LPR4ZZ-GD349 | Dead | |
| LPR4ZZ-GD350 | Dead | |
| LPR4ZZ-GD351 | Dead | |
| LPR4ZZ-GD352 | Dead | |
| LPR4ZZ-GD353 | Dead | |
| LPR4ZZ-GD354 | Dead | |
| LPR4ZZ-GD356 | Dead | |
| LPR4ZZ-GD357 | Dead | |
| LPR4ZZ-GD358 | Dead | |
| LPR4ZZ-GD359 | Dead | |
| LPR4ZZ-GD360 | Dead | |
| LPR4ZZ-GD361 | Dead | |
| LPR4ZZ-GD362 | Dead | |
| LPR4ZZ-GD363 | Dead | |
| LPR4ZZ-GD364 | Dead | |
| LPR4ZZ-GD365 | Dead | |
| LPR4ZZ-GD366 | Dead | |
| LPR4ZZ-GD367 | Dead | |
| LPR4ZZ-GD368 | Dead | |
| LPR4ZZ-GD369 | Dead | |
| LPR4ZZ-GD370 | Dead | |
| LPR4ZZ-GD371 | Dead | |
| LPR4ZZ-GD372 | Dead | |
| LPR4ZZ-GD373 | Dead | |
| LPR4ZZ-GD374 | Dead | |
| LPR4ZZ-GD375 | Dead | |
| LPR4ZZ-GD376 | Dead | |
| LPR4ZZ-GD377 | Dead | |
| LPR4ZZ-GD378 | Dead | |
| LPR4ZZ-GD379 | Dead | |
| LPR4ZZ-GD380 | Dead | |

| | |
|---|---|
| **Project Name:** LPR RI/FS Caged Bivalve Study | **Project No.:** Task 23.2 |
| **Date/Time:** 5/4/11 07:30 | **Field Crew Initials:** MY,TD |
| **Cage ID:** n/a | **Species:** Ribbed mussel (*Geukensia demissa*) |
| **Post deployment** | |
| **Comments:** Day 56 for Reaches 1-5 | |

| Specimen ID | Shell Length (cm) | Comments |
|---|---|---|
| LPR4ZZ-GD381 | Dead | |
| LPR4ZZ-GD382 | Dead | |
| LPR4ZZ-GD383 | Dead | |
| LPR4ZZ-GD384 | Dead | |
| LPR4ZZ-GD385 | Dead | |
| LPR4ZZ-GD386 | Dead | |
| LPR4ZZ-GD387 | Dead | |
| LPR4ZZ-GD388 | Dead | |
| LPR4ZZ-GD389 | Dead | |
| LPR4ZZ-GD390 | Dead | |
| LPR4ZZ-GD391 | Dead | |
| LPR4ZZ-GD392 | Dead | |
| LPR4ZZ-GD393 | Dead | |
| LPR4ZZ-GD394 | Dead | |
| LPR4ZZ-GD395 | Dead | |
| LPR4ZZ-GD396 | Dead | |
| LPR4ZZ-GD397 | Dead | |
| LPR4ZZ-GD398 | Dead | |
| LPR4ZZ-GD399 | Dead | |
| LPR4ZZ-GD400 | Dead | |
| LPR4ZZ-GD401 | Dead | |
| LPR4ZZ-GD402 | Dead | |
| LPR4ZZ-GD403 | Dead | |
| LPR4ZZ-GD404 | Dead | |
| LPR4ZZ-GD405 | Dead | |
| LPR4ZZ-GD406 | Dead | |
| LPR4ZZ-GD407 | Dead | |
| LPR4ZZ-GD408 | Dead | |
| LPR4ZZ-GD409 | Dead | |
| LPR4ZZ-GD411 | Dead | |
| LPR4ZZ-GD413 | Dead | |
| LPR4ZZ-GD415 | Dead | |
| LPR4ZZ-GD416 | Dead | |
| LPR4ZZ-GD417 | Dead | |

| | |
|---|---|
| **Project Name:** LPR RI/FS Caged Bivalve Study | **Project No.:** Task 23.2 |
| **Date/Time:** 5/4/11 07:30 | **Field Crew Initials:** MY,TD |
| **Cage ID:** n/a | **Species:** Ribbed mussel (*Geukensia demissa*) |
| **Post deployment** | |
| **Comments:** Day 56 for Reaches 1-5 | |

| Specimen ID | Shell Length (cm) | Comments |
|---|---|---|
| LPR4ZZ-GD418 | Dead | |
| LPR4ZZ-GD419 | Dead | |
| LPR4ZZ-GD420 | Dead | |
| LPR4ZZ-GD421 | Dead | |
| LPR4ZZ-GD422 | Dead | |
| LPR4ZZ-GD423 | Dead | |
| LPR4ZZ-GD424 | Dead | |
| LPR4ZZ-GD425 | Dead | |
| LPR4ZZ-GD426 | Dead | |
| LPR4ZZ-GD427 | Dead | |
| LPR4ZZ-GD428 | Dead | |
| LPR4ZZ-GD430 | Dead | |
| LPR4ZZ-GD431 | Dead | |
| LPR4ZZ-GD432 | Dead | |
| LPR4ZZ-GD433 | Dead | |
| LPR4ZZ-GD434 | Dead | |
| LPR4ZZ-GD435 | Dead | |
| LPR4ZZ-GD436 | Dead | |
| LPR4ZZ-GD437 | Dead | |
| LPR4ZZ-GD438 | Dead | |
| LPR4ZZ-GD439 | Dead | |
| LPR4ZZ-GD440 | Dead | |
| LPR4ZZ-GD441 | Dead | |
| LPR4ZZ-GD442 | Dead | |
| LPR4ZZ-GD443 | Dead | |
| LPR4ZZ-GD444 | Dead | |
| LPR4ZZ-GD445 | Dead | |
| LPR4ZZ-GD446 | Dead | |
| LPR4ZZ-GD447 | Dead | |
| LPR4ZZ-GD448 | Dead | |
| LPR4ZZ-GD449 | Dead | |
| LPR4ZZ-GD450 | Dead | |
| LPR4ZZ-GD451 | Dead | |
| LPR4ZZ-GD452 | Dead | |

| | |
|---|---|
| **Project Name:** LPR RI/FS Caged Bivalve Study | **Project No.:** Task 23.2 |
| **Date/Time:** 5/4/11 07:30 | **Field Crew Initials:** MY,TD |
| **Cage ID:** n/a | **Species:** Ribbed mussel (*Geukensia demissa*) |
| **Post deployment** | |
| **Comments:** Day 56 for Reaches 1-5 | |

| Specimen ID | Shell Length (cm) | Comments |
|---|---|---|
| LPR4ZZ-GD453 | Dead | |
| LPR4ZZ-GD454 | Dead | |
| LPR4ZZ-GD455 | Dead | |
| LPR4ZZ-GD456 | Dead | |
| LPR4ZZ-GD459 | Dead | |
| LPR4ZZ-GD460 | Dead | |
| LPR4ZZ-GD462 | Dead | |
| LPR4ZZ-GD463 | Dead | |
| LPR4ZZ-GD464 | Dead | |
| LPR4ZZ-GD465 | Dead | |
| LPR4ZZ-GD466 | Dead | |
| LPR4ZZ-GD467 | Dead | |
| LPR4ZZ-GD468 | Dead | |
| LPR4ZZ-GD469 | Dead | |
| LPR4ZZ-GD470 | Dead | |
| LPR4ZZ-GD471 | Dead | |
| LPR4ZZ-GD472 | Dead | |
| LPR4ZZ-GD473 | Dead | |
| LPR4ZZ-GD474 | Dead | |
| LPR4ZZ-GD475 | Dead | |
| LPR4ZZ-GD476 | Dead | |
| LPR4ZZ-GD477 | Dead | |
| LPR4ZZ-GD480 | Dead | |
| LPR5XX-GD481 | Dead | |
| LPR5XX-GD482 | Dead | |
| LPR5XX-GD484 | Dead | |
| LPR5XX-GD485 | Dead | |
| LPR5XX-GD486 | Dead | |
| LPR5XX-GD487 | Dead | |
| LPR5XX-GD489 | Dead | |
| LPR5XX-GD491 | Dead | |
| LPR5XX-GD492 | Dead | |
| LPR5XX-GD493 | Dead | |
| LPR5XX-GD494 | Dead | |

| | |
|---|---|
| **Project Name:** LPR RI/FS Caged Bivalve Study | **Project No.:** Task 23.2 |
| **Date/Time:** 5/4/11 07:30 | **Field Crew Initials:** MY,TD |
| **Cage ID:** n/a | **Species:** Ribbed mussel (*Geukensia demissa*) |
| **Post deployment** | |
| **Comments:** Day 56 for Reaches 1-5 | |

| Specimen ID | Shell Length (cm) | Comments |
|---|---|---|
| LPR5XX-GD495 | Dead | |
| LPR5XX-GD496 | Dead | |
| LPR5XX-GD497 | Dead | |
| LPR5XX-GD498 | Dead | |
| LPR5XX-GD499 | Dead | |
| LPR5XX-GD500 | Dead | |
| LPR5XX-GD511 | Dead | |
| LPR5XX-GD512 | Dead | |
| LPR5XX-GD513 | Dead | |
| LPR5XX-GD514 | Dead | |
| LPR5XX-GD515 | Dead | |
| LPR5XX-GD516 | Dead | |
| LPR5XX-GD517 | Dead | |
| LPR5XX-GD518 | Dead | |
| LPR5XX-GD519 | Dead | |
| LPR5XX-GD520 | Dead | |
| LPR5XX-GD521 | Dead | |
| LPR5XX-GD523 | Dead | |
| LPR5XX-GD524 | Dead | |
| LPR5XX-GD527 | Dead | |
| LPR5XX-GD528 | Dead | |
| LPR5XX-GD530 | Dead | |
| LPR5YY-GD561 | Dead | |
| LPR5YY-GD562 | Dead | |
| LPR5YY-GD566 | Dead | |
| LPR5YY-GD567 | Dead | |
| LPR5YY-GD568 | Dead | |
| LPR5YY-GD573 | Dead | |
| LPR5YY-GD574 | Dead | |
| LPR5YY-GD577 | Dead | |
| LPR5YY-GD578 | Dead | |
| LPR5YY-GD579 | Dead | |
| LPR5YY-GD580 | Dead | |
| LPR5YY-GD581 | Dead | |

| | |
|---|---|
| **Project Name:** LPR RI/FS Caged Bivalve Study | **Project No.:** Task 23.2 |
| **Date/Time:** 5/4/11 07:30 | **Field Crew Initials:** MY,TD |
| **Cage ID:** n/a | **Species:** Ribbed mussel (*Geukensia demissa*) |
| **Post deployment** | |
| **Comments:** Day 56 for Reaches 1-5 | |

| Specimen ID | Shell Length (cm) | Comments |
|---|---|---|
| LPR5YY-GD582 | Dead | |
| LPR5YY-GD583 | Dead | |
| LPR5YY-GD584 | Dead | |
| LPR5YY-GD585 | Dead | |
| LPR5YY-GD586 | Dead | |
| LPR5YY-GD587 | Dead | |
| LPR5YY-GD588 | Dead | |
| LPR5YY-GD589 | Dead | |
| LPR5YY-GD590 | Dead | |
| LPR5YY-GD591 | Dead | |
| LPR5YY-GD592 | Dead | |
| LPR5YY-GD593 | Dead | |
| LPR5YY-GD594 | Dead | |
| LPR5YY-GD595 | Dead | |
| LPR5YY-GD596 | Dead | |
| LPR5YY-GD597 | Dead | |
| LPR5YY-GD598 | Dead | |
| LPR5YY-GD599 | Dead | |
| LPR5YY-GD600 | Dead | |
| LPR5YY-GD601 | Dead | |
| LPR5YY-GD602 | Dead | |
| LPR5YY-GD603 | Dead | |
| LPR5YY-GD604 | Dead | |
| LPR5YY-GD605 | Dead | |
| LPR5YY-GD607 | Dead | |
| LPR5YY-GD608 | Dead | |
| LPR5YY-GD609 | Dead | |
| LPR5YY-GD610 | Dead | |
| LPR5YY-GD611 | Dead | |
| LPR5YY-GD613 | Dead | |
| LPR5YY-GD614 | Dead | |
| LPR5YY-GD615 | Dead | |
| LPR5YY-GD616 | Dead | |
| LPR5YY-GD618 | Dead | |

| | |
|---|---|
| **Project Name:** LPR RI/FS Caged Bivalve Study | **Project No.:** Task 23.2 |
| **Date/Time:** 5/4/11 07:30 | **Field Crew Initials:** MY,TD |
| **Cage ID:** n/a | **Species:** Ribbed mussel (*Geukensia demissa*) |
| **Post deployment** | |
| **Comments:** Day 56 for Reaches 1-5 | |

| Specimen ID | Shell Length (cm) | Comments |
|---|---|---|
| LPR5YY-GD619 | Dead | |
| LPR5YY-GD620 | Dead | |
| LPR5YY-GD621 | Dead | |
| LPR5YY-GD622 | Dead | |
| LPR5YY-GD623 | Dead | |
| LPR5YY-GD624 | Dead | |
| LPR5YY-GD626 | Dead | |
| LPR5YY-GD627 | Dead | |
| LPR5YY-GD628 | Dead | |
| LPR5YY-GD630 | Dead | |
| LPR5YY-GD631 | Dead | |
| LPR5YY-GD632 | Dead | |
| LPR5YY-GD633 | Dead | |
| LPR5YY-GD634 | Dead | |
| LPR5YY-GD636 | Dead | |
| LPR5YY-GD637 | Dead | |
| LPR5YY-GD638 | Dead | |
| LPR5YY-GD639 | Dead | |
| LPR5YY-GD640 | Dead | |

# LPRSA Caged Bivalve Study Data Form

| | |
|---|---|
| **Project Name:** LPR RI/FS Caged Bivalve Study | **Project No.:** Task 23.2 |
| **Date/Time:** 5/5/11 07:30 | **Field Crew Initials:** MY, TD |
| **Cage ID:** n/a | **Species:** Freshwater mussel (*Elliptio complanata)* |
| **Post deployment** | |
| **Comments:** Day 56 for Reaches 6-8 | |

| Specimen ID | Shell Length (cm) | Comments |
|---|---|---|
| LPR6UU-EC041 | 82 | |
| LPR6UU-EC042 | 84.5 | |
| LPR6UU-EC043 | 93 | |
| LPR6UU-EC044 | 89.5 | |
| LPR6UU-EC045 | 82.5 | |
| LPR6UU-EC046 | 95.5 | |
| LPR6UU-EC059 | 79.5 | Sacrificed for health assessment |
| LPR6UU-EC060 | 83.5 | Sacrificed for health assessment |
| LPR7ZZ-EC121 | 85 | |
| LPR7ZZ-EC122 | 90 | |
| LPR7ZZ-EC123 | 78 | |
| LPR7ZZ-EC124 | 95.5 | |
| LPR7ZZ-EC125 | 91.5 | |
| LPR7ZZ-EC126 | 84 | |
| LPR7ZZ-EC127 | 84 | |
| LPR7ZZ-EC128 | 94.5 | |
| LPR7ZZ-EC129 | 78 | |
| LPR7ZZ-EC136 | 80 | Sacrificed for health assessment |
| LPR7ZZ-EC137 | 84.5 | Sacrificed for health assessment |
| LPR7AB-EC221 | 80 | |
| LPR7AB-EC222 | 85.5 | |
| LPR7AB-EC223 | 91 | |
| LPR7AB-EC224 | 83 | |
| LPR7AB-EC225 | 78 | |
| LPR7AB-EC226 | 97.5 | |
| LPR7AB-EC239 | 81 | Sacrificed for health assessment |
| LPR7AB-EC240 | 84.5 | Sacrificed for health assessment |
| LPR8AC-EC281 | 90.5 | |
| LPR8AC-EC282 | 82 | |
| LPR8AC-EC283 | 90 | |
| LPR8AC-EC284 | Dead | |
| LPR8AC-EC285 | 92 | |

| | |
|---|---|
| **Project Name:** LPR RI/FS Caged Bivalve Study | **Project No.:** Task 23.2 |
| **Date/Time:** 5/5/11 07:30 | **Field Crew Initials:** MY, TD |
| **Cage ID:** n/a | **Species:** Freshwater mussel (*Elliptio complanata)* |
| **Post deployment** | |
| **Comments:** Day 56 for Reaches 6-8 | |

| Specimen ID | Shell Length (cm) | Comments |
|---|---|---|
| LPR8AC-EC286 | 87 | |
| LPR8AC-EC296 | Dead | |
| LPR8AC-EC297 | Dead | |
| LPR8AC-EC298 | Dead | |
| LPR8AC-EC299 | Dead | |
| LPR8AC-EC300 | Dead | |
| LPR8AC-EC301 | Dead | |
| LPR8AC-EC302 | Dead | |
| LPR8AC-EC303 | Dead | |
| LPR8AC-EC308 | Dead | |
| LPR8AC-EC309 | Dead | |
| LPR8AC-EC310 | Dead | |
| LPR8AC-EC311 | Dead | |
| LPR8AC-EC312 | Dead | |
| LPR8AC-EC319 | Dead | |
| LPR8AC-EC320 | Dead | |
| LPR8AC-EC321 | Dead | |
| LPR8AC-EC322 | Dead | |
| LPR8AC-EC323 | Dead | |
| LPR8AC-EC324 | Dead | |
| LPR8AC-EC326 | Dead | |
| LPR8AC-EC330 | Dead | |
| LPR8AC-EC332 | Dead | |
| LPR8AC-EC333 | Dead | |
| LPR8AC-EC334 | Dead | |
| LPR8AC-EC335 | Dead | |
| LPR8AC-EC337 | Dead | |
| LPR8AC-EC338 | Dead | |
| LPR8AC-EC340 | Dead | |
| LPR6VV-EC341 | 84 | |
| LPR6VV-EC342 | 87 | |
| LPR6VV-EC343 | 84 | |
| LPR6VV-EC344 | 87.5 | |
| LPR6VV-EC345 | 93 | |

| | |
|---|---|
| **Project Name:** LPR RI/FS Caged Bivalve Study | **Project No.:** Task 23.2 |
| **Date/Time:** 5/5/11 07:30 | **Field Crew Initials:** MY, TD |
| **Cage ID:** n/a | **Species:** Freshwater mussel (*Elliptio complanata)* |
| **Post deployment** | |
| **Comments:** Day 56 for Reaches 6-8 | |

| Specimen ID | Shell Length (cm) | Comments |
|---|---|---|
| LPR6VV-EC346 | 82.5 | |
| LPR6VV-EC359 | 94 | |
| LPR6VV-EC360 | 81 | |

# LPRSA Caged Bivalve Study Data Form

| | |
|---|---|
| **Project Name:** LPR RI/FS Caged Bivalve Study | **Project No.:** Task 23.2 |
| **Date/Time:** 05/09/11 07:00 | **Field Crew Initials:** KT, TD |
| **Cage ID:** n/a | **Species:** Ribbed mussel (*Geukensia demissa*) |
| **Post deployment** | |
| **Comments:** Day 61 for Reaches 1-5 | |

| Specimen ID | Shell Length (cm) | Comments |
|---|---|---|
| LPR1XX-GD001 | 93.5 | Sent to lab for analysis at Day 61 |
| LPR1XX-GD002 | 87.5 | Sent to lab for analysis at Day 61 |
| LPR1XX-GD003 | 103 | Sent to lab for analysis at Day 61 |
| LPR1XX-GD004 | 107 | Sent to lab for analysis at Day 61 |
| LPR1XX-GD005 | 80 | Sent to lab for analysis at Day 61 |
| LPR1XX-GD006 | 95 | Sent to lab for analysis at Day 61 |
| LPR1XX-GD007 | 73.5 | Sent to lab for analysis at Day 61 |
| LPR1XX-GD008 | 86 | Sent to lab for analysis at Day 61 |
| LPR1XX-GD016 | 102 | Sent to lab for analysis at Day 61 |
| LPR1XX-GD017 | 97.5 | Sent to lab for analysis at Day 61 |
| LPR1XX-GD018 | 86 | Sent to lab for analysis at Day 61 |
| LPR1XX-GD019 | 78 | Sent to lab for analysis at Day 61 |
| LPR1XX-GD020 | 85 | Sent to lab for analysis at Day 61 |
| LPR1XX-GD031 | 93 | Sent to lab for analysis at Day 61 |
| LPR1XX-GD032 | 90.5 | Sent to lab for analysis at Day 61 |
| LPR1XX-GD033 | 79 | Sent to lab for analysis at Day 61 |
| LPR1XX-GD034 | 79 | Sent to lab for analysis at Day 61 |
| LPR1XX-GD035 | 85 | Sent to lab for analysis at Day 61 |
| LPR1XX-GD036 | 85 | Sent to lab for analysis at Day 61 |
| LPR1XX-GD037 | 83 | Sent to lab for analysis at Day 61 |
| LPR1XX-GD038 | 88.5 | Sent to lab for analysis at Day 61 |
| LPR1XX-GD039 | 93 | Sent to lab for analysis at Day 61 |
| LPR1XX-GD040 | 75 | Sent to lab for analysis at Day 61 |
| LPR1XX-GD041 | 88.5 | Sent to lab for analysis at Day 61 |
| LPR1XX-GD042 | 81.5 | Sent to lab for analysis at Day 61 |
| LPR1XX-GD043 | 94 | Sent to lab for analysis at Day 61 |
| LPR1XX-GD044 | 90 | Sent to lab for analysis at Day 61 |
| LPR1XX-GD045 | 95 | Sent to lab for analysis at Day 61 |
| LPR1XX-GD046 | 94.5 | Sent to lab for analysis at Day 61 |
| LPR1XX-GD047 | 79 | Sent to lab for analysis at Day 61 |
| LPR1XX-GD048 | 95.5 | Sent to lab for analysis at Day 61 |
| LPR1XX-GD049 | 91 | Sent to lab for analysis at Day 61 |

| | |
|---|---|
| **Project Name:** LPR RI/FS Caged Bivalve Study | **Project No.:** Task 23.2 |
| **Date/Time:** 05/09/11 07:00 | **Field Crew Initials:** KT, TD |
| **Cage ID:** n/a | **Species:** Ribbed mussel (*Geukensia demissa*) |
| **Post deployment** | |
| **Comments:** Day 61 for Reaches 1-5 | |

| Specimen ID | Shell Length (cm) | Comments |
|---|---|---|
| LPR1XX-GD050 | 92.5 | Sent to lab for analysis at Day 61 |
| LPR2AD-GD088 | Dead | Dead at Day 61 |
| LPR2AD-GD100 | Dead | Dead at Day 61 |
| LPR2AD-GD103 | 91 | Sent to lab for analysis at Day 61 |
| LPR2AD-GD105 | 90 | Sent to lab for analysis at Day 61 |
| LPR2AD-GD106 | 96 | Sent to lab for analysis at Day 61 |
| LPR2AD-GD107 | 90.5 | Sent to lab for analysis at Day 61 |
| LPR2AD-GD108 | 87 | Sent to lab for analysis at Day 61 |
| LPR2AD-GD110 | 90.5 | Sent to lab for analysis at Day 61 |
| LPR2AD-GD111 | 91 | Sent to lab for analysis at Day 61 |
| LPR2AD-GD112 | 90 | Sent to lab for analysis at Day 61 |
| LPR2AD-GD113 | 91 | Sent to lab for analysis at Day 61 |
| LPR2AD-GD115 | 80 | Sent to lab for analysis at Day 61 |
| LPR2AD-GD116 | Dead | Dead at Day 61 |
| LPR2AD-GD117 | 92 | Sent to lab for analysis at Day 61 |
| LPR2AD-GD118 | 87 | Sent to lab for analysis at Day 61 |
| LPR2AD-GD119 | 80.5 | Sent to lab for analysis at Day 61 |
| LPR2AD-GD120 | 88.5 | Sent to lab for analysis at Day 61 |
| LPR2AD-GD121 | 98 | Sent to lab for analysis at Day 61 |
| LPR2AD-GD122 | 97 | Sent to lab for analysis at Day 61 |
| LPR2AD-GD123 | 95.5 | Sent to lab for analysis at Day 61 |
| LPR2AD-GD124 | 94.5 | Sent to lab for analysis at Day 61 |
| LPR2AD-GD125 | 94.5 | Sent to lab for analysis at Day 61 |
| LPR2AD-GD126 | 100.5 | Sent to lab for analysis at Day 61 |
| LPR2AD-GD127 | 101.5 | Sent to lab for analysis at Day 61 |
| LPR2AD-GD128 | 96 | Sent to lab for analysis at Day 61 |
| LPR2AD-GD129 | 92.5 | Sent to lab for analysis at Day 61 |
| LPR2AD-GD130 | 94.5 | Sent to lab for analysis at Day 61 |
| LPR2AD-GD141 | 87 | Sent to lab for analysis at Day 61 |
| LPR2AD-GD142 | 82.5 | Sent to lab for analysis at Day 61 |
| LPR2AD-GD143 | 92 | Sent to lab for analysis at Day 61 |
| LPR2AD-GD144 | 94 | Sent to lab for analysis at Day 61 |
| LPR2AD-GD145 | 91 | Sent to lab for analysis at Day 61 |
| LPR2AD-GD146 | 81.5 | Sent to lab for analysis at Day 61 |
| LPR2AD-GD147 | 82 | Sent to lab for analysis at Day 61 |

| | |
|---|---|
| **Project Name:** LPR RI/FS Caged Bivalve Study | **Project No.:** Task 23.2 |
| **Date/Time:** 05/09/11 07:00 | **Field Crew Initials:** KT, TD |
| **Cage ID:** n/a | **Species:** Ribbed mussel (*Geukensia demissa*) |
| **Post deployment** | |
| **Comments:** Day 61 for Reaches 1-5 | |

| Specimen ID | Shell Length (cm) | Comments |
|---|---|---|
| LPR2AD-GD148 | 84 | Sent to lab for analysis at Day 61 |
| LPR3SS-GD161 | 78.5 | Sent to lab for analysis at Day 61 |
| LPR3SS-GD162 | Dead | Dead at Day 61 |
| LPR3SS-GD165 | Dead | Dead at Day 61 |
| LPR3SS-GD173 | 96.5 | Sent to lab for analysis at Day 61 |
| LPR3SS-GD174 | Dead | Dead at Day 61 |
| LPR3SS-GD175 | Dead | Dead at Day 61 |
| LPR3SS-GD176 | Dead | Dead at Day 61 |
| LPR3SS-GD177 | Dead | Dead at Day 61 |
| LPR3SS-GD178 | Dead | Dead at Day 61 |
| LPR3SS-GD179 | Dead | Dead at Day 61 |
| LPR3SS-GD180 | Dead | Dead at Day 61 |
| LPR3SS-GD184 | 78 | Sent to lab for analysis at Day 61 |
| LPR3SS-GD187 | 77 | Sent to lab for analysis at Day 61 |
| LPR3SS-GD193 | Dead | Dead at Day 61 |
| LPR3SS-GD194 | Dead | Dead at Day 61 |
| LPR3SS-GD199 | 79 | Sent to lab for analysis at Day 61 |
| LPR3SS-GD203 | 86 | Sent to lab for analysis at Day 61 |
| LPR3SS-GD204 | 88 | Sent to lab for analysis at Day 61 |
| LPR3SS-GD211 | Dead | Dead at Day 61 |
| LPR3SS-GD215 | 85 | Sent to lab for analysis at Day 61 |
| LPR3SS-GD228 | 85 | Sent to lab for analysis at Day 61 |
| LPR3SS-GD229 | 87 | Sent to lab for analysis at Day 61 |
| LPR3SS-GD234 | Dead | Dead at Day 61 |
| LPR4ZZ-GD414 | Dead | Dead at Day 61 |
| LPR4ZZ-GD458 | Dead | Dead at Day 61 |
| LPR4ZZ-GD461 | Dead | Dead at Day 61 |
| LPR4ZZ-GD479 | 82.5 | Sent to lab for analysis at Day 61 |

# LPRSA Caged Bivalve Study Data Form

| | |
|---|---|
| **Project Name:** LPR RI/FS Caged Bivalve Study | **Project No.:** Task 23.2 |
| **Date/Time:** 5/24/11 07:00 | **Field Crew Initials:** MY, TD |
| **Cage ID:** n/a | **Species:** Ribbed mussel (*Geukensia demissa*) |
| **Post deployment** | |
| **Comments:** Day 76 for Reaches 1-5 | |

| Specimen ID | Shell Length (cm) | Comments |
|---|---|---|
| LPR2AD-GD081 | 73.5 | |
| LPR2AD-GD082 | 96 | |
| LPR2AD-GD083 | 94.5 | |
| LPR2AD-GD084 | 84 | |
| LPR2AD-GD085 | 82.5 | |
| LPR2AD-GD086 | 95 | |
| LPR2AD-GD087 | 97 | |
| LPR2AD-GD137 | Dead | |
| LPR2AD-GD139 | Dead | |
| LPR2AD-GD160 | Dead | |

# LPRSA Caged Bivalve Study Data Form

| | |
|---|---|
| **Project Name:** LPR RI/FS Caged Bivalve Study | **Project No.:** Task 23.2 |
| **Date/Time:** 5/24/11 07:00 | **Field Crew Initials:** MY, TD |
| **Cage ID:** n/a | **Species:** Freshwater mussel (*Elliptio complanata)* |
| **Post deployment** | |
| **Comments:** Day 75 for Reaches 6-8 | |

| Specimen ID | Shell Length (cm) | Comments |
|---|---|---|
| LPR6UU-EC041 | 82 | |
| LPR6UU-EC042 | 87.5 | |
| LPR6UU-EC043 | 93.5 | |
| LPR6UU-EC044 | 90 | |
| LPR6UU-EC045 | 82.5 | |
| LPR6UU-EC046 | 95 | |
| LPR6UU-EC057 | 88 | |
| LPR6UU-EC058 | 80 | |
| LPR7ZZ-EC121 | 86 | |
| LPR7ZZ-EC122 | 90 | |
| LPR7ZZ-EC123 | 77.5 | |
| LPR7ZZ-EC124 | 96 | |
| LPR7ZZ-EC125 | 90.5 | |
| LPR7ZZ-EC126 | 86.5 | |
| LPR7ZZ-EC127 | 83.5 | |
| LPR7ZZ-EC128 | 95 | |
| LPR7ZZ-EC129 | 78 | |
| LPR7ZZ-EC134 | 101 | |
| LPR7ZZ-EC135 | 79.5 | |
| LPR7AB-EC221 | 80 | |
| LPR7AB-EC222 | 84.5 | |
| LPR7AB-EC223 | 91 | |
| LPR7AB-EC224 | 83 | |
| LPR7AB-EC225 | 78 | |
| LPR7AB-EC226 | 97.5 | |
| LPR7AB-EC237 | 96.5 | |
| LPR7AB-EC238 | 84.5 | |
| LPR8AC-EC281 | Dead | |
| LPR8AC-EC282 | 83 | |
| LPR8AC-EC283 | 88 | |
| LPR8AC-EC285 | 91 | |
| LPR8AC-EC286 | 86 | |

| | |
|---|---|
| **Project Name:** LPR RI/FS Caged Bivalve Study | **Project No.:** Task 23.2 |
| **Date/Time:** 5/24/11 07:00 | **Field Crew Initials:** MY, TD |
| **Cage ID:** n/a | **Species:** Freshwater mussel (*Elliptio complanata)* |
| **Post deployment** | |
| **Comments:** Day 75 for Reaches 6-8 | |

| Specimen ID | Shell Length (cm) | Comments |
|---|---|---|
| LPR8AC-EC329 | Dead | |
| LPR6VV-EC341 | 84 | |
| LPR6VV-EC342 | 89 | |
| LPR6VV-EC343 | 85 | |
| LPR6VV-EC344 | 86.5 | |
| LPR6VV-EC345 | 92 | |
| LPR6VV-EC346 | 83 | |
| LPR6VV-EC357 | 90 | |
| LPR6VV-EC358 | 83 | |

# LPRSA Caged Bivalve Study Data Form

| | |
|---|---|
| **Project Name:** LPR RI/FS Caged Bivalve Study | **Project No.:** Task 23.2 |
| **Date/Time:** 6/8/11 07:15 | **Field Crew Initials:** TD, JH |
| **Cage ID:** n/a | **Species:** Ribbed mussel (*Geukensia demissa*), Freshwater mussel (*Elliptio complanata)* |
| **Post deployment** | |
| **Comments:** Day 91 for 1-5 and Day 90 for Reaches 6-8 | |

| Specimen ID | Shell Length (cm) | Comments |
|---|---|---|
| LPR2AD-GD081 | Lost | |
| LPR2AD-GD082 | Lost | |
| LPR2AD-GD083 | Lost | |
| LPR2AD-GD084 | Lost | |
| LPR2AD-GD085 | Lost | |
| LPR2AD-GD086 | Lost | |
| LPR2AD-GD087 | Lost | |
| LPR2AD-GD097 | Lost | |
| LPR2AD-GD098 | Lost | |
| LPR2AD-GD099 | Lost | |
| LPR2AD-GD131 | Lost | |
| LPR2AD-GD132 | Lost | |
| LPR2AD-GD133 | Lost | |
| LPR2AD-GD134 | Lost | |
| LPR2AD-GD135 | Lost | |
| LPR2AD-GD136 | Lost | |
| LPR2AD-GD138 | Lost | |
| LPR2AD-GD140 | Lost | |
| LPR2AD-GD151 | Lost | |
| LPR2AD-GD152 | Lost | |
| LPR2AD-GD153 | Lost | |
| LPR2AD-GD154 | Lost | |
| LPR2AD-GD155 | Lost | |
| LPR2AD-GD156 | Lost | |
| LPR2AD-GD157 | Lost | |
| LPR2AD-GD158 | Lost | |
| LPR2AD-GD159 | Lost | |
| LPR6UU-EC041 | 82.5 | |
| LPR6UU-EC042 | 85.5 | |
| LPR6UU-EC043 | 93 | |

| | |
|---|---|
| **Project Name:** LPR RI/FS Caged Bivalve Study | **Project No.:** Task 23.2 |
| **Date/Time:** 6/8/11 07:15 | **Field Crew Initials:** TD, JH |
| **Cage ID:** n/a | **Species:** Ribbed mussel (*Geukensia demissa*), Freshwater mussel (*Elliptio complanata)* |
| **Post deployment** | |
| **Comments:** Day 91 for 1-5 and Day 90 for Reaches 6-8 | |

| Specimen ID | Shell Length (cm) | Comments |
|---|---|---|
| LPR6UU-EC044 | 91 | |
| LPR6UU-EC045 | 83 | |
| LPR6UU-EC046 | 96 | |
| LPR6UU-EC051 | 102.5 | |
| LPR6UU-EC052 | 85 | |
| LPR6UU-EC053 | 82 | |
| LPR6UU-EC054 | 82 | |
| LPR6UU-EC055 | 89 | |
| LPR6UU-EC056 | 90 | |
| LPR6UU-EC061 | 87 | |
| LPR6UU-EC062 | 90 | |
| LPR6UU-EC063 | 88 | |
| LPR6UU-EC064 | 75 | |
| LPR6UU-EC065 | 86.5 | |
| LPR6UU-EC066 | 89 | |
| LPR6UU-EC067 | 88 | |
| LPR6UU-EC068 | 80 | |
| LPR6UU-EC069 | 77 | |
| LPR6UU-EC070 | 78 | |
| LPR6UU-EC071 | 83 | |
| LPR6UU-EC072 | 92 | |
| LPR6UU-EC073 | 83 | |
| LPR6UU-EC074 | 87 | |
| LPR6UU-EC075 | 79.5 | |
| LPR6UU-EC076 | 80.5 | |
| LPR6UU-EC077 | 94.5 | |
| LPR6UU-EC078 | 86 | |
| LPR6UU-EC079 | 81 | |
| LPR6UU-EC080 | 103.5 | |
| LPR6UU-EC081 | 89 | |
| LPR6UU-EC082 | 90.5 | |
| LPR6UU-EC083 | 84 | |
| LPR6UU-EC084 | 81 | |

| | |
|---|---|
| **Project Name:** LPR RI/FS Caged Bivalve Study | **Project No.:** Task 23.2 |
| **Date/Time:** 6/8/11 07:15 | **Field Crew Initials:** TD, JH |
| **Cage ID:** n/a | **Species:** Ribbed mussel (*Geukensia demissa*), Freshwater mussel (*Elliptio complanata)* |
| **Post deployment** | |
| **Comments:** Day 91 for 1-5 and Day 90 for Reaches 6-8 | |

| Specimen ID | Shell Length (cm) | Comments |
|---|---|---|
| LPR6UU-EC085 | 86.5 | |
| LPR6UU-EC086 | 90 | |
| LPR6UU-EC087 | 76.5 | |
| LPR6UU-EC088 | 78 | |
| LPR6UU-EC089 | 96 | |
| LPR6UU-EC090 | 80 | |
| LPR6UU-EC091 | 90.5 | |
| LPR6UU-EC092 | 83 | |
| LPR6UU-EC093 | 87 | |
| LPR6UU-EC094 | 87 | |
| LPR6UU-EC095 | 98 | |
| LPR6UU-EC096 | 88 | |
| LPR6UU-EC097 | 82 | |
| LPR6UU-EC098 | 98 | |
| LPR6UU-EC099 | 79 | |
| LPR6UU-EC100 | 83 | |
| LPR7ZZ-EC121 | 86 | |
| LPR7ZZ-EC122 | 89.5 | |
| LPR7ZZ-EC123 | 78 | |
| LPR7ZZ-EC124 | 96 | |
| LPR7ZZ-EC125 | 90.5 | |
| LPR7ZZ-EC126 | 86 | |
| LPR7ZZ-EC127 | 84 | |
| LPR7ZZ-EC128 | 94 | |
| LPR7ZZ-EC129 | 78 | |
| LPR7ZZ-EC131 | 87.5 | |
| LPR7ZZ-EC132 | 86 | |
| LPR7ZZ-EC133 | 80.5 | |
| LPR7ZZ-EC141 | 85.5 | |
| LPR7ZZ-EC142 | 87 | |
| LPR7ZZ-EC143 | 85.5 | |
| LPR7ZZ-EC144 | 93 | |
| LPR7ZZ-EC145 | 90.5 | |

| | |
|---|---|
| **Project Name:** LPR RI/FS Caged Bivalve Study | **Project No.:** Task 23.2 |
| **Date/Time:** 6/8/11 07:15 | **Field Crew Initials:** TD, JH |
| **Cage ID:** n/a | **Species:** Ribbed mussel (*Geukensia demissa*), Freshwater mussel (*Elliptio complanata)* |
| **Post deployment** | |
| **Comments:** Day 91 for 1-5 and Day 90 for Reaches 6-8 | |

| Specimen ID | Shell Length (cm) | Comments |
|---|---|---|
| LPR7ZZ-EC146 | 97.5 | |
| LPR7ZZ-EC147 | 95.5 | |
| LPR7ZZ-EC148 | 85 | |
| LPR7ZZ-EC149 | 85 | |
| LPR7ZZ-EC150 | 75 | |
| LPR7ZZ-EC151 | 83 | |
| LPR7ZZ-EC152 | 88 | |
| LPR7ZZ-EC153 | 78 | |
| LPR7ZZ-EC154 | 96 | |
| LPR7ZZ-EC155 | 91 | |
| LPR7ZZ-EC156 | 90.5 | |
| LPR7ZZ-EC157 | 80 | |
| LPR7ZZ-EC158 | 92.5 | |
| LPR7ZZ-EC159 | 91 | |
| LPR7ZZ-EC160 | 90.5 | |
| LPR7ZZ-EC161 | 88.5 | |
| LPR7ZZ-EC162 | 82 | |
| LPR7ZZ-EC163 | Dead | Empty shell |
| LPR7ZZ-EC164 | 90 | |
| LPR7ZZ-EC165 | 80.5 | |
| LPR7ZZ-EC166 | 96 | |
| LPR7ZZ-EC167 | 86 | |
| LPR7ZZ-EC168 | 84 | |
| LPR7ZZ-EC169 | 78 | |
| LPR7ZZ-EC170 | 81.5 | |
| LPR7ZZ-EC171 | 91.5 | |
| LPR7ZZ-EC172 | 88 | |
| LPR7ZZ-EC173 | 86.5 | |
| LPR7ZZ-EC174 | 82.5 | |
| LPR7ZZ-EC175 | 81 | |
| LPR7ZZ-EC176 | 89 | |
| LPR7ZZ-EC177 | 85 | |
| LPR7ZZ-EC178 | 83 | |

| | |
|---|---|
| **Project Name:** LPR RI/FS Caged Bivalve Study | **Project No.:** Task 23.2 |
| **Date/Time:** 6/8/11 07:15 | **Field Crew Initials:** TD, JH |
| **Cage ID:** n/a | **Species:** Ribbed mussel (*Geukensia demissa*), Freshwater mussel (*Elliptio complanata)* |
| **Post deployment** | |
| **Comments:** Day 91 for 1-5 and Day 90 for Reaches 6-8 | |

| Specimen ID | Shell Length (cm) | Comments |
|---|---|---|
| LPR7ZZ-EC179 | 89 | |
| LPR7ZZ-EC180 | 85 | |
| LPR7ZZ-EC181 | 89 | |
| LPR7ZZ-EC182 | 97.5 | |
| LPR7ZZ-EC183 | 83.5 | |
| LPR7ZZ-EC184 | 86.5 | |
| LPR7ZZ-EC185 | 91.5 | |
| LPR7ZZ-EC186 | 82.5 | |
| LPR7ZZ-EC187 | 91 | |
| LPR7ZZ-EC188 | 85 | |
| LPR7ZZ-EC189 | 83.5 | |
| LPR7ZZ-EC190 | 84 | |
| LPR7ZZ-EC201 | 88.5 | |
| LPR7ZZ-EC202 | 96 | |
| LPR7ZZ-EC203 | 97.5 | |
| LPR7ZZ-EC204 | 81 | |
| LPR7ZZ-EC205 | 85 | |
| LPR7ZZ-EC206 | 92.5 | |
| LPR7ZZ-EC207 | 78 | |
| LPR7ZZ-EC208 | 88.5 | |
| LPR7ZZ-EC209 | 81.5 | |
| LPR7ZZ-EC210 | 85 | |
| LPR7ZZ-EC211 | 97 | |
| LPR7ZZ-EC212 | 87 | |
| LPR7ZZ-EC213 | Dead | Empty shell |
| LPR7ZZ-EC214 | 89.5 | |
| LPR7ZZ-EC215 | 81 | |
| LPR7ZZ-EC216 | 90 | |
| LPR7ZZ-EC217 | 83.5 | |
| LPR7ZZ-EC218 | 91 | |
| LPR7ZZ-EC219 | 86.5 | |
| LPR7ZZ-EC220 | 83 | |
| LPR7AB-EC221 | 80.5 | |

| | |
|---|---|
| **Project Name:** LPR RI/FS Caged Bivalve Study | **Project No.:** Task 23.2 |
| **Date/Time:** 6/8/11 07:15 | **Field Crew Initials:** TD, JH |
| **Cage ID:** n/a | **Species:** Ribbed mussel (*Geukensia demissa*), Freshwater mussel (*Elliptio complanata)* |
| **Post deployment** | |
| **Comments:** Day 91 for 1-5 and Day 90 for Reaches 6-8 | |

| Specimen ID | Shell Length (cm) | Comments |
|---|---|---|
| LPR7AB-EC222 | 85.5 | |
| LPR7AB-EC223 | 91 | |
| LPR7AB-EC224 | 82.5 | |
| LPR7AB-EC225 | 79 | |
| LPR7AB-EC226 | 97.5 | |
| LPR7AB-EC231 | 98 | |
| LPR7AB-EC232 | 89.5 | |
| LPR7AB-EC233 | 88.5 | |
| LPR7AB-EC234 | 82.5 | |
| LPR7AB-EC235 | 89 | |
| LPR7AB-EC236 | 83 | |
| LPR7AB-EC241 | 89 | |
| LPR7AB-EC242 | 88 | |
| LPR7AB-EC243 | 81 | |
| LPR7AB-EC244 | 88.5 | |
| LPR7AB-EC245 | 96 | |
| LPR7AB-EC246 | 89.5 | |
| LPR7AB-EC247 | 85 | |
| LPR7AB-EC248 | 77.5 | |
| LPR7AB-EC249 | 83 | |
| LPR7AB-EC250 | 94 | |
| LPR7AB-EC251 | 89 | |
| LPR7AB-EC252 | 95 | |
| LPR7AB-EC253 | 109.5 | |
| LPR7AB-EC254 | 80 | |
| LPR7AB-EC255 | 86.5 | |
| LPR7AB-EC256 | 98 | |
| LPR7AB-EC257 | 88.5 | |
| LPR7AB-EC258 | 87.5 | |
| LPR7AB-EC259 | 88 | |
| LPR7AB-EC260 | 78 | |
| LPR7AB-EC261 | 79 | |
| LPR7AB-EC262 | 84.5 | |

| | |
|---|---|
| **Project Name:** LPR RI/FS Caged Bivalve Study | **Project No.:** Task 23.2 |
| **Date/Time:** 6/8/11 07:15 | **Field Crew Initials:** TD, JH |
| **Cage ID:** n/a | **Species:** Ribbed mussel (*Geukensia demissa*), Freshwater mussel (*Elliptio complanata)* |
| **Post deployment** | |
| **Comments:** Day 91 for 1-5 and Day 90 for Reaches 6-8 | |

| Specimen ID | Shell Length (cm) | Comments |
|---|---|---|
| LPR7AB-EC263 | 87 | |
| LPR7AB-EC264 | 79 | |
| LPR7AB-EC265 | 87 | |
| LPR7AB-EC266 | 83 | |
| LPR7AB-EC267 | 81 | |
| LPR7AB-EC268 | 79.5 | |
| LPR7AB-EC269 | 87 | |
| LPR7AB-EC270 | Dead | Empty shell |
| LPR7AB-EC271 | 86.5 | |
| LPR7AB-EC272 | 83.5 | |
| LPR7AB-EC273 | 91.5 | |
| LPR7AB-EC274 | 86.5 | |
| LPR7AB-EC275 | 83.5 | |
| LPR7AB-EC276 | 85.5 | |
| LPR7AB-EC277 | 83 | |
| LPR7AB-EC278 | 91 | |
| LPR7AB-EC279 | 90 | |
| LPR7AB-EC280 | 85 | |
| LPR8AC-EC282 | Dead | Empty shell |
| LPR8AC-EC283 | Dead | Empty shell |
| LPR8AC-EC285 | 92.5 | |
| LPR8AC-EC286 | 86.5 | |
| LPR8AC-EC291 | Dead | Empty shell |
| LPR8AC-EC292 | Dead | Empty shell |
| LPR8AC-EC293 | Dead | Empty shell |
| LPR8AC-EC294 | Dead | Empty shell |
| LPR8AC-EC295 | Dead | Empty shell |
| LPR8AC-EC304 | Dead | Empty shell |
| LPR8AC-EC305 | 91.5 | |
| LPR8AC-EC306 | Dead | Empty shell |
| LPR8AC-EC307 | 92.5 | |
| LPR8AC-EC314 | Dead | Empty shell |
| LPR8AC-EC325 | Dead | Empty shell |

| | |
|---|---|
| **Project Name:** LPR RI/FS Caged Bivalve Study | **Project No.:** Task 23.2 |
| **Date/Time:** 6/8/11 07:15 | **Field Crew Initials:** TD, JH |
| **Cage ID:** n/a | **Species:** Ribbed mussel (*Geukensia demissa*), Freshwater mussel (*Elliptio complanata)* |
| **Post deployment** | |
| **Comments:** Day 91 for 1-5 and Day 90 for Reaches 6-8 | |

| Specimen ID | Shell Length (cm) | Comments |
|---|---|---|
| LPR8AC-EC331 | Dead | Empty shell |
| LPR6VV-EC341 | 83 | |
| LPR6VV-EC342 | 89 | |
| LPR6VV-EC343 | 84.5 | |
| LPR6VV-EC344 | 88 | |
| LPR6VV-EC345 | 92.5 | |
| LPR6VV-EC346 | 83.5 | |
| LPR6VV-EC351 | 91.5 | |
| LPR6VV-EC352 | 95 | |
| LPR6VV-EC353 | 76.5 | |
| LPR6VV-EC354 | 92 | |
| LPR6VV-EC355 | 95 | |
| LPR6VV-EC356 | 88 | |
| LPR6VV-EC361 | 80 | |
| LPR6VV-EC362 | 90.5 | |
| LPR6VV-EC363 | 95 | |
| LPR6VV-EC364 | 96 | |
| LPR6VV-EC365 | 89 | |
| LPR6VV-EC366 | 84 | |
| LPR6VV-EC367 | 79 | |
| LPR6VV-EC368 | 90 | |
| LPR6VV-EC369 | 83 | |
| LPR6VV-EC370 | 89 | |
| LPR6VV-EC371 | 76.5 | |
| LPR6VV-EC372 | 79 | |
| LPR6VV-EC373 | 80.5 | |
| LPR6VV-EC374 | 90 | |
| LPR6VV-EC375 | 82 | |
| LPR6VV-EC376 | 77.5 | |
| LPR6VV-EC377 | 83 | |
| LPR6VV-EC378 | 83 | |
| LPR6VV-EC379 | 83 | |
| LPR6VV-EC380 | 83 | |

| | |
|---|---|
| **Project Name:** LPR RI/FS Caged Bivalve Study | **Project No.:** Task 23.2 |
| **Date/Time:** 6/8/11 07:15 | **Field Crew Initials:** TD, JH |
| **Cage ID:** n/a | **Species:** Ribbed mussel (*Geukensia demissa*), Freshwater mussel (*Elliptio complanata)* |
| **Post deployment** | |
| **Comments:** Day 91 for 1-5 and Day 90 for Reaches 6-8 | |

| Specimen ID | Shell Length (cm) | Comments |
|---|---|---|
| LPR6VV-EC381 | 81 | |
| LPR6VV-EC382 | 84 | |
| LPR6VV-EC383 | 81.5 | |
| LPR6VV-EC384 | 82 | |
| LPR6VV-EC385 | 78 | |
| LPR6VV-EC386 | 80 | |
| LPR6VV-EC387 | 80 | |
| LPR6VV-EC388 | 86 | |
| LPR6VV-EC389 | 81 | |
| LPR6VV-EC390 | Dead | Empty shell |
| LPR6VV-EC391 | 84 | |
| LPR6VV-EC392 | 84 | |
| LPR6VV-EC393 | 82 | |
| LPR6VV-EC394 | 81 | |
| LPR6VV-EC395 | 80 | |
| LPR6VV-EC396 | 79 | |
| LPR6VV-EC397 | 78 | |
| LPR6VV-EC398 | 78.5 | |
| LPR6VV-EC399 | 79 | |
| LPR6VV-EC400 | 90 | |

# Examination Forms

## Caged Bivalve Examination Form

**Project Name:** Passaic RI/FS Caged Bivalve Study **Project No.:** Task 23.2

**Examination Date/Time:** 3/8/2011 12:10 **Field Crew Initials:** KT, TD, AR, JH

**Location ID:** LPR Background **Species:** GD

**Comments:** 10 ppt

Intentionally Chose mussels for health assessment that had oyster spat on shell. Mussel tissue blotted dry. Weight does not include adductor muscle.

**Observations**

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| **Gape:** Is the shell open or closed? If open, does it respond to a light tap? If closed, is it easily pried open? | Closed tight 80 mm | Closed tight 83 mm | Closed tight 92 mm | Closed tight 74 mm | Closed tight 94 mm |
| **Mantle condition:** Mantle should be thick and not transparent. | Thick | Thick | Thick | Thick | Thick |
| **Color:** Color may vary from white to pale yellow. | Yellow | Yellow | Yellow | Yellow | Yellow |
| **Tone (tissue firmness):** Meat should be firm, and not loose and "milky." | Firm | Firm | Firm | Firm | Firm |
| **Odor:** Is there a rancid odor? | No | No | No | No | No |
| **Parasites:** Are they present? | Oyster spat on shell. No internal parasites | Oyster spat on shell. No internal parasites | Oyster spat on shell. No internal parasites | Oyster spat on shell. No internal parasites | Oyster spat on shell. No internal parasites |
| **Photos taken:** Record photo number(s). (Blotted dry) weight | #1 3.0 gm | #2 3.9 gm | #3 5.5 gm | #7 3.8 gm | #9 5.4 gm |

## Caged Bivalve Examination Form

**Project Name:** Passaic RI/FS Caged Bivalve Study **Project No.:** Task 23.2

**Examination Date/Time:** 3/9/11 1500 **Field Crew Initials:** TD

**Location ID:** LPR Background **Species:** EC

**Comments:**

| **Observations** | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| **Gape:** Is the shell open or closed? If open, does it respond to a light tap? If closed, is it easily pried open? | closed tight 81 m | closed tight 88m | closed tight 89m | closed tight 90 m | closed tight 96 m |
| **Mantle condition:** Mantle should be thick and not transparent. | Thick | Thick | Thick | Thick | Thick |
| **Color:** Color may vary from white to pale yellow. | tan | tan | tan | tan | tan |
| **Tone (tissue firmness):** Meat should be firm, and not loose and "milky." | Firm | Firm | Firm | Firm | Firm |
| **Odor:** Is there a rancid odor? | None | None | None | None | None |
| **Parasites:** Are they present? | None | None | None | None | None |
| **Photos taken:** Record photo number(s). | #12 | #13 | #14 | #15 | #16 |
| Tissue blotted dry (weight) | 10.5g | 14.5g | 15.9g | 16.9g | 20.5g |

## Caged Bivalve Examination Form

**Project Name:** Passaic RI/FS Caged Bivalve Study **Project No.:** Task 23.2

**Examination Date/Time:** 3.23.11 / 0816 **Field Crew Initials:** TD, AR

**Location ID:** LPR1XX **Species:** GD

**Comments:**

### Observations

| | | |
|---|---|---|
| **Gape:** Is the shell open or closed? If open, does it respond to a light tap? If closed, is it easily pried open? | (AR) ~~P009~~ GD009 Closed tight 76.5 mm | (AR) ~~P010~~ GD010 Closed tight 87 mm |
| **Mantle condition:** Mantle should be thick and not transparent. | Thick | Thick |
| **Color:** Color may vary from white to pale yellow. | Yellow | Yellow |
| **Tone (tissue firmness):** Meat should be firm, and not loose and "milky." | Thin & firm | Thin & firm |
| **Odor:** Is there a rancid odor? | None | None |
| **Parasites:** Are they present? | None | None |
| **Photos taken:** Record photo number(s). | #1 | #1 |

## Caged Bivalve Examination Form

**Project Name:** Passaic RI/FS Caged Bivalve Study **Project No.:** Task 23.2

**Examination Date/Time:** 3.23.11 / 0932 **Field Crew Initials:** TD, AR

**Location ID:** LFR 2AD **Species:** GD

**Comments:**

| **Observations** | GD089 | GD090 |
|---|---|---|
| **Gape:** Is the shell open or closed? If open, does it respond to a light tap? If closed, is it easily pried open? | Closed tight<br>89.5mm | Closed tight<br>80mm |
| **Mantle condition:** Mantle should be thick and not transparent. | Thick | Thick |
| **Color:** Color may vary from white to pale yellow. | Yellow | Yellow |
| **Tone (tissue firmness):** Meat should be firm, and not loose and "milky." | Thin & firm | Thin & firm |
| **Odor:** Is there a rancid odor? | NONE | NONE |
| **Parasites:** Are they present? | NONE | NONE |
| **Photos taken:** Record photo number(s). | #2 | #2 |

## Caged Bivalve Examination Form

**Project Name:** Passaic RI/FS Caged Bivalve Study **Project No.:** Task 23.2

**Examination Date/Time:** 3.23.11 1023 **Field Crew Initials:** TD, AR

**Location ID:** LPR355 **Species:** GD

**Comments:**

**Observations**

| | GD169 | GD170 |
|---|---|---|
| **Gape:** Is the shell open or closed? If open, does it respond to a light tap? If closed, is it easily pried open? | Closed tight 81 mm | closed tight 88m |
| **Mantle condition:** Mantle should be thick and not transparent. | Thick | Thick |
| **Color:** Color may vary from white to pale yellow. | Yellow | Yellow |
| **Tone (tissue firmness):** Meat should be firm, and not loose and "milky." | Thin & firm | Thin & firm |
| **Odor:** Is there a rancid odor? | NONE | None |
| **Parasites:** Are they present? | NONE | None |
| **Photos taken:** Record photo number(s). | #3 | #3 |

## Caged Bivalve Examination Form

**Project Name:** Passaic RI/FS Caged Bivalve Study **Project No.:** Task 23.2

**Examination Date/Time:** 3.23.11 / 1149 **Field Crew Initials:** TD, AR

**Location ID:** LPR4-2Z **Species:** GD

**Comments:** EPA split

| **Observations** | GD329 | GD330 |
|---|---|---|
| **Gape:** Is the shell open or closed? If open, does it respond to a light tap? If closed, is it easily pried open? | Closed tight 97mm | Closed tight 104mm |
| **Mantle condition:** Mantle should be thick and not transparent. | Thick | Thick |
| **Color:** Color may vary from white to pale yellow. | Pale Yellow | Pale yellow |
| **Tone (tissue firmness):** Meat should be firm, and not loose and "milky." | Thin & firm | Thin & firm |
| **Odor:** Is there a rancid odor? | None | None |
| **Parasites:** Are they present? | None | None |
| **Photos taken:** Record photo number(s). | #4 | #4 |

## Caged Bivalve Examination Form

**Project Name:** Passaic RI/FS Caged Bivalve Study **Project No.:** Task 23.2

**Examination Date/Time:** 3.23.11 / 1212 **Field Crew Initials:** AR, TD

**Location ID:** LPR4AB **Species:** GD

**Comments:**

| | **Observations** GD249 | GD250 |
|---|---|---|
| **Gape:** Is the shell open or closed? If open, does it respond to a light tap? If closed, is it easily pried open? | Close tight 96.5mm | closed tight 95mm |
| **Mantle condition:** Mantle should be thick and not transparent. | Thick | Thick |
| **Color:** Color may vary from white to pale yellow. | Yellow Pale | Yellow pale |
| **Tone (tissue firmness):** Meat should be firm, and not loose and "milky." | Thin & firm | Thin & firm |
| **Odor:** Is there a rancid odor? | None | None |
| **Parasites:** Are they present? | None | None |
| **Photos taken:** Record photo number(s). | #5 | #5 |

## Caged Bivalve Examination Form

**Project Name:** Passaic RI/FS Caged Bivalve Study **Project No.:** Task 23.2

**Examination Date/Time:** 3.23.11/1315 **Field Crew Initials:** AK, JD

**Location ID:** LPR5XX **Species:** GD

**Comments:**

### Observations GD490

| | |
|---|---|
| **Gape:** Is the shell open or closed? If open, does it respond to a light tap? If closed, is it easily pried open? | Closed tight<br>99 mm |
| **Mantle condition:** Mantle should be thick and not transparent. | Thick |
| **Color:** Color may vary from white to pale yellow. | Pale Yellow |
| **Tone (tissue firmness):** Meat should be firm, and not loose and "milky." | Thick & firm |
| **Odor:** Is there a rancid odor? | None |
| **Parasites:** Are they present? | None |
| **Photos taken:** Record photo number(s). | # 6 |

## Caged Bivalve Examination Form

**Project Name:** Passaic RI/FS Caged Bivalve Study **Project No.:** Task 23.2

**Examination Date/Time:** 3.23.11 / 1334 **Field Crew Initials:** AR, TD

**Location ID:** LPR5YY **Species:** GD

**Comments:**

| **Observations** | GD569 | GD570 |
|---|---|---|
| **Gape:** Is the shell open or closed? If open, does it respond to a light tap? If closed, is it easily pried open? | Closed tight 76mm | closed tight 81mm |
| **Mantle condition:** Mantle should be thick and not transparent. | Thick | thick |
| **Color:** Color may vary from white to pale yellow. | Pale yellow | pale yellow |
| **Tone (tissue firmness):** Meat should be firm, and not loose and "milky." | Thin & firm | Thin & firm |
| **Odor:** Is there a rancid odor? | None | None |
| **Parasites:** Are they present? | None | None |
| **Photos taken:** Record photo number(s). | #7 | #7 |

## Caged Bivalve Examination Form

**Project Name:** Passaic RI/FS Caged Bivalve Study **Project No.:** Task 23.2

**Examination Date/Time:** 03.24.11/0845 **Field Crew Initials:** AR, JD

**Location ID:** LPR6VV **Species:** EC

**Comments:**

| **Observations** | EC349 | EC350 |
|---|---|---|
| **Gape:** Is the shell open or closed? If open, does it respond to a light tap? If closed, is it easily pried open? | Closed tight 86mm | Closed tight 81.5 |
| **Mantle condition:** Mantle should be thick and not transparent. | Thick | Thick |
| **Color:** Color may vary from white to pale yellow. | Beige / tan | Beige / tan |
| **Tone (tissue firmness):** Meat should be firm, and not loose and "milky." | Firm | Firm |
| **Odor:** Is there a rancid odor? | None | None |
| **Parasites:** Are they present? | None | None |
| **Photos taken:** Record photo number(s). | #8 | #8 |

## Caged Bivalve Examination Form

**Project Name:** Passaic RI/FS Caged Bivalve Study **Project No.:** Task 23.2

**Examination Date/Time:** 03.24.11 / 0908 **Field Crew Initials:** AR, TD

**Location ID:** LPREUU **Species:** EC

**Comments:**

| **Observations** | ECO 49 | ECO50 |
|---|---|---|
| **Gape:** Is the shell open or closed? If open, does it respond to a light tap? If closed, is it easily pried open? | Closed tight 78mm | Closed tight 90mm |
| **Mantle condition:** Mantle should be thick and not transparent. | Thick | Thick |
| **Color:** Color may vary from white to pale yellow. | Beige/tan | Beige/tan |
| **Tone (tissue firmness):** Meat should be firm, and not loose and "milky." | Firm | Firm |
| **Odor:** Is there a rancid odor? | NONE | NONE |
| **Parasites:** Are they present? | NONE | NONE |
| **Photos taken:** Record photo number(s). | #9 | #9 |

## Caged Bivalve Examination Form

**Project Name:** Passaic RI/FS Caged Bivalve Study **Project No.:** Task 23.2

**Examination Date/Time:** 08/24/11/1020 **Field Crew Initials:** AR, TD

**Location ID:** LPR22 **Species:** EC

**Comments:**

**Observations** EC ~~130~~ 140 ~~EC~~ (AR)

| | | |
|---|---|---|
| **Gape:** Is the shell open or closed? If open, does it respond to a light tap? If closed, is it easily pried open? | Closed tight 77.5 | ~~Closed tight~~ (AR) |
| **Mantle condition:** Mantle should be thick and not transparent. | Thick | ~~Thick~~ (AR) |
| **Color:** Color may vary from white to pale yellow. | Beige / tan | |
| **Tone (tissue firmness):** Meat should be firm, and not loose and "milky." | Firm | |
| **Odor:** Is there a rancid odor? | NONE | |
| **Parasites:** Are they present? | NONE | |
| **Photos taken:** Record photo number(s). | # 10 | |

## Caged Bivalve Examination Form

**Project Name:** Passaic RI/FS Caged Bivalve Study **Project No.:** Task 23.2

**Examination Date/Time:** 08.24.11/ 1106 **Field Crew Initials:** AR, TD

**Location ID:** LPR 7A B **Species:** EC

**Comments:**

| **Observations** | EC229 | EC230 |
|---|---|---|
| **Gape:** Is the shell open or closed? If open, does it respond to a light tap? If closed, is it easily pried open? | Closed tight 79 mm | Closed tight 89 mm |
| **Mantle condition:** Mantle should be thick and not transparent. | Thick | Thick |
| **Color:** Color may vary from white to pale yellow. | Beige / tan | Beige/tan |
| **Tone (tissue firmness):** Meat should be firm, and not loose and "milky." | Firm | Firm |
| **Odor:** Is there a rancid odor? | None | None |
| **Parasites:** Are they present? | None | None |
| **Photos taken:** Record photo number(s). | #11 | #11 |

## Caged Bivalve Examination Form

**Project Name:** Passaic RI/FS Caged Bivalve Study **Project No.:** Task 23.2

**Examination Date/Time:** 03.24.11/ 1144 **Field Crew Initials:** AR, TD

**Location ID:** LPR28 AC **Species:** EC

**Comments:**

| **Observations** | EC289 | EC290 |
|---|---|---|
| **Gape:** Is the shell open or closed? If open, does it respond to a light tap? If closed, is it easily pried open? | Closed tight 71mm | Closed tight 78mm |
| **Mantle condition:** Mantle should be thick and not transparent. | Thick | Thick |
| **Color:** Color may vary from white to pale yellow. | Beige/tan | Beige/tan |
| **Tone (tissue firmness):** Meat should be firm, and not loose and "milky." | Firm | Firm |
| **Odor:** Is there a rancid odor? | NONE | NONE |
| **Parasites:** Are they present? | NONE | NONE |
| **Photos taken:** Record photo number(s). | #12 | #12 |

## Caged Bivalve Examination Form

**Project Name:** Passaic RI/FS Caged Bivalve Study **Project No.:** Task 23.2

**Examination Date/Time:** 4.13.11 / 0830 **Field Crew Initials:** JMF, TWD

**Location ID:** LPR1XX **Species:** ribbed mussels (GD)

**Comments:**

| **Observations** | GD011 | GD012 |
|---|---|---|
| **Gape:** Is the shell open or closed? If open, does it respond to a light tap? If closed, is it easily pried open? | Closed tight 79mm | Closed tight 78mm. |
| **Mantle condition:** Mantle should be thick and not transparent. | thick | thick |
| **Color:** Color may vary from white to pale yellow. | pale yellow | pale yellow |
| **Tone (tissue firmness):** Meat should be firm, and not loose and "milky." | thin but firm | thin but firm |
| **Odor:** Is there a rancid odor? | none | none |
| **Parasites:** Are they present? | none | none |
| **Photos taken:** Record photo number(s). | 1 | 2 |

## Caged Bivalve Examination Form

**Project Name:** Passaic RI/FS Caged Bivalve Study **Project No.:** Task 23.2

**Examination Date/Time:** 4.13.11/0915 **Field Crew Initials:** JMF, TND

**Location ID:** LPR2AD **Species:** GD

**Comments:**

**Observations** GD091 GD ~~092~~ 093

| | | |
|---|---|---|
| **Gape:** Is the shell open or closed? If open, does it respond to a light tap? If closed, is it easily pried open? | Closed tight 76.5mm | closed tight 76mm |
| **Mantle condition:** Mantle should be thick and not transparent. | ~~thin~~ + ~~firm~~ thick | thick |
| **Color:** Color may vary from white to pale yellow. | pale yellow | pale yellow |
| **Tone (tissue firmness):** Meat should be firm, and not loose and "milky." | thin + firm | thin + firm |
| **Odor:** Is there a rancid odor? | none | none |
| **Parasites:** Are they present? | none | none |
| **Photos taken:** Record photo number(s). | 3 | 4 |

## Caged Bivalve Examination Form

**Project Name:** Passaic RI/FS Caged Bivalve Study **Project No.:** Task 23.2

**Examination Date/Time:** 4.13.11 **Field Crew Initials:** JMF, TND

**Location ID:** LPR 355/1030 **Species:** GD

**Comments:**

| **Observations** | GD171 | GD172 |
|---|---|---|
| **Gape:** Is the shell open or closed? If open, does it respond to a light tap? If closed, is it easily pried open? | closed tight 105.5 | closed tight 88.5 |
| **Mantle condition:** Mantle should be thick and not transparent. | thick | thick |
| **Color:** Color may vary from white to pale yellow. | pale yellow | pale yellow |
| **Tone (tissue firmness):** Meat should be firm, and not loose and "milky." | thin+firm | thin+firm |
| **Odor:** Is there a rancid odor? | none | none |
| **Parasites:** Are they present? | none | none |
| **Photos taken:** Record photo number(s). | 5 | 6 |

## Caged Bivalve Examination Form

**Project Name:** Passaic RI/FS Caged Bivalve Study **Project No.:** Task 23.2

**Examination Date/Time:** 4.13.11 / 1100 **Field Crew Initials:** JMF, TND

**Location ID:** LPR 4 ZZ **Species:** GD

**Comments:**

| **Observations** | GD 339 | GD ~~340~~ 337 |
|---|---|---|
| **Gape:** Is the shell open or closed? If open, does it respond to a light tap? If closed, is it easily pried open? | tightly closed 102 | slightly gaped open 86 |
| **Mantle condition:** Mantle should be thick and not transparent. | thick | thick |
| **Color:** Color may vary from white to pale yellow. | pale yellow | pale yellow |
| **Tone (tissue firmness):** Meat should be firm, and not loose and "milky." | thin + firm | thin + firm |
| **Odor:** Is there a rancid odor? | none | none |
| **Parasites:** Are they present? | none | none |
| **Photos taken:** Record photo number(s). | 8 | 7 |

## Caged Bivalve Examination Form

**Project Name:** Passaic RI/FS Caged Bivalve Study **Project No.:** Task 23.2

**Examination Date/Time:** 4.B.11 / 1200 **Field Crew Initials:** JMF, JND

**Location ID:** LPR 4 AB **Species:** GD

**Comments:**

| **Observations** | GD252 | GD 253 |
|---|---|---|
| **Gape:** Is the shell open or closed? If open, does it respond to a light tap? If closed, is it easily pried open? | closed tightly 85.5 | closed tightly 79.0 |
| **Mantle condition:** Mantle should be thick and not transparent. | thick | thick |
| **Color:** Color may vary from white to pale yellow. | pale yellow | pale yellow |
| **Tone (tissue firmness):** Meat should be firm, and not loose and "milky." | firm + thin | firm + thin |
| **Odor:** Is there a rancid odor? | none | none |
| **Parasites:** Are they present? | none | none |
| **Photos taken:** Record photo number(s). | 9 | 10 |

## Caged Bivalve Examination Form

**Project Name:** Passaic RI/FS Caged Bivalve Study **Project No.:** Task 23.2

**Examination Date/Time:** 4.13.11/1315 **Field Crew Initials:** JMF, TND

**Location ID:** LPPSYY **Species:** GD

**Comments:**

**Observations**

| | GD571 | GD572 |
|---|---|---|
| **Gape:** Is the shell open or closed? If open, does it respond to a light tap? If closed, is it easily pried open? | closed tightly 90 mm | closed tightly 91 mm |
| **Mantle condition:** Mantle should be thick and not transparent. | thick | thick |
| **Color:** Color may vary from white to pale yellow. | pale yellow | pale yellow |
| **Tone (tissue firmness):** Meat should be firm, and not loose and "milky." | thin + firm | thin + firm |
| **Odor:** Is there a rancid odor? | none | none |
| **Parasites:** Are they present? | none | none |
| **Photos taken:** Record photo number(s). | 11 | 12 |

## Caged Bivalve Examination Form

**Project Name:** Passaic RI/FS Caged Bivalve Study **Project No.:** Task 23.2

**Examination Date/Time:** 4.14.11 / 0710 **Field Crew Initials:** JMF + TND

**Location ID:** UPR6VV **Species:** EC

**Comments:**

| **Observations** | EC347 | EC348 |
|---|---|---|
| **Gape:** Is the shell open or closed? If open, does it respond to a light tap? If closed, is it easily pried open? | closed tightly 79mm | closed tightly 80mm |
| **Mantle condition:** Mantle should be thick and not transparent. | thick | thick |
| **Color:** Color may vary from white to pale yellow. | tan | tan |
| **Tone (tissue firmness):** Meat should be firm, and not loose and "milky." | firm | firm |
| **Odor:** Is there a rancid odor? | none | none |
| **Parasites:** Are they present? | none | none |
| **Photos taken:** Record photo number(s). | 1 | 2 |

## Caged Bivalve Examination Form

**Project Name:** Passaic RI/FS Caged Bivalve Study **Project No.:** Task 23.2

**Examination Date/Time:** 4.14.11/0810 **Field Crew Initials:** TND, JMF

**Location ID:** LPR6UU **Species:** EC

**Comments:**

| **Observations** | EC047 | EC048 |
|---|---|---|
| **Gape:** Is the shell open or closed? If open, does it respond to a light tap? If closed, is it easily pried open? | closed tightly<br>95.5mm | closed tightly<br>88.5mm |
| **Mantle condition:** Mantle should be thick and not transparent. | thick | thick |
| **Color:** Color may vary from white to pale yellow. | tan | tan |
| **Tone (tissue firmness):** Meat should be firm, and not loose and "milky." | firm | firm |
| **Odor:** Is there a rancid odor? | none | none |
| **Parasites:** Are they present? | none | none |
| **Photos taken:** Record photo number(s). | 3 | 4 |

## Caged Bivalve Examination Form

**Project Name:** Passaic RI/FS Caged Bivalve Study **Project No.:** Task 23.2

**Examination Date/Time:** 4 14 11 / 0830 **Field Crew Initials:** JMF

**Location ID:** LPR7ZZ **Species:** EC

**Comments:**

| **Observations** | EC138 | EC139 |
|---|---|---|
| **Gape:** Is the shell open or closed? If open, does it respond to a light tap? If closed, is it easily pried open? | closed tightly 90.5 mm | closed tightly 81 mm |
| **Mantle condition:** Mantle should be thick and not transparent. | thick | thick |
| **Color:** Color may vary from white to pale yellow. | tan | tan |
| **Tone (tissue firmness):** Meat should be firm, and not loose and "milky." | firm | firm |
| **Odor:** Is there a rancid odor? | none | none |
| **Parasites:** Are they present? | none | none |
| **Photos taken:** Record photo number(s). | 5 | 6 |

## Caged Bivalve Examination Form

**Project Name:** Passaic RI/FS Caged Bivalve Study **Project No.:** Task 23.2

**Examination Date/Time:** 4.14.11 / 0915 **Field Crew Initials:** JMF, TND

**Location ID:** LPR 7AB **Species:** EC

**Comments:**

| **Observations** | EC 227 | EC 228 |
|---|---|---|
| **Gape:** Is the shell open or closed? If open, does it respond to a light tap? If closed, is it easily pried open? | closed tightly 84.5mm | closed tightly 88mm |
| **Mantle condition:** Mantle should be thick and not transparent. | thick | thick |
| **Color:** Color may vary from white to pale yellow. | tan | tan |
| **Tone (tissue firmness):** Meat should be firm, and not loose and "milky." | firm | firm |
| **Odor:** Is there a rancid odor? | none | none |
| **Parasites:** Are they present? | none | none |
| **Photos taken:** Record photo number(s). | 7 | 8 |

## Caged Bivalve Examination Form

**Project Name:** Passaic RI/FS Caged Bivalve Study **Project No.:** Task 23.2

**Examination Date/Time:** 4.14.11 | 0940 **Field Crew Initials:** JMF + TND

**Location ID:** LPR 8 AC **Species:** EC

**Comments:**

| **Observations** | EC 287 | EC 288 |
|---|---|---|
| **Gape:** Is the shell open or closed? If open, does it respond to a light tap? If closed, is it easily pried open? | closed tight 82 mm | closed tight 98 mm |
| **Mantle condition:** Mantle should be thick and not transparent. | thick | thick |
| **Color:** Color may vary from white to pale yellow. | tan | tan |
| **Tone (tissue firmness):** Meat should be firm, and not loose and "milky." | firm | firm |
| **Odor:** Is there a rancid odor? | none | none |
| **Parasites:** Are they present? | none | none |
| **Photos taken:** Record photo number(s). | 9 | 10 |

## Caged Bivalve Examination Form

**Project Name:** Passaic RI/FS Caged Bivalve Study **Project No.:** Task 23.2

**Examination Date/Time:** 05/04/11 08:25 **Field Crew Initials:** MY, TD

**Location ID:** LPR1XX **Species:** GD

**Comments:**

**Observations**

| | GD013 | GD014 |
|---|---|---|
| **Gape:** Is the shell open or closed? If open, does it respond to a light tap? If closed, is it easily pried open? | Closed tight 96.5mm | Closed tight 78mm |
| **Mantle condition:** Mantle should be thick and not transparent. | Thick | Thick |
| **Color:** Color may vary from white to pale yellow. | Pale Yellow | Pale Yellow |
| **Tone (tissue firmness):** Meat should be firm, and not loose and "milky." | Thin & firm | Thin & firm |
| **Odor:** Is there a rancid odor? | No | No |
| **Parasites:** Are they present? | No | No |
| **Photos taken:** Record photo number(s). | 1 | 2 |

## Caged Bivalve Examination Form

**Project Name:** Passaic RI/FS Caged Bivalve Study **Project No.:** Task 23.2

**Examination Date/Time:** 5/04/11 09:19 **Field Crew Initials:** MY, TD

**Location ID:** LPR2AD **Species:** GD

**Comments:**

| **Observations** | GD094 | GD096 |
|---|---|---|
| **Gape:** Is the shell open or closed? If open, does it respond to a light tap? If closed, is it easily pried open? | Closed tight 77.5 mm | closed tight 75.5 mm |
| **Mantle condition:** Mantle should be thick and not transparent. | Thick | Thick |
| **Color:** Color may vary from white to pale yellow. | Pale yellow | Pale yellow |
| **Tone (tissue firmness):** Meat should be firm, and not loose and "milky." | Thin & firm | Thin & firm |
| **Odor:** Is there a rancid odor? | No | No |
| **Parasites:** Are they present? | No | No |
| **Photos taken:** Record photo number(s). | 3 | 4 |

## Caged Bivalve Examination Form

**Project Name:** Passaic RI/FS Caged Bivalve Study **Project No.:** Task 23.2

**Examination Date/Time:** 5/5/11 0744 **Field Crew Initials:** MY, TP

**Location ID:** LPR6VV **Species:** EC

**Comments:**

**Observations** EC 359 EC 360

| | | |
|---|---|---|
| **Gape:** Is the shell open or closed? If open, does it respond to a light tap? If closed, is it easily pried open? | Closed tight 94 mm | Closed tight 81 mm |
| **Mantle condition:** Mantle should be thick and not transparent. | Thick | Thick |
| **Color:** Color may vary from white to pale yellow. | Tan | Tan |
| **Tone (tissue firmness):** Meat should be firm, and not loose and "milky." | Firm | Firm |
| **Odor:** Is there a rancid odor? | No | No |
| **Parasites:** Are they present? | No | No |
| **Photos taken:** Record photo number(s). | 5 | 6 |

## Caged Bivalve Examination Form

**Project Name:** Passaic RI/FS Caged Bivalve Study **Project No.:** Task 23.2

**Examination Date/Time:** 5/5/11 0810 **Field Crew Initials:** MY, TD

**Location ID:** LPR6UU **Species:** EC

**Comments:**

| **Observations** | EC059 | EC060 |
|---|---|---|
| **Gape:** Is the shell open or closed? If open, does it respond to a light tap? If closed, is it easily pried open? | Closed tight<br>79.5 mm | closed tight<br>83.5 mm |
| **Mantle condition:** Mantle should be thick and not transparent. | thick | thick |
| **Color:** Color may vary from white to pale yellow. | Tan | Tan |
| **Tone (tissue firmness):** Meat should be firm, and not loose and "milky." | Firm | Firm |
| **Odor:** Is there a rancid odor? | No | No |
| **Parasites:** Are they present? | No | No |
| **Photos taken:** Record photo number(s). | 7 | 8 |

## Caged Bivalve Examination Form

**Project Name:** Passaic RI/FS Caged Bivalve Study **Project No.:** Task 23.2

**Examination Date/Time:** 5/5/11 0835 **Field Crew Initials:** MY, TD

**Location ID:** LPR722 **Species:** EC

**Comments:**

**Observations**

| | EC136 | EC137 |
|---|---|---|
| **Gape:** Is the shell open or closed? If open, does it respond to a light tap? If closed, is it easily pried open? | Closed tight 80 mm | closed tight 84.5 mm |
| **Mantle condition:** Mantle should be thick and not transparent. | Thick | Thick |
| **Color:** Color may vary from white to pale yellow. | Tan | Tan |
| **Tone (tissue firmness):** Meat should be firm, and not loose and "milky." | Firm | Firm |
| **Odor:** Is there a rancid odor? | No | No |
| **Parasites:** Are they present? | No | No |
| **Photos taken:** Record photo number(s). | 9 | 10 |

## Caged Bivalve Examination Form

**Project Name:** Passaic RI/FS Caged Bivalve Study **Project No.:** Task 23.2

**Examination Date/Time:** 5/5/11 0910 **Field Crew Initials:** MY, TD

**Location ID:** LPR7AB (MY) **Species:** EC

**Comments:**

| **Observations** | EC 239 | EC 240 |
|---|---|---|
| **Gape:** Is the shell open or closed? If open, does it respond to a light tap? If closed, is it easily pried open? | Closed tight<br>81 mm | closed tight<br>84.5 mm |
| **Mantle condition:** Mantle should be thick and not transparent. | Thick | Thick |
| **Color:** Color may vary from white to pale yellow. | Tan | Tan |
| **Tone (tissue firmness):** Meat should be firm, and not loose and "milky." | Firm | Firm |
| **Odor:** Is there a rancid odor? | No | No |
| **Parasites:** Are they present? | No | No |
| **Photos taken:** Record photo number(s). | 11 | 12 |

## Caged Bivalve Examination Form

**Project Name:** Passaic RI/FS Caged Bivalve Study **Project No.:** Task 23.2

**Examination Date/Time:** 5/24/11 08:00 **Field Crew Initials:** MY, TD

**Location ID:** LPR7AB **Species:** EC

**Comments:**

**Observations**

| | 96.5 mm EC237 | 84.5 mm EC238 |
|---|---|---|
| **Gape:** Is the shell open or closed? If open, does it respond to a light tap? If closed, is it easily pried open? | Closed tight | Closed tight |
| **Mantle condition:** Mantle should be thick and not transparent. | Thick | Thick |
| **Color:** Color may vary from white to pale yellow. | Tan | Tan |
| **Tone (tissue firmness):** Meat should be firm, and not loose and "milky." | Firm | Firm |
| **Odor:** Is there a rancid odor? | No | No |
| **Parasites:** Are they present? | No | No |
| **Photos taken:** Record photo number(s). | 1 | 2 |

## Caged Bivalve Examination Form

**Project Name:** Passaic RI/FS Caged Bivalve Study **Project No.:** Task 23.2

**Examination Date/Time:** 5/24/11 08:30 **Field Crew Initials:** MY, TD

**Location ID:** LPR7ZZ **Species:** EC

**Comments:**

| **Observations** | 101 mm EC134 | 79.5 mm EC135 |
|---|---|---|
| **Gape:** Is the shell open or closed? If open, does it respond to a light tap? If closed, is it easily pried open? | Closed tight | Closed tight |
| **Mantle condition:** Mantle should be thick and not transparent. | Thick | Thick |
| **Color:** Color may vary from white to pale yellow. | Tan | Tan |
| **Tone (tissue firmness):** Meat should be firm, and not loose and "milky." | Firm | Firm |
| **Odor:** Is there a rancid odor? | No | No |
| **Parasites:** Are they present? | No | No |
| **Photos taken:** Record photo number(s). | 3 | 4 |

## Caged Bivalve Examination Form

**Project Name:** Passaic RI/FS Caged Bivalve Study **Project No.:** Task 23.2

**Examination Date/Time:** 5/24/11 9:07 **Field Crew Initials:** MY, TD

**Location ID:** LPR6AA **Species:** A

**Comments:**

| **Observations** | 88 mm EC057 | 80 mm EC058 |
|---|---|---|
| **Gape:** Is the shell open or closed? If open, does it respond to a light tap? If closed, is it easily pried open? | Closed tight | Closed tight |
| **Mantle condition:** Mantle should be thick and not transparent. | Thick | Thick |
| **Color:** Color may vary from white to pale yellow. | Tan | Tan |
| **Tone (tissue firmness):** Meat should be firm, and not loose and "milky." | Firm | Firm |
| **Odor:** Is there a rancid odor? | No | No |
| **Parasites:** Are they present? | No | No |
| **Photos taken:** Record photo number(s). | 5 | 6 |

## Caged Bivalve Examination Form

**Project Name:** Passaic RI/FS Caged Bivalve Study **Project No.:** Task 23.2

**Examination Date/Time:** 5.24.11 09:28 **Field Crew Initials:** MY, TD

**Location ID:** LPR-6VV **Species:** EC

**Comments:**

| **Observations** | 90mm EC357 | 83mm EC358 |
|---|---|---|
| **Gape:** Is the shell open or closed? If open, does it respond to a light tap? If closed, is it easily pried open? | Tight; closed | Tight; closed |
| **Mantle condition:** Mantle should be thick and not transparent. | Thick | Thick |
| **Color:** Color may vary from white to pale yellow. | Tan | Tan |
| **Tone (tissue firmness):** Meat should be firm, and not loose and "milky." | Firm | Firm |
| **Odor:** Is there a rancid odor? | No | No |
| **Parasites:** Are they present? | No | No |
| **Photos taken:** Record photo number(s). | 7 | 8 |

# APPENDIX B. FIELD NOTEBOOK

3.8.11 Ribbed A. Rodriguez

1150 Mussels arrive from Aquatic Research Organism lab to the Rutherford field facility

Field lab crew: A. Rodriguez, T. Do
K. Tobiason, J. Huybregts

Record avg. wt. from the "fresh kill" mussels that arrived from ARO; not used for Health Assessments

Weight (g): 7.5
7.6
5.2
3.8
6.6
6.5
* 3.0 Not a "fresh kill" mussel
10.7

Total = 50.9g Avg = 6.4 g

Five mussels used for Healt Assessments with 10 ppt salinity & corresponding wts:

3.9 g
*3.0 g
5.5g
3.8 g
5.4g

All muscle tissue was blotted dry & excludes adductor muscle

Avg. wt = 4.3 g



3.8.11 A. Rodriguez

Five mussels processed for Healt Assessments w/ 2 ppt salinity

~~5.2g~~ 4.3g
6.0g
5.5g
4.4g
5.3g

Tissue was blotted dry & excludes adductor muscle

Avg Wt. = 5.1g

Avg wt of all 10 mussels used for Health Assessments Avg wt. = 4.7g per mussel

Photo #5 Whole mussels used for Health Assessments at 2ppt

Avg wt. of each mussel = 4.7g in the field lab

Field avg. wt ≈ 4.5g per mussel

Tissue wt. req. for chem analysis = 105g minimum

The estimated # of mussels needed to meet tissue reqs. $\frac{105g}{4.5g}$ = 23.3 ~ 25 mussels

8 mussels per location to sacrifice @ periodic checks plus ~ 10% for mortality

Total ~ 40 mussels per cage & 80 mussels per location

Except @ LPR 422, EPA split sample location

Tissue wt. req for chem analysis = 320g in addition to the original 105g tissue requirement.

3.8.11 A. Rodriguez

The estimated # of ribbed mussels needed to meet the tissue reqs @ LPR422 EPA split sample location

320 g / 4.5 g = 72 mussels + 10% Contingency ~ 80 mussels for LPR422

Total of 160 Ribbed Mussels @ LPR422

Ribbed Mussels

10 ppt mussels:
- LPR1XX Mussels 1-80
- LPR2AD Mussels 81-160
- LPR3SS Mussels 161-240

2 ppt mussels:
- LPR4AB Mussels 241-320
- LPR4ZZ Mussels 321-480 EPA Split
- LPR5XX Mussels 481-560
- LPR5YY Mussels 561-640

1830 Bag background tissue samples To samples for ribbed mussels

LPR BG - GD641 40 mussels

LPR BG ↓ GD680

1900 Complete processing ribbed mussels

Aydit RA



3.9.11 A. Rodriguez

0745 Arrive @ field facility & load supplies

GPS verification

G8XH8 733755N 597692E

G8XH18 733754N 597690E

Field crew: A. Rodriguez (WW)
T. Do (WW), K. Tobiason (WW)
J. Huybregts (WW)

0755 George Molnar (CDM) EPA oversight arrives

0837 Health & Safety meeting w/ ASI
Matt Shappell, Boat operator
Jeff Pydeski, Field tech for boat

0847 Head down to LPR1XX & Raritan

boat crew: A. Rodriguez, K. Tobiason, G. Molnar will collect all water quality measurements for both field crews.

YSI 6920 Calibration log from ASI

pH 3 pt. calibration
- 7.00 → 7.00
- 4.00 → 4.00
- 10.00 → 10.00

Turbidity 0.00 → 0.00 NTU
126.00 → 126.00 NTU

Conductivity 1.413 ms/cm → 1.413 ms/cm

03.09.11 TDO

0815 Arrive at facility dock. Offload.
30's, overcast.
T.DO
J. Huyberegts } WW
A. Rodriquez
K. Tobiason
G. Molnar CDM
R. Croskey
S. Montemuro } ASI
M. Shappell
J. Rydeski
0830 H/S briefing
0845 Head downriver to begin deploying test cages
0945 Arrive at LPR3SS
1005 Deploy cages at LPR3SS, 4.0ft.
1019 Head upriver to LPR4AB
1040 Arrive at LPR4AB
1125 Deploy cages at LPR4AB, 9.3ft.
1135 Head upriver to LPR5XX
1215 Arrive at LPR5XX
1245 Deploy cages at LPR5XX, 5.5 ft.
1255 Head upriver to LPR5YY
1310 Arrive at LPR5YY



03.09.11 T.DO

1330 Deploy cages at LPR5YY, 6.7 ft.
1340 Head back to facility dock
1430 Arrive facility dock. Offload.
End of on-water time.
1800 End of day field coordinates
G8XH8 733756 N 597697 E
G8XH8 733756 N 597697 E

T.DO
03.09.11

03.10.11 TDO

0700 Arrive at dock. light rain 40s. Load supplies.

TDO
J. Huylbregts
A. Rodriguez
K. Tobiason
} WW

G. Molnar ~CDM

R. Crosley
S. Montemuro
M. Shappell
J. Pydeski
} ASI

0715 H/S briefing.

0730 Head upriver to deploy cages.

0800 Cannot pass bridge at RM to access Reach 8 target locations. Talked to George (CDM) about abandoning locations and choosing alternates. River too high, in flood stage. Went downriver to relocate LPR8AC on east bank just above Dundee Canal ~RM 14.3. LPR8AD (abandoned will be relocated to another location in Reach 6 (LPR6VV).



03.10.11 TDO

0825 Deploy cages at LPR8AC
4.9 ft.

| | pH | mg/L D.O. | mS/cm cond. | sal. | °C Temp | NTU Turb. |
|---|---|---|---|---|---|---|
| 1 ft | 8.23 | 13.86 | 0.201 | | 4.47 | 15.6 |
| 2 ft | 8.06 | 14.21 | 0.201 | | 4.46 | 16.0 |
| 3 ft | 7.99 | 14.32 | 0.201 | | 4.46 | ~~1110.9~~ 223.2 |
| 4 ft | 7.89 | 14.35 | 0.201 | | 4.46 | 1009.8 |

0840 Head to LPR7AB

0845 Arrive at LPR7AB

0900 Deploy cages at LPR7AB
7.1 ft.

| | pH | DO | Cond. | Temp. | Turb. |
|---|---|---|---|---|---|
| 1 ft | 7.71 | 13.89 | 0.200 | 4.46 | 13.8 |
| 2 ft | 7.70 | 14.20 | 0.200 | 4.46 | 14.0 |
| 3 ft | 7.67 | 14.35 | 0.200 | 4.46 | 13.1 |
| 4 ft. | 7.65 | 14.43 | 0.200 | 4.45 | 14.4 |
| 5 ft. | 7.62 | 14.48 | 0.200 | 4.45 | 13.7 |
| 6 ft. | 7.60 | 14.48 | 0.200 | 4.45 | 13.6 |

0930 Head to LPR7ZZ to get $H_2O$ parameters.

0950 Arrive LPR7ZZ, 10.3 ft.

| | | | | | |
|---|---|---|---|---|---|
| 1 ft | 7.64 | 14.33 | 0.200 | 4.47 | 12.6 |
| 2 ft | 7.61 | 14.33 | 0.200 | 4.46 | 13.2 |
| 3 ft | 7.59 | 14.38 | 0.200 | 4.45 | 13.5 |
| 4 ft. | 7.57 | 14.41 | 0.200 | 4.46 | 13.7 |

03.10.11 TDO

| | pH | DO | Cond. | Temp. | Turb. |
|---|---|---|---|---|---|
| 5 ft | 7.57 | 14.42 | 0.200 | 4.46 | 13.6 |
| 6 ft | 7.55 | 14.43 | 0.200 | 4.45 | 13.2 |
| 7 ft | 7.52 | 14.43 | 0.200 | 4.44 | 13.6 |
| 8 ft | 7.52 | 14.43 | 0.200 | 4.46 | 13.7 |
| 9 ft | 7.50 | 14.42 | 0.200 | 4.46 | 15.1 |

1000 Head to LPR6UU

1005 Talk to George about location of LPR6UU Alternate for LPR8AD - abandoned. Decided to place around RM 10.5 east side since too many outfalls opposite.

1010 Arrive LPR6UU

1015 Deploy cages at LPR6UU 5.2 ft.

| | pH | DO | Cond. | Temp. | Turb. |
|---|---|---|---|---|---|
| 1 ft | 7.56 | 14.10 | 0.200 | 4.48 | 13.9 |
| 2 ft | 7.53 | 14.06 | 0.200 | 4.48 | 14.5 |
| 3 ft | 7.52 | 14.19 | 0.200 | 4.48 | 14.2 |
| 4 ft | 7.49 | 14.30 | 0.200 | 4.47 | 14.5 |

1020 Head to LPR6VV

1025 Arrive LPR6VV, consult w/ George. Station on east side near Phragmites above DeJessa Bridge.

1030 Deploy cages at LPR6VV, 8 ft.

TDO
3.10.11



03.10.11 TDO

| | pH | DO. | Cond. | Temp. | Turb. |
|---|---|---|---|---|---|
| 1 ft | 7.52 | 14.98 | 0.200 | 4.49 | 12.7 |
| 2 ft | 7.51 | 14.47 | 0.200 | 4.49 | 13.8 |
| 3 ft | 7.50 | 14.37 | 0.200 | 4.48 | 16.2 |
| 4 ft | 7.49 | 14.36 | 0.200 | 4.48 | 16.3 |
| 5 ft | 7.48 | 14.36 | 0.200 | 4.48 | 15.5 |
| 6 ft | 7.48 | 14.39 | 0.200 | 4.47 | 14.9 |
| 7 ft. | 7.46 | 14.38 | 0.200 | 4.47 | 15.6 |

1045 Head to LPR5YY for water readings

1050 Arrive LPR5YY, take readings, 6.5 ft.

| | pH | D.O. | Cond. | Temp | Turb. |
|---|---|---|---|---|---|
| 1 ft | 7.47 | 14.81 | 0.200 | 4.51 | 14.9 |
| 2 ft | 7.46 | 14.40 | 0.200 | 4.50 | 14.3 |
| 3 ft | 7.46 | 14.35 | 0.200 | 4.49 | 14.3 |
| 4 ft | 7.45 | 14.35 | 0.200 | 4.49 | 15.7 |
| 5 ft | 7.44 | 14.35 | 0.200 | 4.50 | 14.9 |
| 6 ft. | 7.43 | 14.36 | 0.200 | 4.49 | 11.2 |

1055 Head to LPR5XX for water readings

1100 Arrive LPR5XX, take readings. 8.7 ft.

TDO
3.10.11

03.10.11 T.DO

| | pH | DO | Cond. | Temp | Turb. |
|---|---|---|---|---|---|
| 1 ft | 7.45 | 14.61 | 0.200 | 4.52 | 12.8 |
| 2 ft | 7.44 | 14.28 | 0.200 | 4.51 | 13.7 |
| 3 ft | 7.43 | 14.27 | 0.200 | 4.52 | 14.0 |
| 4 ft | 7.44 | 14.29 | 0.200 | 4.51 | 14.7 |
| 5 ft | 7.43 | 14.31 | 0.200 | 4.51 | 14.0 |
| 6 ft | 7.42 | 14.31 | 0.200 | 4.51 | 14.1 |
| 7 ft | 7.41 | 14.31 | 0.200 | 4.51 | 14.3 |
| 8 ft | 7.41 | 14.30 | 0.200 | 4.51 | 14.2 |

1110 Head to LPR44B for water readings

1115 Arrive LPR44B, take readings, 10.5 ft

| | pH | DO | Cond. | Temp. | Turb. |
|---|---|---|---|---|---|
| 1 ft | 7.44 | 23.22 | 0.200 | 4.54 | 12.7 |
| 2 ft | 7.43 | 18.41 | 0.200 | 4.53 | 14.4 |
| 3 ft | 7.44 | 17.97 | 0.200 | 4.53 | 14.1 |
| 4 ft | 7.43 | 17.70 | 0.200 | 4.53 | 14.2 |
| 5 ft | 7.41 | 17.60 | 0.200 | 4.53 | 13.7 |
| 6 ft | 7.42 | 17.52 | 0.200 | 4.53 | 15.4 |
| 7 ft | 7.42 | 17.81 | 0.200 | 4.52 | 15.1 |
| 8 ft | 7.41 | 17.47 | 0.200 | 4.52 | 14.7 |
| 9 ft | 7.40 | 17.72 | 0.200 | 4.52 | 14.6 |
| 10 ft | 7.40 | 17.39 | 0.200 | 4.52 | 15.0 |

1120 Head to LPR422 for water readings

1125 Arrive at LPR422, take readings, 8.5 ft



03.10.11 TDO

| | pH | DO | Cond. | Temp | Turb. |
|---|---|---|---|---|---|
| 1 ft | 7.44 | 20.56 | 0.201 | 4.58 | 13.1 |
| 2 ft | 7.42 | 18.38 | 0.200 | 4.57 | 14.3 |
| 3 ft | 7.41 | 18.23 | 0.200 | 4.56 | 15.3 |
| 4 ft | 7.39 | 18.17 | 0.200 | 4.57 | 15.0 |
| 5 ft | 7.40 | 18.61 | 0.200 | 4.57 | 14.9 |
| 6 ft | 7.39 | 18.28 | 0.200 | 4.56 | 14.5 |
| 7 ft | 7.39 | 18.27 | 0.200 | 4.56 | 14.9 |
| 8 ft | 7.39 | 26.24 | 0.200 | 4.56 | 17.3 |

1135 Pick up A. Rodriguez, K. Tobiasek, J. Pydoski from Hampton Inn. Head upriver back to field facility.

1225 Arrive at facility dock. Offload. End of on water day.

1245 GPS coord. unit.

68X418 733755 N 597697 E

68X418 733756 N 597696 E

See VSI calibration log for specs.

TDO 03.10.11

3.8.11 Ribbed A. Rodriguez
1150 Mussels arrive from Aquatic Research Organism lab to the Rutherford field facility
Field lab crew: A. Rodriguez, T. Do
K. Tobiason, J. Huybregts
Record avg. wt. from the "fresh kill" mussels that arrived from ARO; not used for Health Assessments
Weight (g): 7.5
7.6
5.2
3.8
6.6
6.5
* 3.0 Not a "fresh kill" mussel
10.7
Total = 50.9g Avg = 6.4 g

Five mussels used for Healt Assessments with 10 ppt salinity & corresponding wts:
3.9 g All muscle tissue was blotted dry
*3.0 g & excludes adductor muscle
5.5g Avg. wt = 4.3 g
3.8 g
5.4g



3.8.11 A. Rodriguez
Five mussels processed for Health Assessments w/ 2 ppt salinity
~~5.2g~~ 4.3g Tissue was blotted dry
6.0g & excludes adductor muscle
5.5g
4.4g Avg Wt. = 5.1g
5.3g
Avg wt of all 10 mussels used for Health Assessments Avg wt. = 4.7g per mussel
Photo #5 Whole mussels used for Health Assessments at 2ppt

Avg wt. of each mussel = 4.7g in the field lab
Field avg. wt ≈ 4.5g per mussel
Tissue wt. req. for chem analysis = 105g minimum
The estimated # of mussels needed to meet tissue reqs. $\frac{105g}{4.5g}$ = 23.3 ~ 25 mussels
8 mussels per location to sacrifice @ periodic checks plus ~ 10% for mortality
Total ~ 40 mussels per cage & 80 mussels per location
Except @ LPR 422, EPA split sample location
Tissue wt. req for chem analysis = 320g in addition to the original 105g tissue requirement.

3.8.11 A. Rodriguez

The estimated # of ribbed mussels needed to meet the tissue reqs @ LPR422 EPA split sample location

$\frac{320\,g}{4.5\,g}$ = 72 mussels + 10% Contingency ~ 80 mussels for LPR422

Total of 160 Ribbed Mussels @ LPR422

Ribbed Mussels

| | | |
|---|---|---|
| LPR1XX | Mussels 1 - 80 | |
| LPR2AD | Mussels 81 - 160 | |
| LPR3SS | Mussels 161 - 240 | |
| LPR4AB | Mussels 241 - 320 | |
| LPR4ZZ | Mussels 321 - 480 | EPA Split |
| LPR5XX | Mussels 481 - 560 | |
| LPR5YY | Mussels 561 - 640 | |

1830 Bag background tissue samples To samples for ribbed mussels

LPR BG - GD641 40 mussels

LPR BG ↓ GD680

1900 Complete processing ribbed mussels

Ayalit RA



3.9.11 A. Rodriguez

0745 Arrive @ field facility & load supplies

GPS verification

G8XH8 733755N 597692E

G8XH18 733754N 597690E

Field crew: A. Rodriguez (WW)
T. Do (WW), K. Tobiason (WW)
J. Huybregts (WW)

0755 George Molnar (CDM) EPA oversight arrives

0837 Health & Safety meeting w/ ASI
Matt Shappell, Boat operator
Jeff Pydeski, Field tech for boat

0847 Head down to LPR1XX & Raritan

boat crew: A. Rodriguez, K. Tobiason, G. Molnar will collect all water quality measurements for both field crews.

YSI 6920 Calibration log from ASI

pH 3 pt. calibration
7.00 → 7.00
4.00 → 4.00
10.00 → 10.00

Turbidity 0.00 → 0.00 NTU
126.00 → 126.00 NTU

Conductivity 1.413 ms/cm → 1.413 ms/cm

3.9.11 A. Rodriguez

~~E~~ DO 100% → 100%

0918 Observe bright magneta fluid @ the surface of the water @ ~RM 7.5, possibly transmission fluid

0933 Call to have the Bridge St. Bridge open b/c ~~can't~~ the tide coming in & flooding on the Passaic River cause for higher than normal water levels & the Raritan can't get underneath the bridge.

1005 Arrive @ LPR1XX ~RM 1, East side water depth = 8.5'

1024 Receive a negative reading of -5.6 NTU for turbidity so calibrate the YSI 6920 for turbidity

0 NTU → 0 NTU

126 NTU → 123 NTU

Retake turbidity measurements

1045 Complete setting traps @ LPR1XX

1053 Head to LPR2AD

1115 Arrive @ LPR2AD ~RM 2.2 west side

Water depth = 6.5'

Abandon WQ ~~measu~~ recordings b/c experience technical problems w/ YSI meter but will return w/ the other YSI meter to record WQ later today.



3.9.11 A. Rodriguez

1140 ~~Speak~~ Turbidity readings are inaccurate so we need the other YSI meter from Thai Di's boat

1203 Meet Schuylll boat @ Bridge St. Bridge to pick up YSI 650 meter

1225 Arrive @ LPR2AD to record WQ measurements & re-calibrate meter for salinity @ 25 ppt; turbidity sensor is malfunctioning so can't take turbidity readings

YSI 650 Calibration log from ASI

DO (mg/L) = 7.60 → 8.5

2 pt: 7 pH = 7.22 → 7.00

10 pH = 9.92 → 10.00

Turbidity – Not working

Salinity 25.38 → 25 ppt

Temperature 22.0 → 21.57 °C

1240 Complete WQ readings @ LPR2AD

1255 Arrive @ 355 to record WQ readings & the salinity readings were consistently the same @ 0.12 ppt for both LPR355 & LPR2AD so NW recommends renting another YSI meter to retake WQ readings @ all locations except LPR1XX tomorrow.

3.9.11 A. Rodriguez

For the remaining locations the field crew will continue to record WQ readings.

1309 Call Bridge St. Bridge operator to open bridge for access underneath & have to wait ~15 minutes

1332 Arrive @ LPR 422 ~RM 6.3, eastside EPA split sample (~320 g tissue req.) set 4 traps for a total of 160 ribbed mussels Water depth = 10.5'

1353 Complete setting traps @ LPR422 & head up to LPR4AB, 5XX & 5YY to record WQ readings

1355 Observe the liquid smoking @ the surface of the water @ RM 7.5

1352 Arrive @ LPR4AB RM 7.4, record WQ measurements @ water depth = 11'

1401 Complete WQ readings & depart for LPR5XX

1413 Arrive @ LPR5XX RM 8.9 to record WQ measurements @ water depth = 5'

1416 Complete WQ readings & depart for LPR5YY



3.9.11 A. Rodriguez

1421 Arrive @ LPR5YY RM 9.9 to record WQ measurements @ Water depth = 5.5'

1426 Complete WQ readings & talk to Thai to relocate the traps @ LPR5XX from the west side of the river to the east side b/c of the woody debris that is piling on the buoys of the traps. Inform EPA oversight George of the rationale for moving the traps to area w/slower moving water & w/o woody debris

1443 Retrieve the traps @ LPR5XX on the west side & move across to the east side upstream from the athletics field new LPR5XX location

1454 Deploy traps @ the relocated LPR5XX ~RM 8.9 & record WQ readings water depth = 7.2'

1500 Complete setting traps @ relocated LPR5XX & head back to field facility Observe fishermen fishing @ the ~~Middle~~ Third River & fishermen downstream of the Rt 3 Bridge

3.9.11 A. Rodriguez

1518 Arrive @ the Rutherford dock

1900 After the Health Assessments were conducted on 5 mussels @ 0 ppt, Fresh water
Avg. wt of each mussel = 10.5g in the field lab
Field avg. wt ≈ 10 g per mussel
The estimated # of mussels needed to meet tissue reqs. $\frac{105g}{10g}$ ≈ 11 mussels
8 mussels per location to sacrifice @ periodic checks + 2 mussels (i.e, accounting for 10% mortality)
Total of 21 mussels ~ 30 mussels per cage
60 mussels per location
Except @ LPR 7ZZ, EPA split sample location where the tissue wt. req. for chem analysis = 480 g in addition to the original 105 g tissue req
The est. # of mussels needed to meet tissue reqs. @ LPR7ZZ
$\frac{480g}{10g}$ = 48 mussels + 10% contingency
= 53 mussels ~ 60 mussels
Total of 120 mussels @ LPR7ZZ

1500 To mussel samples for freshwater # 0-40



3.9.11

1920 Begin processing freshwater mussels
LPR6UU 041 - 100
LPR7AB 221 - 280
LPR7ZZ 101 → 220 EPA split station
LPR8AD 341 - 400
LPR8AC 281 - 340

2142 Complete processing freshwater mussels

Angel R

3.10.11 A. Rodriguez

0630 Arrive to the field facility & load supplies
GPS verification
G8XH8 733756N 597692E
G8XH18 733~~666~~766N (AR) 597691E

0700 Arrive @ Rutherford dock
Field crew: A. Rodriguez (WW)
T. Do (WW), K. Tobiason (WW)
J. Huybregts (WW)
M. Shappell (ASI) Boat operator
J. Pydeski (ASI)
Flood conditions all day; low tide @0600

0720 Health & safety meeting (~480g tissue req.)

0741 Arrive @ LPR722, EPA split sample location ~ RM 12.4, west side set 4 traps @ location for a total of 120 mussels; will collect WQ parameters after YSI meter arrives ~0800

0803 Complete setting traps @ LPR722

0810 Arrive @ Rutherford dock & p/u YSI meter & then head down toward LPR1XX

0830 Karen talks to Rob Law (dmi) regarding the relocation of sample locations in Reach 8
18779276337 Spill ~~Hotline~~ (AR) Hotline



3.10.11 A. Rodriguez

0856 Again observe the enviro/chem spill @ ~RM 7.4 westside in front of old marina area w/derelict boats & upstream from Coastal Oil Storage area
Contact Janine MacGregor, NJDEP to report the enviro spill described above & get directed to NJDEP Spill Hotline. Contact the Hotline to report the spill to Collin, Operator #42 & rec^v case #110310085552.

0928 Bruce Doyle withe the NJ Emergency Spill Response Division calls to discuss the spill described above & informs Angelita that it's a CSO discharge that's being released illegally. The magenta colored liquid observed on 3.9.11 was most likely a dye that releases into the river when an illegal discharge is occurring. They NJDEP will look into the spill.

3.10.11 A. Rodriguez

0922 Arrive @ LPR1XX & record WQ parameters mark buoys, check traps & secure doors w/zip ties. Water depth = 8.8'

0941 ~~Complete~~ AR Fire Fighter Kaywork, Kearney Township to discuss chem? spill on water & he will inform the USCG b/c its out of his district.

0946 Arrive @ LPR2AD to record WQ parameters, mark buoys, check traps & secure doors w/zip ties. Water depth = 6.3'

1004 Arrive @ LPR3SS to record WQ parameters, AR ~~mark buoys~~, check traps & secure doors w/zip ties. Water depth = 7.8'

1014 Observe a person on the west side @ RM 4.1 possibly having a fire on the river bank.

1021 Arrive @ Bridge St Bridge & Call to have the bridge opened. Told the bridge can't be opened for access because a crew is not available.

1036 Contact Thai to coordinate a p/u @ the Hampton Inn by the Schuykill & Matt Shappell (ASI) leaves w/ the Raritan to get off the water b/f the storm hits



3.10.11 A. Rodriguez

1048-1130 Wait for p/u @ Hampton Inn

1135 Schuykill picks up A. Rodriguez, K. Tobiason, & J. Pydeski @ the Hampton Inn

1220 Return to Rutherford dock & off load supplies

1225-~~1315~~ 1315 Clean up lab

Angelita R

3.23.11 A. RODRIQUEZ

0650 Arrive @ field facility & load up field supplies
George Molnar arrives to the field facility
GPS verification @ flagpole
733756 N 597696E

0705 Arrive @ field dock
Field crew: Angelita Rodriguez (WW)
Thai Do (WW)
Rob Crosby (ASI)
Steve Montemuro (ASI captain)

0716 Health & Safety meeting; low tide @ 0700
mix of snow & rain in morning & afternoon

0816 Arrive @ LPR1XX to retrieve traps, check ~~[illegible]~~ 10% for size, mortality & conduct HAs on 2 ribbed mussels GD009 & GD010; photos taken

0915 Arrive @ LPR2AD to retrieve traps, check mortality on all & check size on 10% for size & conduct HA on 2 ribbed mussels GD009 & GD010
Photos taken

0956 Arrive @ LPR3SS retrieve traps, check mortality on all & check size on 10% & conduct HA on 2 ribbed mussels; 2 dead



3.23.11 A Rodriguez

1050 Arrive @ LPR4ZZ - retrieve traps, check for mortality on all & check 10% for size & conduct HAs on 2 ribbed mussels
EPA split 160 mussels

1202 Arrive @ LPR4AB - retrieve traps, check for mortality, check 10% for size & conduct HAs on 2 ribbed mussels & 1 dead

1254 Arrive @ LPR5XX - retrieve traps, check for mortality, check 10% for size, conduct HAs on 1 ribbed mussels b/c lost 1 trap

1334 Arrive @ LPR5YY retrieve traps. Check for mortality, check 10% for size, conduct HAs on 2 ribbed mussels & 1 dead.

1430 Return to facility dock
GPS verification @ flagpole
733756 N 597692E

1544 YSI 6920 Calibration
Conductivity 1.413 → 1.414 mS/cm
Turbidity-2pt 0.0 → 0.0 NTU
126 → 126 NTU
pH 3-pt 4.00 → 4.00 ~~[illegible]~~ AR
7.00 → 7.00
10.00 → 10.02

1615 - Depart facility
AR

3.24.11 A. RODRIGUEZ

0700 Arrive @ field facility & load supplies

0712 GPS verification @ flagpole
733753N 597690E
Field crew: A. Rodriguez (WW)
T. Do (WW)
R. Croskey (ASI)
S. Montemuro (ASI Captain)
G. Molnar (CDM) EPA oversight

0714 Arrive @ field dock; low tide @ 0700
Overcast, 32°C, COLD

0724 Health & Safety meeting

0752 Arrive @ LPR6~~UU~~ YY retrieve traps, check all for mortality & check 10% for size & conduct HAs on 2 mussels (EC)
Sand & leaf debris on the bottom of both traps; photos taken

0858 Arrive @ LPR6UU retrieve traps; check all for mortality & 10% for size & conduct HAs on 2 mussel (EC)
photo taken

0954 Arrive @ LPR7ZZ, EPA split
90 mussels location w/ 3 traps b/c lost 1 trap during the flood event. Retrieve traps, check all for mortality & 10% for size & Conduct HAs on 1 mussel (EC); photo taken
1 dead



3.24.11 A. Rodriguez

1046 Arrive @ LPR7AB - retrieve traps, check all for mortality & 10% for size & conduct HAs on 2 mussels (EC). Photo taken

1121 Arrive @ LPR8AC - retrieve traps, Check all for mortality & 10% for size & conduct HAs on 2 mussels (EC). Photo taken; sand & leaf litter @ bottom of traps

1205 Return to field dock
GPS verification @ flagpole
733757N 597691E

1300 Depart field facility

4.13.11 J. Florer

0645 Arrive Kearney boat ramp
crew: Thai Do (WW), Joanne Florer (WW)
George Molnar (CDM), Rob Crosby (ASI)
Steve ~~Jessie~~ Montamuro (ASI)
GPS verification @ flag pole
703363 N 586720 E

0700 launch boat + daily set-up
0710 H+S meeting.
tide ebbing low at 11:32 am
overcast, windy (5-10 mph), rain, 42°F

0810 Arrive LPR1XX to retrieve traps, check 10% for growth + all for mortality + conduct HAs on 2 ribbed mussels GD011 + GD012 ; photos taken

0900 Arrive LPR2AD to retrieve traps check 10% for growth + all for mortality. Conduct HAs on 2 ribbed mussels GD091 + ~~GD092~~ GD0093 photos taken

0950 Arrive LPR3SS to retrieve traps check 10% growth, mortality on all + conduct HAs on 2 ribbed mussels GD171 + GD172 ; photos taken



4.13.11 J. Florer

1040 Arrive LPR4ZZ to retrieve traps, check 10% growth + mortality on all. Conduct HAs on 2 ribbed mussels: GD339 + 337 ; photos taken

1140 Arrive LPR4AB to retrieve traps, check 10% growth, + mortality on all. Conduct HAs on 2 ribbed mussels: GD252 + 253 ; photos taken
a pair of swans flew by going upstream.

1240 Arrive LPR5XX to retrieve trap, check 10% growth + mortality on all. No HA conducted since additional traps were lost. Photo taken of dead mussels

1300 Arrive LPR YY to retrieve traps check 10% growth + mortality on all. Conducted HAs on 2 ribbed mussels: GD571 + 572 ; photo taken

1330 finished estuarine locations headed back to Kearney boat ramp

1350 Off the water. verification words.
703359 N 586719 E

4.13.11 J. Florer

Water quality meter probe calibration
Calibrated from Pine environmental
See calibration log

~~0720~~ 1620 water quality meter probe calibrated for next day use w/ the following readings:
3pt - pH - 4 w/4, 7.00 w/7, 10.00 w/10 solution
2pt - turbidity - 126 NTU solution = 126, Ø NTU = Ø
Cond - 1.413 mS/cm solution = 1.413

~~0745~~ 1645 End of day

4.13.11

J. Florer



4.14.11 J. Florer

0645 Arrive LPR field facility
crew: Thai Do (UW), Jeanne Florer (UW), George Molnar (CDM), Rob Crosby (ASI) + Matt Shappell (ASI)
GPS verification @ field facility flag pole: 733757 N 597690 E

0700 H+S briefing + departed boat ramp downstream to first freshwater location LPR 6VV
tide ebbing, low at 1223 pm
partly cloudy, light to no wind
mid 50's. BCNH spotted on north bank

0715 Arrive LPR 6VV to retrieve traps
check 10% for growth, mortality on all. HAS on two freshwater mussels: EC 347 + EC 348; photos taken

0800 Arrive LPR 6UU to retrieve traps
gmt check 10% for growth + all for mortality
HAs conducted on two freshwater mussels: EC047 + EC048; photos taken

0830 Arrive LPR 7ZZ to retrieve traps
gmt check ~~for~~ 10% for growth + all

4.14.11 J. Flower

0930 - for mortality. HAs conducted on 2
con't Freshwater mussels: EC 138 + 139
photos taken

0905 Arrive LPR 7AB for trap retrieval
10% for growth, all for mortality + HAs
conducted on 2 freshwater mussels:
EC 227 + 228 gm17 ; photos taken

0935 Arrive LPR 78AC for trap retrieval
checked 10% for growth, all for mortality
+ conducted HAs on two freshwater
mussels: EC 287 + 288 ; photos taken
the 2nd cage was exposed +
location substrate is soft silty
mud. The cage was redeployed
in slightly deeper water (~ 2-3ft deeper)

1010 Freshwater day 35
monitoring completed headed
back to field facility

1015 ~~arrive~~ Arrive field facility

1025 GPS end of day verification
coordinates:
733757N 597691E

1030 End of day

4.14.11 J. Flower



5-4-11 M. YARNES

0620 Arrive @ field facility & load up
field supplies
GPS verification @ flagpole
733754N 597692E

0640 George Molnar arrives @ field facility
Low tide @ 0505
High tide @ 0953
Arrive @ field dock

0720 Field Crew: Thao Do (WW)
Mike Yarnes (WW)
Rob Crosby (ASI)
Matt Shappell (ASI capt.)

0725 Health & Safety meeting
Overcast, rain

0825 Arrive @ LPR1XX to retrieve traps.
checked 10% for growth, all for
mortality & conducted HA's on
two ribbed mussels: GD013 & 014
Photos taken

0914 Arrive @ LPR2AD to retrieve traps
~~checked 10% growth for all~~,
checked 10% for growth, all for
mortality & conducted HAs on
two ribbed mussels: GD094 & 096.
Photos taken

5.4.11

1003 Arrive @ LPR3SS to retrieve traps, check 10% for growth & all for mortality. No HAs @ location due to high mortality.

1100 Arrive @ LPR4ZZ to retrieve traps, check 10% for growth & all for mortality. No health assessments due to high mortality. Only two traps remain.

1205 Arrive @ LPR4AB to retrieve traps, check 10% for growth & all for mortality. No HAs due to high mortality. No traps re-deployed.

1230 Arrive @ LPR5XX to retrieve traps, check 10% for growth & all for mortality. No HAs due to high mortality. And no trap redeployed (all dead)

1242 Arrive @ LPR5YY to retrieve traps, check 10% for growth & all for mortality. No HAs due to high mortality & no traps redeployed (all dead).

Headed to fuel-up & try to find other submerged trap @ LPR1XX.



5.4.11

1350 Arrived @ LPR1XX, but could not find the second trap. Labeled as lost and headed back to field facility dock.

1500 Arrived @ field facility dock @ 1500 and transported equipment back to field facility.

1515 Arrived @ field facility

1530 YSI calibrated

pH → 4.00 = 4.00

pH → 7.00 = 7.00

Turbidity → 0.0 NTU = 0.0

Turbidity → 126 NTU = 126

Conductivity → 1.413 mS/cm = 1.413

See separate calibration report for calibration on 5.3.11

430 GPS verification @ flagpole

733760N 597692E

435 End of Day

5.4.11

25 5.5.11 M. YARNES

0630 Arrive @ field facility & load up field supplies

(my) GPS verification @ flagpole
733758 N 597692 E

Field crew: George Molnar
Mike Yarnes
Thai Do
Matt Shappell
Rob Crosky

low tide: 0502
high tide: 1029

0726 Arrive @ field facility dock

0730 Health & safety meeting
Partly cloudy, breezy

0744 Arrive @ LPR6VV to retrieve traps, check 10% for growth & all for mortality. Conducted HAs on two freshwater mussels - EC359 & 360.
Photos taken

0810 Arrive @ LPR6UU to retrieve traps. Check 10% for growth & all for mortality. Conducted HAs on two freshwater mussels: (my) EC060 & 059.
Photos taken

5.5.11 M. Yarnes

0835 Arrive @ LPR7ZZ to retrieve traps, check 10% for growth & all for mortality. Conducted HAs for two freshwater mussels: EC136 & 137
Photos taken

0910 Arrive @ LPR7AB to retrieve traps, check 10% for growth, & all for mortality. HAs conducted on two freshwater mussels: EC239 & EC240
Photos taken

0952 Arrive @ LPR8AC to retrieve traps, check 10% for growth & all for mortality
(my) ~~Conducted HAs on freshwater mussel~~:
~~EC~~ No HAs due to high mortality (A lot
(my) ~~photos taken~~ of leaf/wood debris in cages.)

1045 Arrived @ field facility dock & transported equipment to field facility

1100 Arrived @ field facility

1225 GPS Verification @ flagpole
733759 N 597694 E

1230 End of day

5.5.11

K. Tobiason

5-9-11 CBS - Day 61 - Estuarine

Meet at Kearney Boat Ramp 0700
Tide too low to put boat in water
Use time waiting for tide to rise
to prep for mussel handling
get supplies ready - ice / labels

Meet back at Kearney Boat Ramp
0930
Field Crew:
Thai Do
Karen Tobiason
George Molnar
Matt Shappell
Rob Crosby

Purpose of field day is to
pull cages of ribbed mussels
to terminate exposure because
the mussels were dying in
upper estuarine section.

0950 Health + Safety Meeting
1000 Start down river 1000
Sunny, 60s, breezy



5-9-11

K. Tobiason

~~1020~~ Arrive @ LPR1XX
1020 Take water quality readings
Look for missing cage - not found
Pull remaining cage, clip zipties
holding mesh bags to cage
Put mussels in labeled bucket
with site water
Look for missing cage again -
not found

1045 Arrive LPR2AD
Pull cages
Cage 1 - 46 live mussels
Cage 2 - 25 live mussels (2 dead)

Move 2 bags of mussels to get
Cage 1: (pulled) ~~38~~ 36
1105 Cage 2 (redeploy) 29

1120 Arrive LPR3SS
Took water quality readings
pulled cages

5-9-11 K. Tibiason

1140 Arrive LPR4ZZ
pull 2 cages
2 alive / 2 dead
Leave station

1200 Off water

1220 Back at Field Facility

| | | |
|---|---|---|
| LPR1XX | 33 | Final survival count |
| LPR2AD | 32 | |
| LPR3SS | 10 | |
| LPR4ZZ | 1 | |

Process stations - ribbed mussels
- check for survival
- measure length of each surviving mussel
- label and bag mussels to ship to Alpha
- check tissue of dead mussels under microscope (dissecting scope)

take photos



05.09.11 K. Tibiason

~~2~~ 1430 Alpha picked up mussels
1500 End of Day

05.09.11

5.24.11 M. YARNES

6:45 CBS Day 75
Arrive @ field facility & load up gear
GPS Verification - flagpole
597686 N 733752 E
Field crew: Mike Yarnes
Thai Do
George Molnar
Rob Crosky
Mike Telesco
low tide: 0908
high tide: 1502

0705 Health & Safety meeting
Overcast, very humid, mid 70's - low 80's

0710 Depart from dock

0720 Arrive @ LPR8AC to check traps, check 10% for growth & all for mortality. No HAs done due to overall mortality @ site.

0800 Arrive @ LPR7AB to check traps, check 10% for growth & all for mortality. Conducted HAs on two freshwater mussels: EC237 & 238
Photos taken



0830 Arrive @ LPR7ZZ to check traps, check 10% for growth & all for mortality. Conducted HAs on two freshwater mussels: EC134, 135
photos taken

0907 Arrive @ LPR6UU to check traps, check 10% for growth & all for mortality. Conducted HAs on two freshwater mussels: EC057, 058
photos taken

0928 Arrive @ LPR6VV to check traps, check 10% for growth & all for mortality. Conducted HAs on two freshwater mussels: EC357, 358
photos taken

1020 Arrive @ LPR2AD to check traps, check 10% for growth & all for mortality. No HAs for site due to previous mortality.

1030 Arrive @ LPR1XX to try to find missing trap; no luck.
Headed back to dock

1140 Arrive @ dock & unload gear

1145 GPS verification - flagpole
597694 N 733753 E

Arrive @ field facility

5.24.11 M. YARNES

1200 For YSI calibration see calibration report

End of day

5.24.11



6/8/11 J. HUYBREGTS

06:15 CBS Day 90

Arrive @ field facility & load up gear

GPS verification - flagpole

597 693 N 733 756 E

Field crew: Jessica Huybregts

Thai Do

George Molnar

Rob Crosky

AJ Mottola

low tide: 0835

high tide: 1423

0715 Health & Safety briefing

Hazy, humid, 90s.

Loaded boat

For YSI calibration see calibration report.

0730 Depart from dock

~~Arrive @ LPR 8AC~~ JH

0740 Arrive @ site LPR 8AC

Pulled out 2 traps from water.

Placed netted mussels in labeled bucket of water from LPR.

0755 Arrival @ LPR 7AB

Pulled out 2 traps. Mussels in bucket of water.

0820 Arrival at LPR 7ZZ
Pulled 3 traps out. Mussels into buckets of Passaic water.

0848 Arrival @ LPR 6UU
1 trap exposed at surface at low tide.
(All mussels look ok - closed tight.)
Second trap fully submerged.
Both traps pulled. mussels into buckets of Passaic water.

0903 Arrival @ LPR 6VV
Pulled out 2 trays. Mussels into bucket of Passaic water

~~Arrival @ LPR 2AD~~ JH

0937 At same location as noted on 3/10/11, a small ~~chemical~~ dye spill observed on Starboard side heading downstream. Pink discharge entering river.

1010 Arrival @ LPR 2AD area but could not locate buoy. Checked GPS coordinates and did 2 passes looking for buoy. Had to abandon.

1015 Headed back to dock.
WQ parameters measured at all locations where traps were pulled out.



1115 Arrival @ dock & unload gear.

1120 Arrival @ field facility. Begin to process mussels.

1130 - 1353 Completed processing mussels

1355 QA sample #s:
LPR 6VV : 51
LPR 6UU : 52
LPR 7ZZ : 30 + 50 = 80
LPR 7AB : 51
LPR 8AC : 4
Total # samples to lab = 238

1500 GPS verification - flagpole
597 690 E 733 756 N

End of day

6/8/11 JH

# APPENDIX C FIELD SAMPLING AND SAMPLE PROCESSING PHOTOGRAPHS

| Photo No.: | 1 |
|---|---|
| Date: | 03/08/11 |

**Spring 2011 Caged Bivalve Study:**

Ribbed mussels (*Geukensia demissa*) used in the estuarine zone for the caged bivalve study

| Photo No.: | 2 |
|---|---|
| Date: | 03/08/11 |

**Spring 2011 Caged Bivalve Study:**

Eastern elliptio mussels (*Elliptio complanata*) used in the freshwater zone for the caged bivalve study

| Photo No.: | 3 |
|---|---|
| Date: | 03/08/11 |

**Spring 2011 Caged Bivalve Study:**

Health assessment of ribbed mussel, acclimated to 2 ppth (Day 0)

| Photo No.: | 4 |
|---|---|
| Date: | 03/08/11 |

**Spring 2011 Caged Bivalve Study:**

Health assessment of ribbed mussel, acclimated to 2 ppth (Day 0)

| Photo No.: | 5 |
|---|---|
| Date: | 03/08/11 |

**Spring 2011 Caged Bivalve Study:**

Health assessment of ribbed mussel, acclimated to 2 ppth (Day 0)

| Photo No.: | 6 |
|---|---|
| Date: | 03/09/11 |

**Spring 2011 Caged Bivalve Study:**

Health assessment of ribbed mussel, acclimated to 2 ppth (Day 0)

| Photo No.: | 7 |
|---|---|
| Date: | 03/08/11 |

**Spring 2011 Caged Bivalve Study:**

Health assessment of ribbed mussel, acclimated to 2 ppth (Day 0)

| Photo No.: | 8 |
|---|---|
| Date: | 03/08/11 |

**Spring 2011 Caged Bivalve Study:**

Health assessment of ribbed mussel, acclimated to 10 ppth (Day 0)

| Photo No.: | 9 |
|---|---|
| Date: | 03/08/11 |

**Spring 2011 Caged Bivalve Study:**
Health assessment of ribbed mussel, acclimated to 10 ppth (Day 0)

| Photo No.: | 10 |
|---|---|
| Date: | 03/08/11 |

**Spring 2011 Caged Bivalve Study:**
Health assessment of ribbed mussel, acclimated to 10 ppth (Day 0)

| Photo No.: | 11 |
|---|---|
| Date: | 03/08/11 |

**Spring 2011 Caged Bivalve Study:**

Health assessment of ribbed mussel, acclimated to 10 ppth (Day 0)

| Photo No.: | 12 |
|---|---|
| Date: | 03/08/11 |

**Spring 2011 Caged Bivalve Study:**

Length measurements for ribbed mussel (Day 0)

Caged Bivalve Study Field Cheat Sheet

| Location ID | Specimen ID & number | Color Code within cage | Status /Shell Length (mm) $D_0$ | $D_{30}$ | $D_{60}$ | $D_{90}$ | $D_{90}$ | Comments |
|---|---|---|---|---|---|---|---|---|
| LPR XX | GD 521 | K | 111 | | | | | |
| LPR | GD 522 | K | 116.5 | | | | | |
| LPR | GD 523 | K | 110.5 | | | | | |
| LPR | GD 524 | K | 90 | | | | | |
| LPR | GD 525 | K | 115 | | | | | |
| LPR | GD 526 | K | 99 | | | | | |
| LPR | GD 527 | K | 96 | | | | | |
| LPR | GD 528 | K | 99.5 | | | | | |
| LPR | GD 529 | K | 92 | | | | | |
| LPR | GD 530 | K | 90.5 | | | | | |
| LPR | GD 531 | KO | 94 | | | | | |
| LPR | GD 532 | KO | 92 | | | | | |
| LPR | GD 533 | KO | 90 | | | | | |
| LPR | GD 534 | KO | 91 | | | | | |
| LPR | GD 535 | KO | 94 | | | | | |
| LPR | GD 536 | KO | 87.5 | | | | | |
| LPR | GD 537 | KO | 93 | | | | | |
| LPR | GD 538 | KO | 95.5 | | | | | |
| LPR | GD 539 | KO | 85 | | | | | |
| LPR | GD 540 | KO | 89.5 | | | | | |
| LPR | GD | | | | | | | |
| LPR | GD | | | | | | | |
| LPR | GD | | | | | | | |
| LPR | GD | | | | | | | |
| LPR | GD | | | | | | | |

Specimen ID: GD (Geukensia demissa ribbed mussel) or EC (Elliptio complanata Eastern elliptio)
Color Code: B (blue) K (black) P (pink) W (white) Y (yellow)
Status: / (alive) or X (dead)

| Photo No.: | 13 |
|---|---|
| Date: | 03/08/11 |

**Spring 2011 Caged Bivalve Study:**

Preparing ribbed mussels for cage setup (Day 0)

| Photo No.: | 14 |
|---|---|
| Date: | 03/09/11 |

**Spring 2011 Caged Bivalve Study:**

Health assessment of eastern elliptio mussel (Day 0)

| Photo No.: | 15 |
|---|---|
| Date: | 03/08/11 |

**Spring 2011 Caged Bivalve Study:**

Health assessment of eastern elliptio mussel (Day 0)

| Photo No.: | 16 |
|---|---|
| Date: | 03/09/11 |

**Spring 2011 Caged Bivalve Study:**

Health assessment of eastern elliptio mussel (Day 0)

| Photo No.: | 17 |
|---|---|
| Date: | 03/09/11 |

**Spring 2011 Caged Bivalve Study:**
Health assessment of eastern elliptio mussel (Day 0)

| Photo No.: | 18 |
|---|---|
| Date: | 03/09/11 |

**Spring 2011 Caged Bivalve Study:**
Health assessment of eastern elliptio mussel (Day 0)

| Photo No.: | 19 |
|---|---|
| Date: | 03/09/11 |

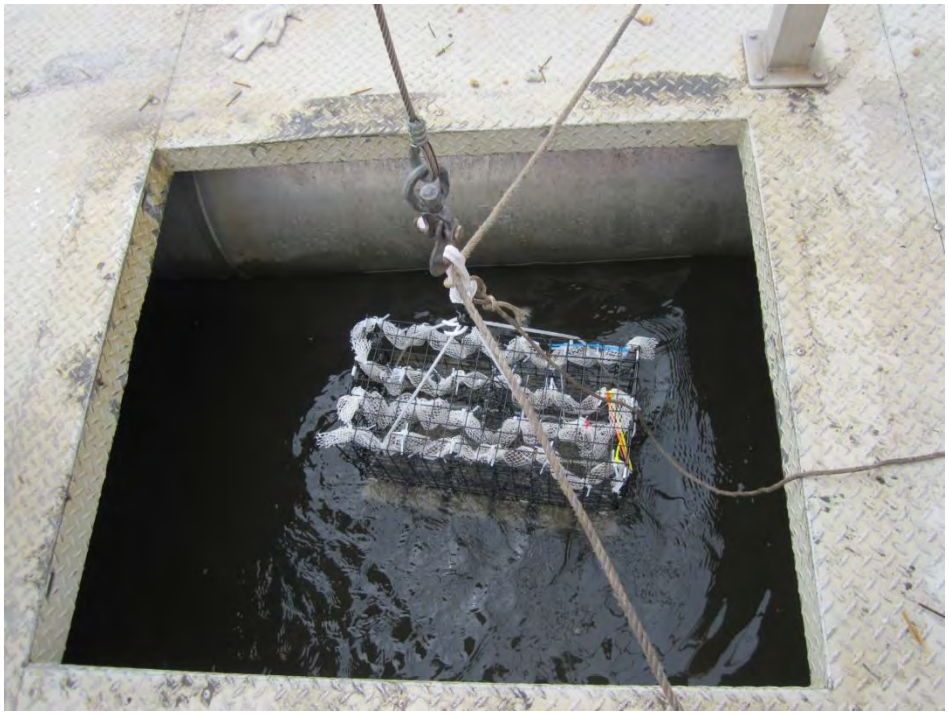
**Spring 2011 Caged Bivalve Study:**
Bivalve test cage setup (Day 0)

| Photo No.: | 20 |
|---|---|
| Date: | 03/09/11 |

**Spring 2011 Caged Bivalve Study:**
Cage deployment at location LPR3SS (Day 0)

| Photo No.: | 21 |
|---|---|
| Date: | 03/09/11 |

**Spring 2011 Caged Bivalve Study:**
Cage deployment at location LPR3SS (Day 0)



| Photo No.: | 22 |
|---|---|
| Date: | 03/09/11 |

**Spring 2011 Caged Bivalve Study:**
Cages (post-deployment) at location LPR2AD (Day 0)

| Photo No.: | 23 |
|---|---|
| Date: | 03/10/11 |

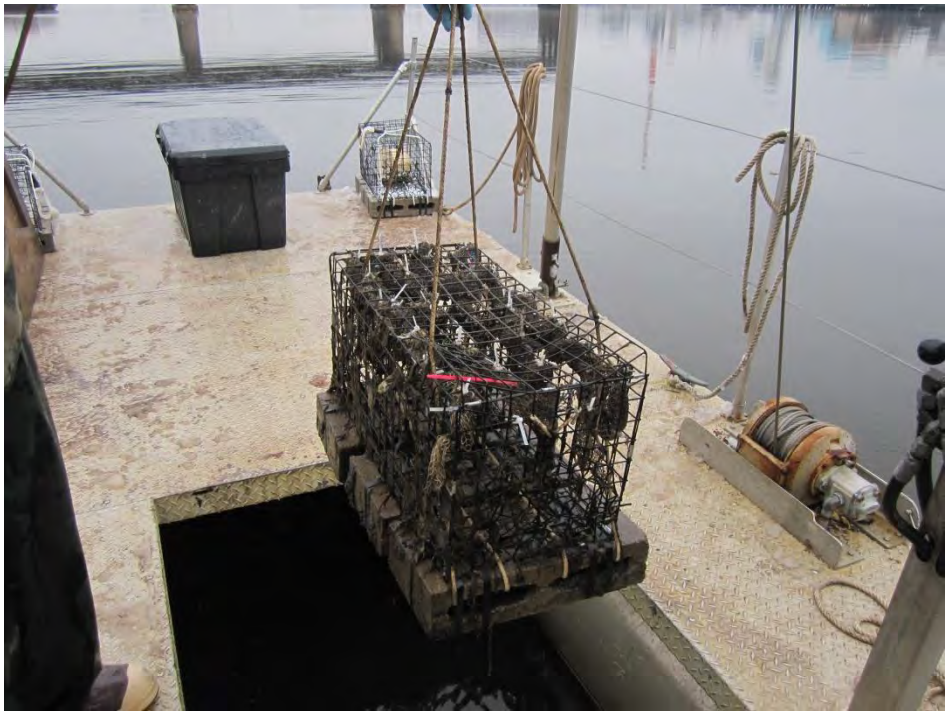
**Spring 2011 Caged Bivalve Study:**
Cages (post-deployment) at USEPA split sample location LPR7ZZ (Day 0)

| Photo No.: | 24 |
|---|---|
| Date: | 03/23/11 |

**Spring 2011 Caged Bivalve Study:**
Retrieving test cage in estuarine zone (Day 14)

| Photo No.: | 25 |
|---|---|
| Date: | 03/23/11 |

**Spring 2011 Caged Bivalve Study:**
Retrieving test cage in estuarine zone (Day 14)



| Photo No.: | 26 |
|---|---|
| Date: | 03/23/11 |

**Spring 2011 Caged Bivalve Study:**
Health assessments for ribbed mussels LPR1XX-GD009 and LPR1XX-GD010 (Day 14)

| Photo No.: | 27 |
|---|---|
| Date: | 03/23/11 |

**Spring 2011 Caged Bivalve Study:**
Health assessments for ribbed mussels LPR2AD-GD089 and LPR2AD-GD090 (Day 14)

| Photo No.: | 28 |
|---|---|
| Date: | 03/23/11 |

**Spring 2011 Caged Bivalve Study:**
Health assessments for ribbed mussels LPR3SS-GD169 and LPR3SS-GD170 (Day 14)

| Photo No.: | 29 |
|---|---|
| Date: | 03/23/11 |

**Spring 2011 Caged Bivalve Study:**
Health assessments for ribbed mussels LPR4AB-GD249 and LPR4AB-GD2590 (Day 14)

| Photo No.: | 30 |
|---|---|
| Date: | 03/23/11 |

**Spring 2011 Caged Bivalve Study:**
Health assessments for ribbed mussels LPR4ZZ-GD329 and LPR4ZZ-GD330 (Day 14)

| Photo No.: | 31 |
|---|---|
| Date: | 03/23/11 |

**Spring 2011 Caged Bivalve Study:**
Health assessment for ribbed mussel LPR5XX-GD490 (Day 14)

| Photo No.: | 32 |
|---|---|
| Date: | 03/23/11 |

**Spring 2011 Caged Bivalve Study:**
Health assessments for ribbed mussels LPR5YY-GD569 and LPR5YY-GD570 (Day 14)

| Photo No.: | 33 |
|---|---|
| Date: | 03/24/11 |

**Spring 2011 Caged Bivalve Study:**
Health assessments for eastern elliptio mussels LPR6UU-EC049 and LPR6UU-EC050
(Day 14)

| Photo No.: | 34 |
|---|---|
| Date: | 03/24/11 |

**Spring 2011 Caged Bivalve Study:**
Health assessments for eastern elliptio mussels LPR6VV-EC349 and LPR6VV-EC350
(Day 14)

| Photo No.: | 35 |
|---|---|
| Date: | 03/24/11 |

**Spring 2011 Caged Bivalve Study:**
Health assessments for eastern elliptio mussels LPR7AB-EC229 and LPR7AB-EC230
(Day 14)

| Photo No.: | 36 |
|---|---|
| Date: | 03/24/11 |

**Spring 2011 Caged Bivalve Study:**
Health assessment for eastern elliptio mussel LPR7ZZ-EC140
(Day 14)

| Photo No.: | 37 |
|---|---|
| Date: | 03/24/11 |

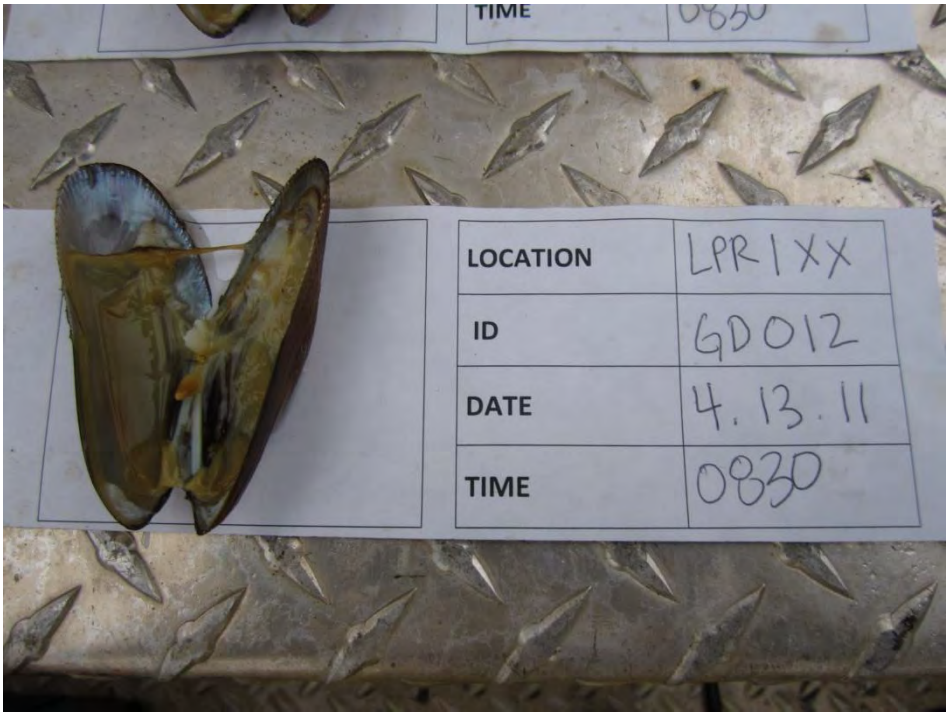
**Spring 2011 Caged Bivalve Study:**
Health assessments for eastern elliptio mussels LPR8AC-EC289 and LPR8AC-EC290
(Day 14)

| Photo No.: | 38 |
|---|---|
| Date: | 04/13/11 |

**Spring 2011 Caged Bivalve Study:**
Health assessment for ribbed mussel LPR1XX-GD011
(Day 35)

| Photo No.: | 39 |
|---|---|
| Date: | 04/13/11 |

**Spring 2011 Caged Bivalve Study:**
Health assessment for ribbed mussel LPR1XX-GD012 (Day 35)




| Photo No.: | 40 |
|---|---|
| Date: | 04/13/11 |

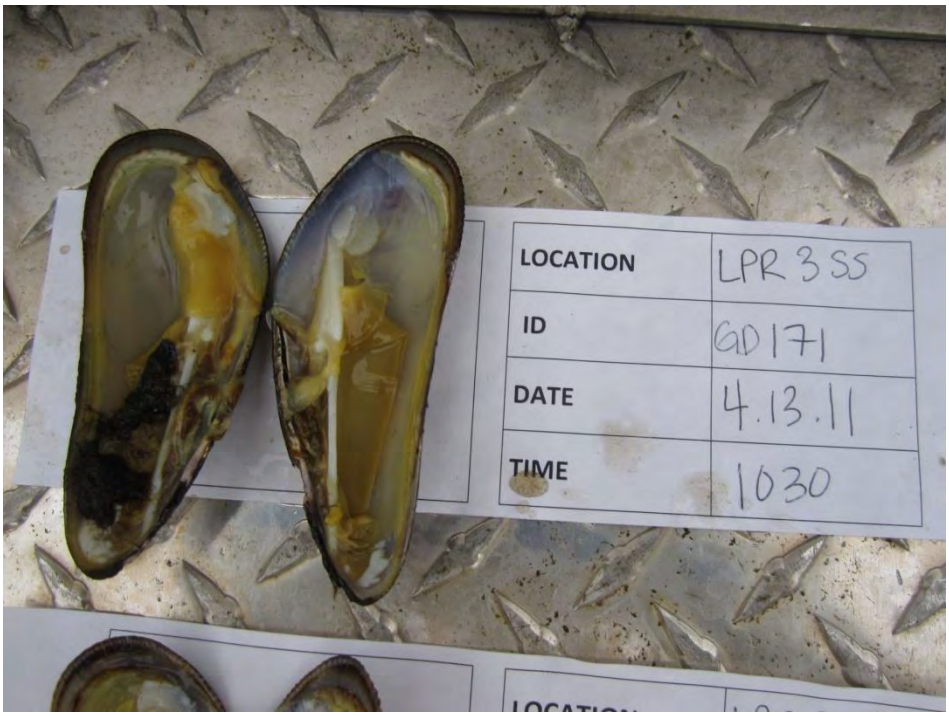
**Spring 2011 Caged Bivalve Study:**
Health assessment for ribbed mussel LPR2AD-GD091 (Day 35)

| Photo No.: | 41 |
|---|---|
| Date: | 04/13/11 |

**Spring 2011 Caged Bivalve Study:**
Health assessment for ribbed mussel LPR2AD-GD093 (Day 35)

| Photo No.: | 42 |
|---|---|
| Date: | 04/13/11 |

**Spring 2011 Caged Bivalve Study:**
Health assessment for ribbed mussel LPR3SS-GD171 (Day 35)



| Photo No.: | 43 |
|---|---|
| Date: | 04/13/11 |

**Spring 2011 Caged Bivalve Study:**
Health assessment for ribbed mussel LPR3SS-GD172 (Day 35)

| Photo No.: | 44 |
|---|---|
| Date: | 04/13/11 |

**Spring 2011 Caged Bivalve Study:**
Health assessment for ribbed mussel LPR4ZZ-GD337 (Day 35)

| Photo No.: | 45 |
|---|---|
| Date: | 04/13/11 |

**Spring 2011 Caged Bivalve Study:**
Health assessment for ribbed mussel LPR4ZZ-GD339 (Day 35)

| Photo No.: | 46 |
|---|---|
| Date: | 04/13/11 |

**Spring 2011 Caged Bivalve Study:**
Health assessment for ribbed mussel LPR4AB-GD252 (Day 35)

| Photo No.: | 47 |
|---|---|
| Date: | 04/13/11 |

**Spring 2011 Caged Bivalve Study:**
Health assessment for ribbed mussel LPR4ZZ-GD253 (Day 35)

| Photo No.: | 48 |
|---|---|
| Date: | 04/13/11 |

**Spring 2011 Caged Bivalve Study:**
Health assessment for ribbed mussel LPR5YY-GD571 (Day 35)

| Photo No.: | 49 |
|---|---|
| Date: | 04/13/11 |

**Spring 2011 Caged Bivalve Study:**
Health assessment for ribbed mussel LPR5YY-GD572 (Day 35)

| Photo No.: | 50 |
|---|---|
| Date: | 04/13/11 |

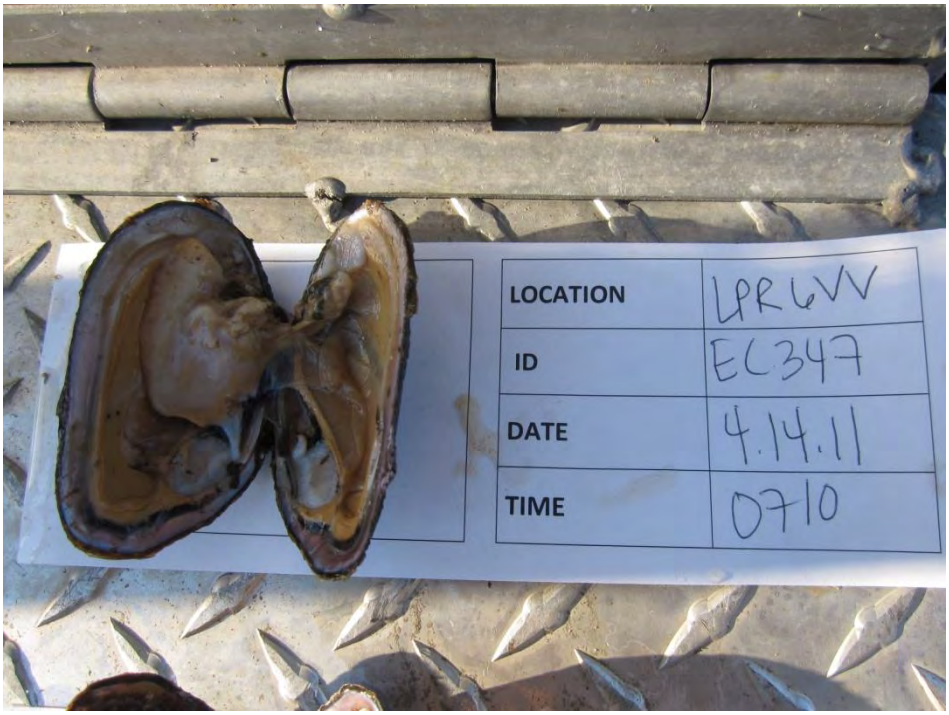
**Spring 2011 Caged Bivalve Study:**
Dead ribbed mussels at location LPR5XX (Day 35)

| Photo No.: | 51 |
|---|---|
| Date: | 04/14/11 |

**Spring 2011 Caged Bivalve Study:**
Retrieving eastern elliptio mussel cage at location LPR6VV (Day 35)

| Photo No.: | 52 |
|---|---|
| Date: | 04/14/11 |

**Spring 2011 Caged Bivalve Study:**
Health assessment for eastern elliptio mussel LPR6VV-EC347 (Day 35)



| Photo No.: | 53 |
|---|---|
| Date: | 04/14/11 |

**Spring 2011 Caged Bivalve Study:**
Health assessment for eastern elliptio mussel LPR6VV-EC348 (Day 35)

| Photo No.: | 54 |
|---|---|
| Date: | 04/14/11 |

**Spring 2011 Caged Bivalve Study:**
Health assessment for eastern elliptio mussel LPR6UU-EC047 (Day 35)

| Photo No.: | 55 |
|---|---|
| Date: | 04/14/11 |

**Spring 2011 Caged Bivalve Study:**
Health assessment for eastern elliptio mussel LPR6UU-EC048 (Day 35)

| Photo No.: | 56 |
|---|---|
| Date: | 04/14/11 |

**Spring 2011 Caged Bivalve Study:**
Health assessment for eastern elliptio mussel LPR7ZZ-EC138 (Day 35)

| Photo No.: | 57 |
|---|---|
| Date: | 04/14/11 |

**Spring 2011 Caged Bivalve Study:**
Health assessment for eastern elliptio mussel LPR7ZZ-EC139 (Day 35)

| Photo No.: | 58 |
|---|---|
| Date: | 04/14/11 |

**Spring 2011 Caged Bivalve Study:**
Health assessment for eastern elliptio mussel LPR7AB-EC227 (Day 35)

| Photo No.: | 59 |
|---|---|
| Date: | 04/14/11 |

**Spring 2011 Caged Bivalve Study:**
Health assessment for eastern elliptio mussel LPR7AB-EC228
(Day 35)

| Photo No.: | 60 |
|---|---|
| Date: | 04/14/11 |

**Spring 2011 Caged Bivalve Study:**
Health assessment for eastern elliptio mussel LPR8AC-EC287
(Day 35)

| Photo No.: | 61 |
|---|---|
| Date: | 04/14/11 |

**Spring 2011 Caged Bivalve Study:**
Health assessment for eastern elliptio mussel LPR8AC-EC288 (Day 35)

| Photo No.: | 62 |
|---|---|
| Date: | 04/14/11 |

**Spring 2011 Caged Bivalve Study:**
Dead eastern elliptio mussels at location LPR8AC (Day 35)

| Photo No.: | 63 |
|---|---|
| Date: | 05/04/11 |

**Spring 2011 Caged Bivalve Study:**
Health assessment for ribbed mussel LPR1XX-GD013 (Day 56)

| Photo No.: | 64 |
|---|---|
| Date: | 05/04/11 |

**Spring 2011 Caged Bivalve Study:**
Health assessment for ribbed mussel LPR1XX-GD014 (Day 56)

| Photo No.: | 65 |
|---|---|
| Date: | 05/04/11 |

**Spring 2011 Caged Bivalve Study:**
Health assessment for ribbed mussel LPR2AD-GD094 (Day 56)

| Photo No.: | 66 |
|---|---|
| Date: | 05/04/11 |

**Spring 2011 Caged Bivalve Study:**
Health assessment for ribbed mussel LPR2AD-GD096 (Day 56)

| Photo No.: | 67 |
|---|---|
| Date: | 05/05/11 |

**Spring 2011 Caged Bivalve Study:**
Health assessment for eastern elliptio mussel LPR6VV-EC359 (Day 56)

| Photo No.: | 68 |
|---|---|
| Date: | 05/05/11 |

**Spring 2011 Caged Bivalve Study:**
Health assessment for eastern elliptio mussel LPR6VV-EC360 (Day 56)

| Photo No.: | 69 |
|---|---|
| Date: | 05/05/11 |

**Spring 2011 Caged Bivalve Study:**
Health assessment for eastern elliptio mussel LPR6UU-EC059
(Day 56)

| Photo No.: | 70 |
|---|---|
| Date: | 05/05/11 |

**Spring 2011 Caged Bivalve Study:**
Health assessment for eastern elliptio mussel LPR6UU-EC060
(Day 56)

| Photo No.: | 71 |
|---|---|
| Date: | 05/05/11 |

**Spring 2011 Caged Bivalve Study:**
Health assessment for eastern elliptio mussel LPR7ZZ-EC136
(Day 56)

| Photo No.: | 72 |
|---|---|
| Date: | 05/05/11 |

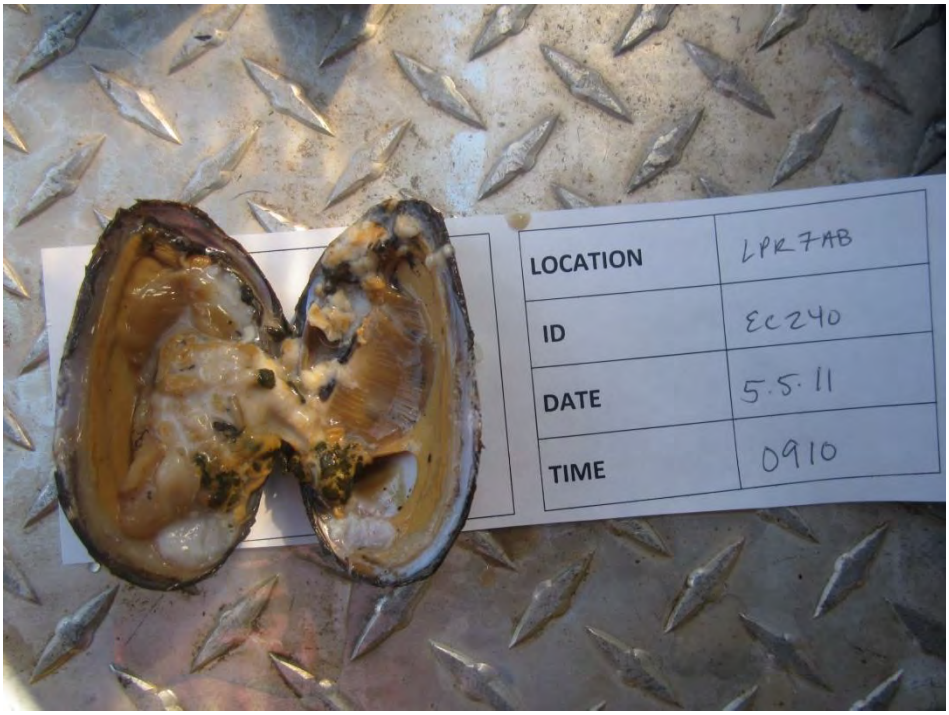
**Spring 2011 Caged Bivalve Study:**
Health assessment for eastern elliptio mussel LPR7ZZ-EC137
(Day 56)

| Photo No.: | 73 |
|---|---|
| Date: | 05/05/11 |

**Spring 2011 Caged Bivalve Study:**
Health assessment for eastern elliptio mussel LPR7AB-EC239
(Day 56)

| Photo No.: | 74 |
|---|---|
| Date: | 05/05/11 |

**Spring 2011 Caged Bivalve Study:**
Health assessment for eastern elliptio mussel LPR7AB-EC239
(Day 56)



| Photo No.: | 75 |
|---|---|
| Date: | 05/09/11 |

**Spring 2011 Caged Bivalve Study:**
Retrieving ribbed mussels from estuarine zone at location LPR1XX (Day 61)

| Photo No.: | 76 |
|---|---|
| Date: | 05/09/11 |

**Spring 2011 Caged Bivalve Study:**
Retrieving ribbed mussels from estuarine zone at location LPR1XX (Day 61)

| Photo No.: | 77 |
|---|---|
| Date: | 05/09/11 |

**Spring 2011 Caged Bivalve Study:**
Dead ribbed mussel from estuarine zone at location LPR3SS (Day 61)

| Photo No.: | 78 |
|---|---|
| Date: | 05/09/11 |

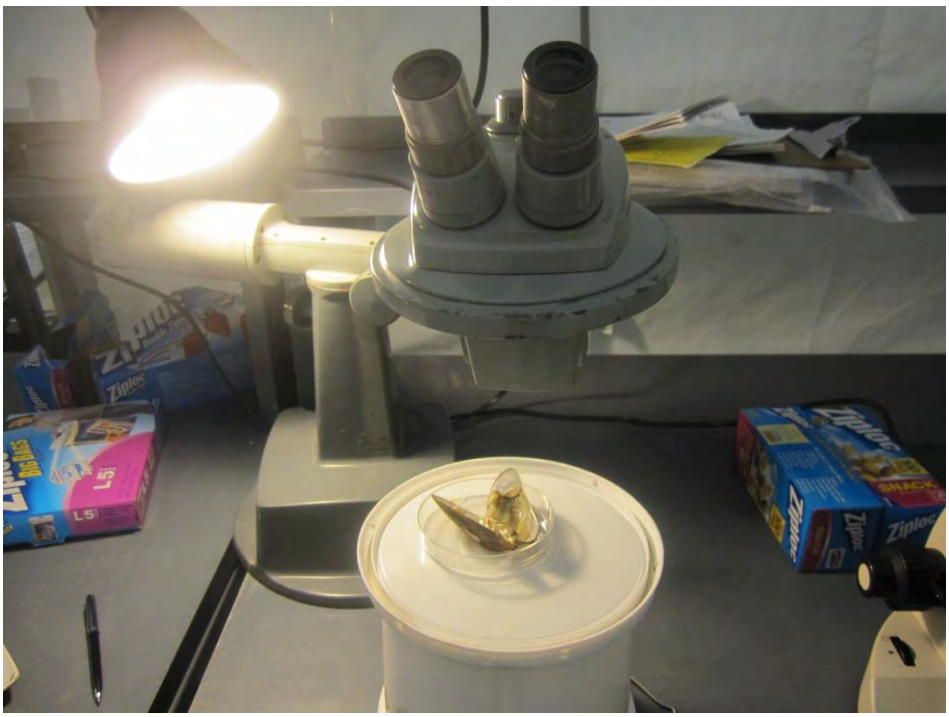
**Spring 2011 Caged Bivalve Study:**
Processing ribbed mussels retrieved from estuarine zone (Day 61)

| Photo No.: | 79 |
|---|---|
| Date: | 05/09/11 |

**Spring 2011 Caged Bivalve Study:**
Processing ribbed mussels retrieved from estuarine zone (Day 61)

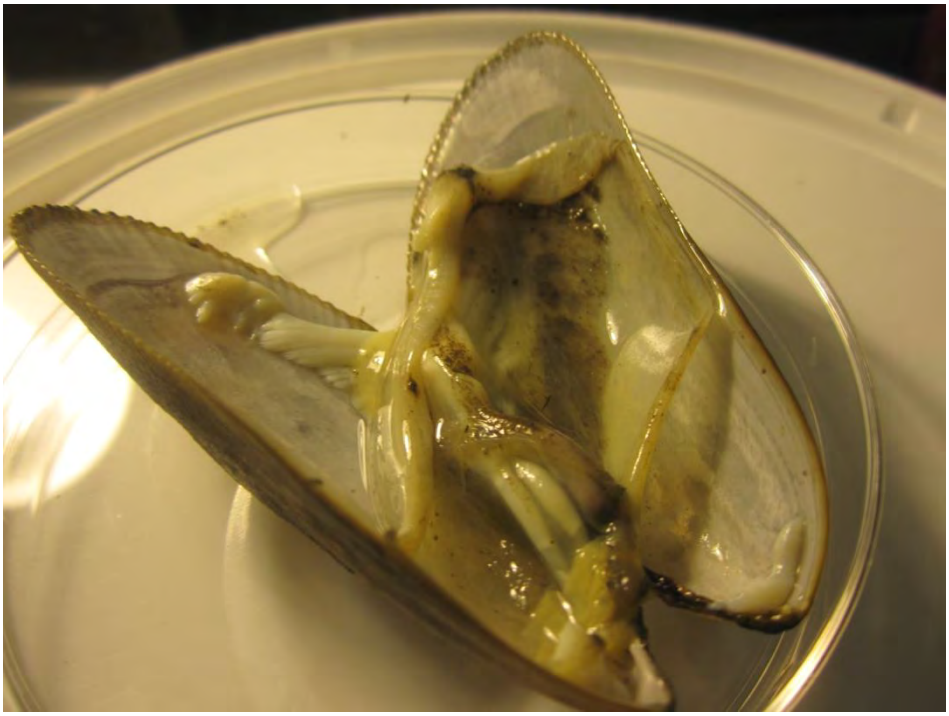
| Photo No.: | 80 |
|---|---|
| Date: | 05/09/11 |

**Spring 2011 Caged Bivalve Study:**
Examining dead ribbed mussel retrieved from estuarine zone (Day 61)



| Photo No.: | 81 |
|---|---|
| Date: | 05/09/11 |

**Spring 2011 Caged Bivalve Study:**
Examining dead ribbed mussel retrieved from estuarine zone (Day 61)



| Photo No.: | 82 |
|---|---|
| Date: | 05/24/11 |

**Spring 2011 Caged Bivalve Study:**
Health assessment for eastern elliptio mussel LPR7AB-EC237 (Day 75)

| Photo No.: | 83 |
|---|---|
| Date: | 05/24/11 |

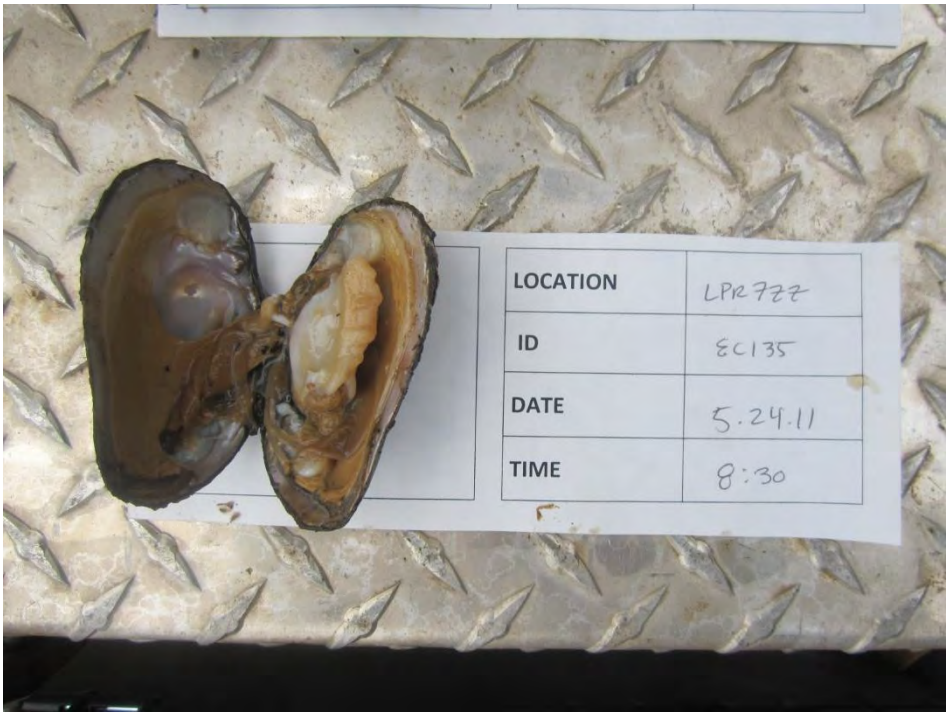
**Spring 2011 Caged Bivalve Study:**
Health assessment for eastern elliptio mussel LPR7AB-EC238 (Day 75)

| Photo No.: | 84 |
|---|---|
| Date: | 05/24/11 |

**Spring 2011 Caged Bivalve Study:**
Health assessment for eastern elliptio mussel LPR7ZZ-EC134 (Day 75)

| Photo No.: | 85 |
|---|---|
| Date: | 05/24/11 |

**Spring 2011 Caged Bivalve Study:**
Health assessment for eastern elliptio mussel LPR7ZZ-EC135
(Day 75)




| Photo No.: | 86 |
|---|---|
| Date: | 05/24/11 |

**Spring 2011 Caged Bivalve Study:**
Health assessment for eastern elliptio mussel LPR6UU-EC057
(Day 75)

| Photo No.: | 87 |
|---|---|
| Date: | 05/24/11 |

**Spring 2011 Caged Bivalve Study:**
Health assessment for eastern elliptio mussel LPR6UU-EC058 (Day 75)

| Photo No.: | 88 |
|---|---|
| Date: | 05/24/11 |

**Spring 2011 Caged Bivalve Study:**
Health assessment for eastern elliptio mussel LPR6VV-EC357 (Day 75)

| Photo No.: | 89 |
|---|---|
| Date: | 05/24/11 |

**Spring 2011 Caged Bivalve Study:**
Health assessment for eastern elliptio mussel LPR6VV-EC358 (Day 75)

| Photo No.: | 90 |
|---|---|
| Date: | 06/08/11 |

**Spring 2011 Caged Bivalve Study:**
Processing eastern elliptio mussels retrieved upon test termination (Day 90)

| Photo No.: | 91 |
|---|---|
| Date: | 06/08/11 |

**Spring 2011 Caged Bivalve Study:**
Dead eastern elliptio mussels retrieved from location LPR8AC upon test termination (Day 90)

| Photo No.: | 92 |
|---|---|
| Date: | 06/08/11 |

**Spring 2011 Caged Bivalve Study:**
Eastern elliptio mussels processed after test termination for shipment to analytical laboratory (Day 90)

# APPENDIX D. WATER QUALITY MEASUREMENT DATA TABLE

## Table D-1. Water quality data for the 2011 LPRSA caged bivalve study

| Location ID | Date and Time | Station Depth (ft) | Measurement Depth (ft) | DO (mg/L) | pH | Turbidity (NTU) | Temperature (°C) | Conductivity (mS/cm) | Salinity (ppt) |
|---|---|---|---|---|---|---|---|---|---|
| **Day 0** | | | | | | | | | |
| LPR1XX | 3/9/11 10:15 | 8.5 | 1 | 13.24 | 7.25 | 169.4 | 4.68 | 0.940 | 0.48 |
| | | | 2 | 12.85 | 6.78 | 500 | 4.66 | 1.050 | 0.53 |
| | | | 3 | 12.97 | 6.91 | 1132 | 4.68 | 1.140 | 0.58 |
| | | | 4 | 13.00 | 6.96 | 948 | 4.68 | 1.280 | 0.63 |
| | | | 5 | 13.02 | 7.03 | 705 | 4.68 | 1.180 | 0.60 |
| | | | 6 | 13.02 | 7.05 | 268 | 4.68 | 1.150 | 0.60 |
| | | | 7 | 13.00 | 7.18 | 815 | 4.68 | 1.150 | 0.57 |
| | | | 8 | 13.02 | 7.20 | 825 | 4.70 | 1.230 | 0.60 |
| LPR2AD | 3/9/11 12:25 | 6.5 | 1 | 13.14 | 6.63 | na | 4.81 | 1.47 | 0.12 |
| | | | 2 | 12.88 | 6.64 | na | 4.80 | 1.47 | 0.12 |
| | | | 3 | 12.82 | 6.65 | na | 4.79 | 1.47 | 0.12 |
| | | | 4 | 12.77 | 6.65 | na | 4.79 | 1.47 | 0.12 |
| | | | 5 | 12.74 | 6.65 | na | 4.79 | 1.47 | 0.12 |
| | | | 6 | 12.72 | 6.64 | na | 4.78 | 1.47 | 0.12 |
| LPR3SS | 3/9/11 12:41 | 4.0 | 1 | 12.68 | 6.90 | na | 4.98 | na | 0.12 |
| | | | 2 | 12.3 | 6.90 | na | 4.96 | na | 0.12 |
| | | | 3 | 12.92 | 6.90 | na | 4.96 | na | 0.12 |

## Table D-1. Water quality data for the 2011 LPRSA caged bivalve study

| Location ID | Date and Time | Station Depth (ft) | Measurement Depth (ft) | DO (mg/L) | pH | Turbidity (NTU) | Temperature (°C) | Conductivity (mS/cm) | Salinity (ppt) |
|---|---|---|---|---|---|---|---|---|---|
| LPR4ZZ | 3/9/11 13:32 | 10.5 | 1 | 13.49 | 6.80 | na | 5.25 | na | 0.14 |
| | | | 2 | 13.45 | 6.79 | na | 5.24 | na | 0.14 |
| | | | 3 | 13.41 | 6.80 | na | 5.24 | na | 0.14 |
| | | | 4 | 13.4 | 6.80 | na | 5.24 | na | 0.14 |
| | | | 5 | 13.41 | 6.81 | na | 5.22 | na | 0.14 |
| | | | 6 | 13.38 | 6.81 | na | 5.22 | na | 0.14 |
| | | | 7 | 13.36 | 6.82 | na | 5.22 | na | 0.14 |
| | | | 8 | 13.33 | 6.82 | na | 5.23 | na | 0.14 |
| | | | 9 | 13.29 | 6.83 | na | 5.23 | na | 0.14 |
| | | | 10 | 13.24 | 6.83 | na | 5.23 | na | 0.14 |
| LPR4AB | 3/9/11 13:57 | 11.0 | 1 | 13.32 | 6.82 | na | 5.31 | na | 0.14 |
| | | | 2 | 13.31 | 6.83 | na | 5.32 | na | 0.14 |
| | | | 3 | 13.30 | 6.84 | na | 5.32 | na | 0.14 |
| | | | 4 | 13.30 | 6.84 | na | 5.32 | na | 0.14 |
| | | | 5 | 13.28 | 6.84 | na | 5.31 | na | 0.14 |
| | | | 6 | 13.25 | 6.85 | na | 5.31 | na | 0.14 |
| | | | 7 | 13.23 | 6.85 | na | 5.31 | na | 0.14 |
| | | | 8 | 13.22 | 6.86 | na | 5.31 | na | 0.14 |
| | | | 9 | 13.21 | 6.86 | na | 5.30 | na | 0.14 |
| | | | 10 | 13.18 | 6.87 | na | 5.30 | na | 0.14 |

## Table D-1. Water quality data for the 2011 LPRSA caged bivalve study

| Location ID | Date and Time | Station Depth (ft) | Measurement Depth (ft) | DO (mg/L) | pH | Turbidity (NTU) | Temperature (°C) | Conductivity (mS/cm) | Salinity (ppt) |
|---|---|---|---|---|---|---|---|---|---|
| LPR5XX (old location) | 3/9/11 14:15 | 5.0 | 1 | 13.77 | 6.91 | na | 5.42 | na | 0.15 |
| | | | 2 | 13.63 | 6.91 | na | 5.42 | na | 0.15 |
| | | | 3 | 13.56 | 6.92 | na | 5.42 | na | 0.15 |
| | | | 4 | 13.53 | 6.92 | na | 5.42 | na | 0.15 |
| LPR5YY | 3/9/11 14:25 | 5.0 | 1 | 13.78 | 6.95 | na | 5.48 | na | 0.15 |
| | | | 2 | 13.50 | 6.95 | na | 5.48 | na | 0.15 |
| | | | 3 | 13.44 | 6.94 | na | 5.47 | na | 0.15 |
| | | | 4 | 13.39 | 6.95 | na | 5.46 | na | 0.15 |
| LPR5XX (new location) | 3/9/11 14:54 | 7.2 | 1 | 14.56 | 6.97 | na | 5.50 | na | 0.15 |
| | | | 2 | 14.48 | 6.96 | na | 5.50 | na | 0.15 |
| | | | 3 | 13.3 | 6.96 | na | 5.50 | na | 0.15 |
| | | | 4 | 13.23 | 6.95 | na | 5.50 | na | 0.15 |
| | | | 5 | 13.25 | 6.95 | na | 5.49 | na | 0.15 |
| | | | 6 | 13.22 | 6.96 | na | 5.48 | na | 0.15 |
| LPR1XX | 3/10/11 09:22 | 8.8 | 1 | 12.91 | 7.30 | 8.6 | 5.11 | 0.356 | 0.16 |
| | | | 2 | 12.86 | 7.23 | 8.4 | 5.10 | 0.351 | 0.17 |
| | | | 3 | 12.83 | 7.20 | 9.0 | 5.11 | 0.364 | 0.18 |
| | | | 4 | 12.80 | 7.19 | 9.1 | 5.09 | 0.392 | 0.19 |
| | | | 5 | 12.80 | 7.20 | 8.7 | 5.08 | 0.372 | 0.18 |
| | | | 6 | 12.81 | 7.22 | 8.7 | 5.07 | 0.349 | 0.17 |
| | | | 7 | 12.83 | 7.12 | 9.1 | 5.08 | 0.423 | 0.21 |
| | | | 8 | 12.84 | 7.15 | 8.9 | 5.06 | 0.410 | 0.21 |

## Table D-1. Water quality data for the 2011 LPRSA caged bivalve study

| Location ID | Date and Time | Station Depth (ft) | Measurement Depth (ft) | DO (mg/L) | pH | Turbidity (NTU) | Temperature (°C) | Conductivity (mS/cm) | Salinity (ppt) |
|---|---|---|---|---|---|---|---|---|---|
| LPR2AD | 3/10/11 09:46 | 6.3 | 1 | 13.83 | 7.34 | 6.9 | 5.12 | 0.309 | 0.15 |
| | | | 2 | 13.16 | 7.29 | 7.5 | 5.10 | 0.310 | 0.15 |
| | | | 3 | 12.95 | 7.27 | 7.5 | 5.10 | 0.310 | 0.15 |
| | | | 4 | 12.88 | 7.25 | 7.6 | 5.11 | 0.310 | 0.15 |
| | | | 5 | 12.84 | 7.24 | 7.7 | 5.10 | 0.311 | 0.15 |
| LPR3SS | 3/10/11 10:07 | 7.8 | 1 | 13.04 | 7.28 | 8.2 | 5.07 | 0.313 | 0.15 |
| | | | 2 | 12.95 | 7.26 | 8.1 | 5.06 | 0.313 | 0.15 |
| | | | 3 | 12.91 | 7.25 | 8.5 | 5.06 | 0.313 | 0.15 |
| | | | 4 | 12.89 | 7.24 | 8.7 | 5.05 | 0.313 | 0.15 |
| | | | 5 | 12.88 | 7.22 | 9.4 | 5.05 | 0.313 | 0.15 |
| | | | 6 | 12.88 | 7.23 | 9.2 | 5.05 | 0.314 | 0.15 |
| | | | 7 | 12.86 | 7.22 | 9.2 | 5.05 | 0.313 | 0.15 |
| LPR8AC | 3/10/11 08:25 | 4.9 | 1 | 13.86 | 8.23 | 15.6 | 4.47 | 0.201 | <1[a] |
| | | | 2 | 14.21 | 8.06 | 16.0 | 4.46 | 0.201 | <1[a] |
| | | | 3 | 14.32 | 7.99 | 223.2 | 4.46 | 0.201 | <1[a] |
| | | | 4 | 14.35 | 7.89 | 1009.8 | 4.46 | 0.201 | <1[a] |
| LPR7AB | 3/10/11 09:00 | 7.1 | 1 | 13.89 | 7.71 | 13.8 | 4.46 | 0.200 | <1[a] |
| | | | 2 | 14.20 | 7.70 | 14.0 | 4.46 | 0.200 | <1[a] |
| | | | 3 | 14.35 | 7.67 | 13.1 | 4.46 | 0.200 | <1[a] |
| | | | 4 | 14.43 | 7.65 | 14.4 | 4.45 | 0.200 | <1[a] |
| | | | 5 | 14.48 | 7.62 | 13.7 | 4.45 | 0.200 | <1[a] |
| | | | 6 | 14.48 | 7.60 | 13.6 | 4.45 | 0.200 | <1[a] |

## Table D-1. Water quality data for the 2011 LPRSA caged bivalve study

| Location ID | Date and Time | Station Depth (ft) | Measurement Depth (ft) | DO (mg/L) | pH | Turbidity (NTU) | Temperature (°C) | Conductivity (mS/cm) | Salinity (ppt) |
|---|---|---|---|---|---|---|---|---|---|
| LPR7ZZ | 3/10/11 09:50 | 10.3 | 1 | 14.33 | 7.64 | 12.6 | 4.47 | 0.200 | <1[a] |
| | | | 2 | 14.33 | 7.61 | 13.2 | 4.46 | 0.200 | <1[a] |
| | | | 3 | 14.38 | 7.59 | 13.5 | 4.45 | 0.200 | <1[a] |
| | | | 4 | 14.41 | 7.57 | 13.7 | 4.46 | 0.200 | <1[a] |
| | | | 5 | 14.42 | 7.57 | 13.6 | 4.46 | 0.200 | <1[a] |
| | | | 6 | 14.43 | 7.55 | 13.2 | 4.45 | 0.200 | <1[a] |
| | | | 7 | 14.43 | 7.52 | 13.6 | 4.44 | 0.200 | <1[a] |
| | | | 8 | 14.43 | 7.52 | 13.7 | 4.46 | 0.200 | <1[a] |
| | | | 9 | 14.42 | 7.50 | 15.1 | 4.46 | 0.200 | <1[a] |
| LPR6UU | 3/10/11 10:15 | 5.2 | 1 | 14.10 | 7.56 | 13.9 | 4.48 | 0.200 | <1[a] |
| | | | 2 | 14.06 | 7.53 | 14.5 | 4.48 | 0.200 | <1[a] |
| | | | 3 | 14.19 | 7.52 | 14.2 | 4.48 | 0.200 | <1[a] |
| | | | 4 | 14.30 | 7.49 | 14.5 | 4.47 | 0.200 | <1[a] |
| LPR6VV | 3/10/11 10:30 | 8.0 | 1 | 14.98 | 7.52 | 12.7 | 4.49 | 0.200 | <1[a] |
| | | | 2 | 14.47 | 7.51 | 13.8 | 4.49 | 0.200 | <1[a] |
| | | | 3 | 14.37 | 7.5 | 16.2 | 4.48 | 0.200 | <1[a] |
| | | | 4 | 14.36 | 7.49 | 16.3 | 4.48 | 0.200 | <1[a] |
| | | | 5 | 14.36 | 7.48 | 15.5 | 4.48 | 0.200 | <1[a] |
| | | | 6 | 14.39 | 7.48 | 14.9 | 4.47 | 0.200 | <1[a] |
| | | | 7 | 14.38 | 7.46 | 15.6 | 4.47 | 0.200 | <1[a] |

## Table D-1. Water quality data for the 2011 LPRSA caged bivalve study

| Location ID | Date and Time | Station Depth (ft) | Measurement Depth (ft) | DO (mg/L) | pH | Turbidity (NTU) | Temperature (°C) | Conductivity (mS/cm) | Salinity (ppt) |
|---|---|---|---|---|---|---|---|---|---|
| LPR5YY | 3/10/11 10:50 | 6.5 | 1 | 14.81 | 7.47 | 14.9 | 4.51 | 0.200 | <1[a] |
| | | | 2 | 14.4 | 7.46 | 14.3 | 4.50 | 0.200 | <1[a] |
| | | | 3 | 14.35 | 7.46 | 14.3 | 4.49 | 0.200 | <1[a] |
| | | | 4 | 14.35 | 7.45 | 15.7 | 4.49 | 0.200 | <1[a] |
| | | | 5 | 14.35 | 7.44 | 14.9 | 4.50 | 0.200 | <1[a] |
| | | | 6 | 14.36 | 7.43 | 11.2 | 4.49 | 0.200 | <1[a] |
| LPR5XX | 3/10/11 11:00 | 8.7 | 1 | 14.61 | 7.45 | 12.8 | 4.52 | 0.200 | <1[a] |
| | | | 2 | 14.28 | 7.44 | 13.7 | 4.51 | 0.200 | <1[a] |
| | | | 3 | 14.27 | 7.43 | 14.0 | 4.52 | 0.200 | <1[a] |
| | | | 4 | 14.29 | 7.44 | 14.7 | 4.51 | 0.200 | <1[a] |
| | | | 5 | 14.31 | 7.43 | 14.0 | 4.51 | 0.200 | <1[a] |
| | | | 6 | 14.31 | 7.42 | 14.1 | 4.51 | 0.200 | <1[a] |
| | | | 7 | 14.31 | 7.41 | 14.3 | 4.51 | 0.200 | <1[a] |
| | | | 8 | 14.30 | 7.41 | 14.2 | 4.51 | 0.200 | <1[a] |

## Table D-1. Water quality data for the 2011 LPRSA caged bivalve study

| Location ID | Date and Time | Station Depth (ft) | Measurement Depth (ft) | DO (mg/L) | pH | Turbidity (NTU) | Temperature (°C) | Conductivity (mS/cm) | Salinity (ppt) |
|---|---|---|---|---|---|---|---|---|---|
| <1[a] LPR4AB | 3/10/11 11:15 | 10.5 | 1 | 23.22 | 7.44 | 12.7 | 4.54 | 0.200 | <1[a] |
| | | | 2 | 18.41 | 7.43 | 14.4 | 4.53 | 0.200 | <1[a] |
| | | | 3 | 17.97 | 7.44 | 14.1 | 4.53 | 0.200 | <1[a] |
| | | | 4 | 17.70 | 7.43 | 14.2 | 4.53 | 0.200 | <1[a] |
| | | | 5 | 17.60 | 7.41 | 13.7 | 4.53 | 0.200 | <1[a] |
| | | | 6 | 17.52 | 7.42 | 15.4 | 4.53 | 0.200 | <1[a] |
| | | | 7 | 17.81 | 7.42 | 15.1 | 4.52 | 0.200 | <1[a] |
| | | | 8 | 17.47 | 7.41 | 14.7 | 4.52 | 0.200 | <1[a] |
| | | | 9 | 17.72 | 7.40 | 14.6 | 4.52 | 0.200 | <1[a] |
| | | | 10 | 17.39 | 7.40 | 15.0 | 4.52 | 0.200 | <1[a] |
| LPR4ZZ | 3/10/11 11:25 | 8.5 | 1 | 20.56 | 7.44 | 13.1 | 4.58 | 0.201 | <1[a] |
| | | | 2 | 18.38 | 7.42 | 14.3 | 4.57 | 0.200 | <1[a] |
| | | | 3 | 18.23 | 7.41 | 15.3 | 4.56 | 0.200 | <1[a] |
| | | | 4 | 18.17 | 7.39 | 15.0 | 4.57 | 0.200 | <1[a] |
| | | | 5 | 18.61 | 7.4 | 14.9 | 4.57 | 0.200 | <1[a] |
| | | | 6 | 18.28 | 7.39 | 14.5 | 4.56 | 0.200 | <1[a] |
| | | | 7 | 18.27 | 7.39 | 14.9 | 4.56 | 0.200 | <1[a] |
| | | | 8 | 26.24 | 7.39 | 17.3 | 4.56 | 0.200 | <1[a] |

## Table D-1. Water quality data for the 2011 LPRSA caged bivalve study

| Location ID | Date and Time | Station Depth (ft) | Measurement Depth (ft) | DO (mg/L) | pH | Turbidity (NTU) | Temperature (°C) | Conductivity (mS/cm) | Salinity (ppt) |
|---|---|---|---|---|---|---|---|---|---|
| **Day 14** | | | | | | | | | |
| LPR1XX | 3/23/11 08:59 | 7.6 | 1 | 11.65 | 6.67 | 3.4 | 7.21 | 1.200 | 0.92 |
| | | | 2 | 11.46 | 6.58 | 4.5 | 7.34 | 1.506 | 1.27 |
| | | | 3 | 11.38 | 6.51 | 4.5 | 7.35 | 2.561 | 1.57 |
| | | | 4 | 11.27 | 6.5 | 4.3 | 7.37 | 4.886 | 4.30 |
| | | | 5 | 11.20 | 6.51 | 4.3 | 7.38 | 4.881 | 4.18 |
| | | | 6 | 10.89 | 6.4 | 7.6 | 7.40 | 5.352 | 4.28 |
| | | | 7 | 10.98 | 6.61 | 7.6 | 7.40 | 6.714 | 5.80 |
| LPR2AD | 3/23/11 09:38 | 5.5 | 1 | 12.16 | 7.46 | 7.0 | 7.24 | 0.588 | 0.46 |
| | | | 2 | 12.13 | 7.45 | 7.0 | 7.24 | 0.660 | 0.50 |
| | | | 3 | 12.83 | 7.39 | 8.8 | 7.24 | 0.684 | 0.53 |
| | | | 4 | 11.79 | 7.3 | 8.6 | 7.24 | 0.857 | 0.63 |
| | | | 5 | 11.66 | 6.95 | 25.9 | 7.23 | 2.601 | 1.73 |
| LPR3SS | 3/23/11 10:17 | 8.5 | 1 | 12.12 | 7.60 | 6.9 | 7.42 | 0.371 | 0.27 |
| | | | 2 | 12.04 | 7.57 | 6.9 | 7.42 | 0.371 | 0.27 |
| | | | 3 | 12.05 | 7.54 | 6.9 | 7.41 | 0.371 | 0.27 |
| | | | 4 | 11.9 | 7.53 | 5.7 | 7.41 | 0.371 | 0.27 |
| | | | 5 | 11.88 | 7.52 | 5.6 | 7.41 | 0.312 | 0.27 |
| | | | 6 | 11.88 | 7.50 | 5.6 | 7.40 | 0.374 | 0.27 |
| | | | 7 | 11.84 | 7.49 | 6.4 | 7.40 | 0.375 | 0.27 |
| | | | 8 | 11.84 | 7.48 | 6.2 | 7.40 | 0.375 | 0.27 |

## Table D-1. Water quality data for the 2011 LPRSA caged bivalve study

| Location ID | Date and Time | Station Depth (ft) | Measurement Depth (ft) | DO (mg/L) | pH | Turbidity (NTU) | Temperature (°C) | Conductivity (mS/cm) | Salinity (ppt) |
|---|---|---|---|---|---|---|---|---|---|
| LPR4ZZ | 3/23/11 11:51 | 13.5 | 1 | 12.07 | 7.57 | 0.8 | 7.73 | 0.345 | 0.25 |
| | | | 2 | 12.00 | 7.56 | 0.8 | 7.73 | 0.346 | 0.25 |
| | | | 3 | 12.01 | 7.53 | 0.4 | 7.74 | 0.345 | 0.25 |
| | | | 4 | 11.80 | 7.54 | 1.0 | 7.74 | 0.346 | 0.25 |
| | | | 5 | 11.78 | 7.53 | 1.0 | 7.75 | 0.348 | 0.25 |
| | | | 6 | 11.79 | 7.53 | 1.1 | 7.75 | 0.347 | 0.25 |
| | | | 7 | 11.74 | 7.52 | 1.1 | 7.74 | 0.349 | 0.25 |
| | | | 8 | 11.73 | 7.52 | 1.1 | 7.74 | 0.347 | 0.25 |
| | | | 9 | 11.74 | 7.51 | 1.1 | 7.74 | 0.347 | 0.25 |
| | | | 10 | 11.73 | 7.51 | 1.5 | 7.74 | 0.347 | 0.25 |
| | | | 11 | 11.72 | 7.5 | 1.4 | 7.75 | 0.354 | 0.26 |
| | | | 12 | 11.71 | 7.49 | 1.4 | 7.77 | 0.361 | 0.26 |
| | | | 13 | 11.70 | 7.49 | 2.1 | 7.78 | 0.363 | 0.26 |

## Table D-1. Water quality data for the 2011 LPRSA caged bivalve study

| Location ID | Date and Time | Station Depth (ft) | Measurement Depth (ft) | DO (mg/L) | pH | Turbidity (NTU) | Temperature (°C) | Conductivity (mS/cm) | Salinity (ppt) |
|---|---|---|---|---|---|---|---|---|---|
| LPR4AB | 3/23/11 12:34 | 13.3 | 1 | 10.83 | 7.61 | 0.0 | 7.47 | 0.316 | 0.23 |
| | | | 2 | 12.09 | 7.58 | 0.2 | 7.52 | 0.317 | 0.23 |
| | | | 3 | 12.08 | 7.57 | 0.2 | 7.52 | 0.317 | 0.23 |
| | | | 4 | 12.08 | 7.56 | 1.1 | 7.51 | 0.317 | 0.23 |
| | | | 5 | 11.83 | 7.56 | 0.6 | 7.51 | 0.317 | 0.23 |
| | | | 6 | 11.86 | 7.54 | 0.6 | 7.46 | 0.316 | 0.23 |
| | | | 7 | 11.79 | 7.55 | 0.4 | 7.51 | 0.317 | 0.23 |
| | | | 8 | 11.78 | 7.54 | 0.4 | 7.53 | 0.318 | 0.23 |
| | | | 9 | 11.79 | 7.54 | 0.2 | 7.53 | 0.318 | 0.23 |
| | | | 10 | 11.76 | 7.51 | 0.8 | 7.53 | 0.318 | 0.23 |
| | | | 11 | 11.76 | 7.53 | 1.1 | 7.52 | 0.318 | 0.23 |
| | | | 12 | 11.76 | 7.53 | 1.0 | 7.53 | 0.318 | 0.23 |
| LPR5XX | 3/23/11 13:24 | 11.8 | 1 | 12.99 | 7.47 | 0.9 | 7.19 | 0.318 | 0.23 |
| | | | 2 | 12.66 | 7.51 | 0.9 | 7.22 | 0.317 | 0.23 |
| | | | 3 | 12.65 | 7.53 | 0.9 | 7.22 | 0.318 | 0.23 |
| | | | 4 | 12.02 | 7.52 | 0.6 | 7.22 | 0.318 | 0.23 |
| | | | 5 | 11.89 | 7.52 | 0.7 | 7.22 | 0.318 | 0.23 |
| | | | 6 | 11.98 | 7.52 | 0.7 | 7.22 | 0.318 | 0.23 |
| | | | 7 | 11.9 | 7.52 | 1.3 | 7.22 | 0.318 | 0.23 |
| | | | 8 | 11.87 | 7.52 | 1.3 | 7.22 | 0.318 | 0.23 |
| | | | 9 | 11.87 | 7.51 | 1.2 | 7.22 | 0.318 | 0.23 |
| | | | 10 | 11.84 | 7.51 | 1.3 | 7.22 | 0.318 | 0.23 |
| | | | 11 | 11.85 | 7.51 | 1.0 | 7.22 | 0.318 | 0.23 |

## Table D-1. Water quality data for the 2011 LPRSA caged bivalve study

| Location ID | Date and Time | Station Depth (ft) | Measurement Depth (ft) | DO (mg/L) | pH | Turbidity (NTU) | Temperature (°C) | Conductivity (mS/cm) | Salinity (ppt) |
|---|---|---|---|---|---|---|---|---|---|
| LPR5YY | 3/23/11 14:01 | 6.0 | 1 | 12.29 | 7.55 | 2.4 | 7.01 | 0.337 | 0.25 |
| | | | 2 | 12.15 | 7.55 | 2.7 | 7.02 | 0.337 | 0.25 |
| | | | 3 | 12.15 | 7.55 | 2.7 | 7.02 | 0.336 | 0.25 |
| | | | 4 | 11.94 | 7.55 | 2.6 | 7.01 | 0.336 | 0.25 |
| | | | 5 | 11.93 | 7.55 | 2.5 | 7.02 | 0.336 | 0.25 |
| LPR6VV | 3/24/11 08:48 | 8.2 | 1 | 13.72 | 8.83 | 4.3 | 5.74 | 0.513 | 0.40 |
| | | | 2 | 13.34 | 8.57 | 4.3 | 5.75 | 0.514 | 0.40 |
| | | | 3 | 12.69 | 8.45 | 5.0 | 5.75 | 0.513 | 0.40 |
| | | | 4 | 12.59 | 8.35 | 5.1 | 5.75 | 0.514 | 0.40 |
| | | | 5 | 12.60 | 8.27 | 5.1 | 5.74 | 0.515 | 0.40 |
| | | | 6 | 12.39 | 8.22 | 4.7 | 5.74 | 0.517 | 0.40 |
| | | | 7 | 12.37 | 8.17 | 4.9 | 5.74 | 0.518 | 0.40 |
| LPR6UU | 3/24/11 09:33 | 4.0 | 1 | 13.22 | 8.10 | 3.5 | 5.70 | 0.505 | 0.39 |
| | | | 2 | 12.68 | 7.99 | 3.9 | 5.72 | 0.506 | 0.39 |
| | | | 3 | 12.55 | 7.96 | 3.8 | 5.72 | 0.506 | 0.39 |
| LPR7ZZ | 3/24/11 10:30 | 7.7 | 1 | 13.3 | 7.89 | 3.0 | 5.53 | 0.512 | 0.40 |
| | | | 2 | 13.08 | 7.88 | 3.2 | 5.52 | 0.513 | 0.40 |
| | | | 3 | 12.69 | 7.85 | 3.2 | 5.53 | 0.513 | 0.40 |
| | | | 4 | 12.62 | 7.84 | 3.0 | 5.52 | 0.512 | 0.40 |
| | | | 5 | 12.62 | 7.83 | 3.0 | 5.52 | 0.513 | 0.40 |
| | | | 6 | 12.47 | 7.81 | 7.1 | 5.52 | 0.513 | 0.40 |
| | | | 7 | 12.46 | 7.80 | 7.1 | 5.53 | 0.513 | 0.40 |

## Table D-1. Water quality data for the 2011 LPRSA caged bivalve study

| Location ID | Date and Time | Station Depth (ft) | Measurement Depth (ft) | DO (mg/L) | pH | Turbidity (NTU) | Temperature (°C) | Conductivity (mS/cm) | Salinity (ppt) |
|---|---|---|---|---|---|---|---|---|---|
| LPR7AB | 3/24/11 11:12 | 7.2 | 1 | 14.25 | 7.80 | 2.5 | 5.47 | 0.523 | 0.41 |
| | | | 2 | 13.31 | 7.79 | 2.9 | 5.46 | 0.522 | 0.41 |
| | | | 3 | 13.31 | 7.78 | 2.9 | 5.46 | 0.521 | 0.41 |
| | | | 4 | 12.9 | 7.78 | 3.0 | 5.45 | 0.521 | 0.41 |
| | | | 5 | 12.83 | 7.78 | 3.0 | 5.44 | 0.521 | 0.41 |
| | | | 6 | 12.83 | 7.77 | 3.0 | 5.44 | 0.520 | 0.41 |
| LPR8AC | 3/24/11 11:56 | 4.2 | 1 | 13.33 | 7.83 | 2.9 | 5.77 | 0.494 | 0.38 |
| | | | 2 | 13.42 | 7.79 | 2.9 | 5.71 | 0.493 | 0.38 |
| | | | 3 | 13.08 | 7.79 | 2.7 | 5.66 | 0.492 | 0.38 |
| **Day 35** | | | | | | | | | |
| LPR1XX | 4/13/11 08:30 | 8.0 | 1 | 10.14 | 7.60 | 0.1 | 11.35 | 4.480 | 3.30[a] |
| | | | 2 | 9.80 | 7.65 | 0.5 | 11.29 | 4.658 | 3.50[a] |
| | | | 3 | 9.78 | 7.66 | 0.5 | 11.28 | 4.667 | 3.50[a] |
| | | | 4 | 9.76 | 7.66 | 1.1 | 11.22 | 4.876 | 3.60[a] |
| | | | 5 | 9.76 | 7.65 | 2.0 | 11.17 | 4.970 | 3.70[a] |
| | | | 6 | 9.74 | 7.65 | 1.1 | 11.19 | 4.997 | 3.70[a] |
| | | | 7 | 9.71 | 7.65 | 2.2 | 11.13 | 5.044 | 3.80[a] |
| LPR2AD | 4/13/11 09:15 | 4.2 | 1 | 10.09 | 7.94 | 0.6 | 12.05 | 2.002 | <1[a] |
| | | | 2 | 9.76 | 7.82 | 0.8 | 12.06 | 2.007 | <1[a] |
| | | | 3 | 9.47 | 7.78 | 0.6 | 12.02 | 2.050 | <1[a] |

## Table D-1. Water quality data for the 2011 LPRSA caged bivalve study

| Location ID | Date and Time | Station Depth (ft) | Measurement Depth (ft) | DO (mg/L) | pH | Turbidity (NTU) | Temperature (°C) | Conductivity (mS/cm) | Salinity (ppt) |
|---|---|---|---|---|---|---|---|---|---|
| LPR3SS | 4/13/11 10:30 | 5.8 | 1 | 10.28 | 7.98 | 12.7 | 12.45 | 0.423 | <1[a] |
| | | | 2 | 9.44 | 7.86 | 9.7 | 12.48 | 0.409 | <1[a] |
| | | | 3 | 9.25 | 7.81 | 7.9 | 12.51 | 0.406 | <1[a] |
| | | | 4 | 9.27 | 7.78 | 9.6 | 12.52 | 0.404 | <1[a] |
| | | | 5 | 9.29 | 7.77 | 8.4 | 12.51 | 0.411 | <1[a] |
| LPR4ZZ | 4/13/11 11:00 | 8.7 | 1 | 9.65 | 7.69 | 5.8 | 12.06 | 0.360 | <1[a] |
| | | | 2 | 9.25 | 7.66 | 6.4 | 12.06 | 0.359 | <1[a] |
| | | | 3 | 9.11 | 7.64 | 8.4 | 12.07 | 0.359 | <1[a] |
| | | | 4 | 9.00 | 7.62 | 9.3 | 12.06 | 0.360 | <1[a] |
| | | | 5 | 8.97 | 7.61 | 8.2 | 12.06 | 0.360 | <1[a] |
| | | | 6 | 8.98 | 7.58 | 8.2 | 12.05 | 0.362 | <1[a] |
| | | | 7 | 8.98 | 7.58 | 9.9 | 12.05 | 0.362 | <1[a] |
| | | | 8 | 8.97 | 7.58 | 8.2 | 12.05 | 0.361 | <1[a] |
| LPR4AB | 4/12/11 12:15 | 5.6 | 1 | 10.37 | 7.72 | 8.5 | 11.69 | 0.337 | <1[a] |
| | | | 2 | 9.85 | 7.66 | 9.2 | 11.68 | 0.337 | <1[a] |
| | | | 3 | 9.51 | 7.63 | 11.5 | 11.69 | 0.337 | <1[a] |
| | | | 4 | 9.39 | 7.60 | 9.3 | 11.68 | 0.337 | <1[a] |
| | | | 5 | 9.32 | 7.59 | 10.4 | 11.67 | 0.336 | <1[a] |

## Table D-1. Water quality data for the 2011 LPRSA caged bivalve study

| Location ID | Date and Time | Station Depth (ft) | Measurement Depth (ft) | DO (mg/L) | pH | Turbidity (NTU) | Temperature (°C) | Conductivity (mS/cm) | Salinity (ppt) |
|---|---|---|---|---|---|---|---|---|---|
| LPR5XX | 4/13/11 12:45 | 15.4 | 1 | 10.45 | 7.75 | 6.1 | 11.59 | 0.325 | <1[a] |
| | | | 2 | 9.71 | 7.65 | 6.1 | 11.58 | 0.326 | <1[a] |
| | | | 3 | 9.47 | 7.62 | 6.3 | 11.58 | 0.326 | <1[a] |
| | | | 4 | 9.41 | 7.60 | 6.7 | 11.58 | 0.326 | <1[a] |
| | | | 5 | 9.36 | 7.58 | 6.7 | 11.58 | 0.326 | <1[a] |
| | | | 6 | 9.34 | 7.57 | 7.0 | 11.58 | 0.326 | <1[a] |
| | | | 7 | 9.32 | 7.56 | 7.1 | 11.58 | 0.325 | <1[a] |
| | | | 8 | 9.31 | 7.55 | 10.7 | 11.57 | 0.326 | <1[a] |
| | | | 9 | 9.30 | 7.55 | 7.8 | 11.57 | 0.326 | <1[a] |
| | | | 10 | 9.29 | 7.54 | 9.2 | 11.57 | 0.325 | <1[a] |
| | | | 11 | 9.29 | 7.53 | 6.1 | 11.56 | 0.325 | <1[a] |
| | | | 12 | 9.29 | 7.53 | 6.2 | 11.57 | 0.325 | <1[a] |
| | | | 13 | 9.29 | 7.53 | 13.2 | 11.56 | 0.325 | <1[a] |
| | | | 14 | 9.27 | 7.53 | 10.1 | 11.56 | 0.325 | <1[a] |
| LPR5YY | 4/13/11 13:15 | 8.8 | 1 | 10.19 | 7.65 | 7.1 | 11.51 | 0.325 | <1[a] |
| | | | 2 | 9.78 | 7.60 | 6.7 | 11.50 | 0.324 | <1[a] |
| | | | 3 | 9.55 | 7.57 | 6.7 | 11.50 | 0.325 | <1[a] |
| | | | 4 | 9.46 | 7.55 | 6.4 | 11.49 | 0.325 | <1[a] |
| | | | 5 | 9.41 | 7.54 | 6.1 | 11.48 | 0.326 | <1[a] |
| | | | 6 | 9.40 | 7.53 | 5.7 | 11.46 | 0.326 | <1[a] |
| | | | 7 | 9.39 | 7.53 | 5.3 | 11.45 | 0.326 | <1[a] |
| | | | 8 | 9.28 | 7.52 | 5.0 | 11.45 | 0.326 | <1[a] |

## Table D-1. Water quality data for the 2011 LPRSA caged bivalve study

| Location ID | Date and Time | Station Depth (ft) | Measurement Depth (ft) | DO (mg/L) | pH | Turbidity (NTU) | Temperature (°C) | Conductivity (mS/cm) | Salinity (ppt) |
|---|---|---|---|---|---|---|---|---|---|
| LPR6VV | 4/14/11 07:40 | 8.1 | 1 | 9.90 | 7.24 | 7.2 | 11.09 | 0.477 | <1[a] |
| | | | 2 | 9.80 | 7.24 | 7.5 | 11.09 | 0.477 | <1[a] |
| | | | 3 | 9.76 | 7.25 | 7.0 | 11.09 | 0.478 | <1[a] |
| | | | 4 | 9.74 | 7.25 | 7.0 | 11.09 | 0.478 | <1[a] |
| | | | 5 | 9.73 | 7.25 | 7.2 | 11.09 | 0.478 | <1[a] |
| | | | 6 | 9.72 | 7.24 | 7.4 | 11.09 | 0.478 | <1[a] |
| | | | 7 | 9.72 | 7.24 | 7.7 | 11.09 | 0.478 | <1[a] |
| LPR6UU | 4/14/11 08:10 | 4.6 | 1 | 10.23 | 7.39 | 6.6 | 11.05 | 0.478 | <1[a] |
| | | | 2 | 9.96 | 7.40 | 6.4 | 11.05 | 0.478 | <1[a] |
| | | | 3 | 9.86 | 7.41 | 8.4 | 11.05 | 0.478 | <1[a] |
| | | | 4 | 9.83 | 7.42 | 8.9 | 11.05 | 0.478 | <1[a] |
| LPR7ZZ | 4/14/11 08:40 | 8.9 | 1 | 10.80 | 7.48 | 4.8 | 10.87 | 0.481 | <1[a] |
| | | | 2 | 10.40 | 7.49 | 4.9 | 10.87 | 0.481 | <1[a] |
| | | | 3 | 10.26 | 7.49 | 7.5 | 10.87 | 0.481 | <1[a] |
| | | | 4 | 10.18 | 7.50 | 6.3 | 10.87 | 0.481 | <1[a] |
| | | | 5 | 10.15 | 7.50 | 5.5 | 10.87 | 0.481 | <1[a] |
| | | | 6 | 10.13 | 7.50 | 5.8 | 10.86 | 0.481 | <1[a] |
| | | | 7 | 10.11 | 7.51 | 5.3 | 10.86 | 0.481 | <1[a] |
| | | | 8 | 10.10 | 7.51 | 5.3 | 10.86 | 0.480 | <1[a] |

## Table D-1. Water quality data for the 2011 LPRSA caged bivalve study

| Location ID | Date and Time | Station Depth (ft) | Measurement Depth (ft) | DO (mg/L) | pH | Turbidity (NTU) | Temperature (°C) | Conductivity (mS/cm) | Salinity (ppt) |
|---|---|---|---|---|---|---|---|---|---|
| LPR7AB | 4/14/11 09:20 | 11.8 | 1 | 10.74 | 7.57 | 4.0 | 10.80 | 0.481 | <1[a] |
| | | | 2 | 10.57 | 7.56 | 4.3 | 10.81 | 0.482 | <1[a] |
| | | | 3 | 10.44 | 7.55 | 4.7 | 10.80 | 0.481 | <1[a] |
| | | | 4 | 10.40 | 7.55 | 4.5 | 10.79 | 0.481 | <1[a] |
| | | | 5 | 10.35 | 7.55 | 4.6 | 10.78 | 0.481 | <1[a] |
| | | | 6 | 10.32 | 7.54 | 4.9 | 10.79 | 0.481 | <1[a] |
| | | | 7 | 10.30 | 7.54 | 4.8 | 10.78 | 0.481 | <1[a] |
| | | | 8 | 10.29 | 7.54 | 4.6 | 10.78 | 0.481 | <1[a] |
| | | | 9 | 10.27 | 7.54 | 4.7 | 10.77 | 0.481 | <1[a] |
| | | | 10 | 10.26 | 7.54 | 5.0 | 10.77 | 0.481 | <1[a] |
| | | | 11 | 10.25 | 7.54 | 4.7 | 10.77 | 0.481 | <1[a] |
| LPR8AC | 4/14/11 09:40 | 4.2 | 1 | 10.93 | 7.61 | 4.9 | 10.88 | 0.478 | <1[a] |
| | | | 2 | 10.73 | 7.60 | 6.8 | 10.84 | 0.478 | <1[a] |
| | | | 3 | 10.65 | 7.59 | 6.4 | 10.83 | 0.478 | <1[a] |
| **Day 56** | | | | | | | | | |
| LPR1XX | 5/4/11 08:25 | 7.8 | 1 | 8.29 | 7.42 | 7.7 | 15.50 | 7.916 | 7.21 |
| | | | 2 | 7.85 | 7.34 | 8.4 | 15.51 | 8.938 | 7.21 |
| | | | 3 | 7.52 | 7.34 | 9.2 | 15.52 | 7.062 | 4.93 |
| | | | 4 | 7.53 | 7.29 | 9.1 | 15.22 | 12.79 | 9.26 |
| | | | 5 | 7.27 | 7.34 | 11.2 | 15.22 | 12.35 | 8.89 |
| | | | 6 | 7.17 | 7.35 | 10.7 | 14.71 | 13.74 | 10.13 |
| | | | 7 | 7.22 | 7.37 | 13.1 | 14.69 | 13.44 | 10.07 |

## Table D-1. Water quality data for the 2011 LPRSA caged bivalve study

| Location ID | Date and Time | Station Depth (ft) | Measurement Depth (ft) | DO (mg/L) | pH | Turbidity (NTU) | Temperature (°C) | Conductivity (mS/cm) | Salinity (ppt) |
|---|---|---|---|---|---|---|---|---|---|
| LPR2AD | 5/4/11 09:19 | 6.5 | 1 | 10.12 | 7.52 | 5.4 | 15.92 | 2.364 | 1.49 |
| | | | 2 | 9.51 | 7.45 | 5.7 | 15.92 | 3.203 | 2.04 |
| | | | 3 | 9.25 | 7.47 | 5.4 | 15.91 | 2.985 | 1.96 |
| | | | 4 | 9.16 | 7.30 | 5.5 | 15.80 | 6.627 | 4.52 |
| | | | 5 | 8.77 | 7.36 | 5.8 | 15.79 | 6.889 | 4.81 |
| | | | 6 | 8.41 | 7.43 | 5.7 | 15.89 | 3.113 | 1.87 |
| LPR3SS | 5/4/11 10:03 | 10.6 | 1 | 10.89 | 7.64 | 4.9 | 16.13 | 0.374 | 0.22 |
| | | | 2 | 9.96 | 7.59 | 5.3 | 16.15 | 0.371 | 0.22 |
| | | | 3 | 9.81 | 7.58 | 5.2 | 16.16 | 0.368 | 0.21 |
| | | | 4 | 9.74 | 7.55 | 5.2 | 16.16 | 0.405 | 0.24 |
| | | | 5 | 9.66 | 7.55 | 6.3 | 16.15 | 0.479 | 0.28 |
| | | | 6 | 9.61 | 7.55 | 5.7 | 16.15 | 0.476 | 0.3 |
| | | | 7 | 9.56 | 7.54 | 5.7 | 16.14 | 0.517 | 0.32 |
| | | | 8 | 9.53 | 7.50 | 5.3 | 16.13 | 0.541 | 0.31 |
| | | | 9 | 9.49 | 7.50 | 5.3 | 16.13 | 0.660 | 0.35 |
| | | | 10 | 9.43 | 7.54 | 5.1 | 16.19 | 0.636 | 0.39 |

## Table D-1. Water quality data for the 2011 LPRSA caged bivalve study

| Location ID | Date and Time | Station Depth (ft) | Measurement Depth (ft) | DO (mg/L) | pH | Turbidity (NTU) | Temperature (°C) | Conductivity (mS/cm) | Salinity (ppt) |
|---|---|---|---|---|---|---|---|---|---|
| LPR4ZZ | 5/4/11 11:00 | 9.4 | 1 | 11.59 | 7.67 | 7.0 | 16.83 | 0.343 | 0.20 |
| | | | 2 | 10.73 | 7.66 | 7.4 | 16.83 | 0.343 | 0.20 |
| | | | 3 | 10.42 | 7.65 | 7.3 | 16.83 | 0.344 | 0.20 |
| | | | 4 | 10.22 | 7.64 | 8.0 | 16.83 | 0.343 | 0.20 |
| | | | 5 | 10.10 | 7.63 | 7.2 | 16.83 | 0.344 | 0.20 |
| | | | 6 | 9.98 | 7.64 | 7.4 | 16.83 | 0.344 | 0.20 |
| | | | 7 | 9.93 | 7.64 | 8.4 | 16.83 | 0.344 | 0.20 |
| | | | 8 | 9.88 | 7.64 | 8.1 | 16.84 | 0.344 | 0.20 |
| LPR4AB | 5/4/11 12:05 | 4.2 | 1 | 10.53 | 7.60 | 17.1 | 16.66 | 0.341 | 0.20 |
| | | | 2 | 9.72 | 7.57 | 13.6 | 16.66 | 0.341 | 0.20 |
| | | | 3 | 9.49 | 7.57 | 13.3 | 16.66 | 0.341 | 0.20 |

## Table D-1. Water quality data for the 2011 LPRSA caged bivalve study

| Location ID | Date and Time | Station Depth (ft) | Measurement Depth (ft) | DO (mg/L) | pH | Turbidity (NTU) | Temperature (°C) | Conductivity (mS/cm) | Salinity (ppt) |
|---|---|---|---|---|---|---|---|---|---|
| LPR5XX | 5/4/11 12:30 | 17.0 | 1 | 10.75 | 7.65 | 4.7 | 16.52 | 0.342 | 0.20 |
| | | | 2 | 10.12 | 7.59 | 6.0 | 16.54 | 0.342 | 0.20 |
| | | | 3 | 9.73 | 7.57 | 5.4 | 16.54 | 0.342 | 0.20 |
| | | | 4 | 9.53 | 7.57 | 6.1 | 16.55 | 0.342 | 0.20 |
| | | | 5 | 9.41 | 7.56 | 5.5 | 16.54 | 0.343 | 0.20 |
| | | | 6 | 9.35 | 7.56 | 5.9 | 16.54 | 0.342 | 0.20 |
| | | | 7 | 9.32 | 7.56 | 6.6 | 16.55 | 0.342 | 0.20 |
| | | | 8 | 9.30 | 7.57 | 6.3 | 16.55 | 0.342 | 0.20 |
| | | | 9 | 9.30 | 7.56 | 7.1 | 16.55 | 0.342 | 0.20 |
| | | | 10 | 9.29 | 7.57 | 9.7 | 16.55 | 0.342 | 0.20 |
| | | | 11 | 9.27 | 7.56 | 10.5 | 16.55 | 0.342 | 0.20 |
| | | | 12 | 9.25 | 7.57 | 9.9 | 16.55 | 0.342 | 0.20 |
| | | | 13 | 9.23 | 7.57 | 11.2 | 16.55 | 0.342 | 0.20 |
| | | | 14 | 9.21 | 7.57 | 11.1 | 16.55 | 0.341 | 0.20 |
| | | | 15 | 9.21 | 7.57 | 12.5 | 16.55 | 0.342 | 0.20 |
| | | | 16 | 9.20 | 7.57 | 9.6 | 16.55 | 0.341 | 0.20 |

## Table D-1. Water quality data for the 2011 LPRSA caged bivalve study

| Location ID | Date and Time | Station Depth (ft) | Measurement Depth (ft) | DO (mg/L) | pH | Turbidity (NTU) | Temperature (°C) | Conductivity (mS/cm) | Salinity (ppt) |
|---|---|---|---|---|---|---|---|---|---|
| LPR5YY | 5/4/11 12:42 | 11.7 | 1 | 11.51 | 7.60 | 8.1 | 16.46 | 0.343 | 0.20 |
| | | | 2 | 10.57 | 7.57 | 8.0 | 16.47 | 0.343 | 0.20 |
| | | | 3 | 10.21 | 7.54 | 7.2 | 16.47 | 0.342 | 0.20 |
| | | | 4 | 9.97 | 7.56 | 7.9 | 16.47 | 0.343 | 0.20 |
| | | | 5 | 9.80 | 7.55 | 8.6 | 16.47 | 0.344 | 0.20 |
| | | | 6 | 9.71 | 7.54 | 10.2 | 16.47 | 0.344 | 0.20 |
| | | | 7 | 9.66 | 7.54 | 10.7 | 16.47 | 0.343 | 0.20 |
| | | | 8 | 9.58 | 7.55 | 9.4 | 16.47 | 0.344 | 0.20 |
| | | | 9 | 9.55 | 7.54 | 10.1 | 16.47 | 0.345 | 0.20 |
| | | | 10 | 9.52 | 7.56 | 9.1 | 16.47 | 0.346 | 0.20 |
| | | | 11 | 9.49 | 7.56 | 9.3 | 16.47 | 0.345 | 0.20 |
| LPR6VV | 5/5/11 07:44 | 4.4 | 1 | 11.17 | 7.61 | 7.0 | 15.05 | 0.342 | 0.20 |
| | | | 2 | 10.23 | 7.55 | 8.1 | 15.05 | 0.341 | 0.20 |
| | | | 3 | 9.92 | 7.53 | 14.8 | 15.07 | 0.342 | 0.20 |
| LPR6UU | 5/5/11 08:10 | 6.4 | 1 | 10.47 | 7.58 | 5.9 | 15.20 | 0.338 | 0.20 |
| | | | 2 | 10.00 | 7.55 | 7.3 | 15.21 | 0.338 | 0.20 |
| | | | 3 | 9.79 | 7.54 | 7.5 | 15.22 | 0.339 | 0.20 |
| | | | 4 | 9.63 | 7.54 | 6.5 | 15.23 | 0.339 | 0.20 |
| | | | 5 | 9.52 | 7.54 | 8.5 | 15.19 | 0.339 | 0.20 |

## Table D-1. Water quality data for the 2011 LPRSA caged bivalve study

| Location ID | Date and Time | Station Depth (ft) | Measurement Depth (ft) | DO (mg/L) | pH | Turbidity (NTU) | Temperature (°C) | Conductivity (mS/cm) | Salinity (ppt) |
|---|---|---|---|---|---|---|---|---|---|
| LPT7ZZ | 5/5/11 08:35 | 9.8 | 1 | 11.37 | 7.60 | 5.1 | 15.16 | 0.336 | 0.20 |
| | | | 2 | 10.72 | 7.58 | 4.5 | 15.13 | 0.336 | 0.20 |
| | | | 3 | 10.35 | 7.58 | 4.5 | 15.12 | 0.338 | 0.20 |
| | | | 4 | 10.17 | 7.58 | 4.3 | 15.11 | 0.338 | 0.20 |
| | | | 5 | 10.05 | 7.57 | 4.5 | 15.10 | 0.338 | 0.20 |
| | | | 6 | 9.95 | 7.57 | 4.6 | 15.10 | 0.338 | 0.20 |
| | | | 7 | 9.88 | 7.57 | 4.7 | 15.10 | 0.338 | 0.20 |
| | | | 8 | 9.82 | 7.57 | 4.6 | 15.10 | 0.338 | 0.20 |
| | | | 9 | 9.78 | 7.57 | 4.6 | 15.10 | 0.338 | 0.20 |
| LPR7AB | 5/5/11 09:10 | 12.3 | 1 | 10.86 | 7.62 | 3.9 | 15.06 | 0.338 | 0.20 |
| | | | 2 | 10.27 | 7.61 | 4.1 | 15.02 | 0.338 | 0.20 |
| | | | 3 | 10.22 | 7.61 | 4.6 | 15.03 | 0.338 | 0.20 |
| | | | 4 | 10.17 | 7.61 | 4.7 | 15.02 | 0.338 | 0.20 |
| | | | 5 | 10.12 | 7.61 | 4.5 | 15.00 | 0.337 | 0.20 |
| | | | 6 | 10.07 | 7.61 | 4.6 | 15.01 | 0.337 | 0.20 |
| | | | 7 | 10.04 | 7.61 | 4.1 | 15.01 | 0.337 | 0.20 |
| | | | 8 | 10.00 | 7.61 | 4.7 | 15.00 | 0.338 | 0.20 |
| | | | 9 | 9.98 | 7.61 | 5.1 | 14.99 | 0.338 | 0.20 |
| | | | 10 | 9.96 | 7.60 | 5.7 | 14.99 | 0.337 | 0.20 |
| | | | 11 | 9.93 | 7.61 | 5.5 | 14.99 | 0.337 | 0.20 |

## Table D-1. Water quality data for the 2011 LPRSA caged bivalve study

| Location ID | Date and Time | Station Depth (ft) | Measurement Depth (ft) | DO (mg/L) | pH | Turbidity (NTU) | Temperature (°C) | Conductivity (mS/cm) | Salinity (ppt) |
|---|---|---|---|---|---|---|---|---|---|
| LPR8AC | 5/5/11 09:52 | 7.8 | 1 | 11.13 | 7.66 | 4.1 | 15.08 | 0.330 | 0.20 |
| | | | 2 | 10.96 | 7.66 | 4.9 | 15.06 | 0.330 | 0.20 |
| | | | 3 | 10.84 | 7.66 | 5.3 | 15.05 | 0.330 | 0.20 |
| | | | 4 | 10.73 | 7.65 | 5.2 | 15.06 | 0.330 | 0.20 |
| | | | 5 | 10.67 | 7.65 | 4.9 | 15.06 | 0.330 | 0.20 |
| | | | 6 | 10.61 | 7.65 | 4.9 | 15.04 | 0.331 | 0.20 |
| | | | 7 | 10.54 | 7.65 | 5.1 | 15.05 | 0.331 | 0.20 |
| **Day 61** | | | | | | | | | |
| LPR1XX | 5/9/11 10:25 | 7.4 | 1 | 12.56 | 7.67 | 1.6 | 15.48 | 8.686 | 5.61 |
| | | | 2 | 10.77 | 7.58 | 1.8 | 15.41 | 8.602 | 5.91 |
| | | | 3 | 10.32 | 7.55 | 2.1 | 15.32 | 9.306 | 6.94 |
| | | | 4 | 10.03 | 7.53 | 2.7 | 15.09 | 10.27 | 7.53 |
| | | | 5 | 9.66 | 7.48 | 4.5 | 14.69 | 11.07 | 7.70 |
| | | | 6 | 9.32 | 7.53 | 3.5 | 14.71 | 13.99 | 10.35 |
| LPR2AD | 5/9/11 11:10 | 4.8 | 1 | 12.64 | 7.87 | 7.7 | 16.35 | 2.809 | 1.80 |
| | | | 2 | 12.13 | 7.81 | 5.6 | 16.22 | 3.111 | 2.04 |
| | | | 3 | 11.72 | 7.78 | 5.8 | 16.25 | 3.190 | 1.85 |
| | | | 4 | 11.47 | 7.80 | 5.5 | 16.33 | 2.698 | 1.86 |

## Table D-1. Water quality data for the 2011 LPRSA caged bivalve study

| Location ID | Date and Time | Station Depth (ft) | Measurement Depth (ft) | DO (mg/L) | pH | Turbidity (NTU) | Temperature (°C) | Conductivity (mS/cm) | Salinity (ppt) |
|---|---|---|---|---|---|---|---|---|---|
| LPR3SS | 5/9/11 11:21 | 7.3 | 1 | 12.42 | 7.88 | 1.9 | 16.55 | 0.737 | 0.44 |
| | | | 2 | 11.96 | 7.87 | 2.3 | 16.53 | 0.729 | 0.44 |
| | | | 3 | 11.63 | 7.82 | 2.7 | 16.28 | 1.002 | 0.58 |
| | | | 4 | 11.33 | 7.78 | 3.1 | 16.33 | 0.972 | 0.65 |
| | | | 5 | 11.17 | 7.73 | 3.0 | 16.16 | 1.321 | 0.81 |
| | | | 6 | 10.88 | 7.65 | 4.3 | 16.01 | 1.889 | 1.19 |
| LPR4ZZ | 5/9/11 11:40 | 11.0 | 1 | 12.66 | 7.90 | 2.3 | 16.05 | 0.384 | 0.22 |
| | | | 2 | 12.09 | 7.84 | 2.7 | 16.02 | 0.384 | 0.22 |
| | | | 3 | 11.85 | 7.81 | 2.7 | 16.00 | 0.384 | 0.22 |
| | | | 4 | 11.64 | 7.80 | 3.2 | 15.98 | 0.384 | 0.22 |
| | | | 5 | 11.43 | 7.79 | 3.7 | 15.95 | 0.384 | 0.22 |
| | | | 6 | 11.27 | 7.78 | 3.9 | 15.95 | 0.384 | 0.22 |
| | | | 7 | 11.12 | 7.77 | 3.8 | 15.98 | 0.385 | 0.23 |
| | | | 8[b] | 11.00 | 7.77 | 3.6 | 16.01 | 0.385 | 0.23 |
| **Day 75** | | | | | | | | | |
| LPR8AC | 5/24/11 07:20 | 5.1 | 1 | 10.09 | 7.37 | 17.4 | 16.20 | 0.246 | 0.14 |
| | | | 2 | 9.83 | 7.37 | 16.4 | 16.19 | 0.246 | 0.14 |
| | | | 3 | 9.80 | 7.35 | 16.4 | 16.19 | 0.246 | 0.14 |
| | | | 4 | 9.77 | 7.36 | 16.8 | 16.19 | 0.246 | 0.14 |

## Table D-1. Water quality data for the 2011 LPRSA caged bivalve study

| Location ID | Date and Time | Station Depth (ft) | Measurement Depth (ft) | DO (mg/L) | pH | Turbidity (NTU) | Temperature (°C) | Conductivity (mS/cm) | Salinity (ppt) |
|---|---|---|---|---|---|---|---|---|---|
| LPR7AB | 5/24/11 08:00 | 11.4 | 1 | 9.94 | 7.43 | 15.0 | 16.20 | 0.245 | 0.14 |
| | | | 2 | 9.84 | 7.39 | 15.5 | 16.21 | 0.245 | 0.14 |
| | | | 3 | 9.79 | 7.39 | 15.7 | 16.19 | 0.245 | 0.14 |
| | | | 4 | 9.76 | 7.38 | 15.7 | 16.19 | 0.245 | 0.14 |
| | | | 5 | 9.74 | 7.36 | 15.9 | 16.19 | 0.245 | 0.14 |
| | | | 6 | 9.72 | 7.33 | 16.0 | 16.19 | 0.245 | 0.14 |
| | | | 7 | 9.71 | 7.22 | 15.9 | 16.19 | 0.245 | 0.14 |
| | | | 8 | 9.69 | 7.23 | 15.8 | 16.19 | 0.245 | 0.14 |
| | | | 9 | 9.68 | 7.22 | 16.0 | 16.19 | 0.245 | 0.14 |
| | | | 10 | 9.67 | 7.24 | 16.1 | 16.19 | 0.245 | 0.14 |
| LPR7ZZ | 5/24/11 08:30 | 7.1 | 1 | 9.87 | 7.44 | 16.2 | 16.24 | 0.245 | 0.14 |
| | | | 2 | 9.77 | 7.39 | 16.3 | 16.23 | 0.246 | 0.14 |
| | | | 3 | 9.72 | 7.39 | 16.2 | 16.23 | 0.246 | 0.14 |
| | | | 4 | 9.70 | 7.37 | 16.5 | 16.22 | 0.246 | 0.14 |
| | | | 5 | 9.68 | 7.36 | 16.2 | 16.23 | 0.246 | 0.14 |
| | | | 6 | 9.66 | 7.34 | 16.3 | 16.22 | 0.246 | 0.14 |
| LPR6UU | 5/24/11 09:07 | 4.7 | 1 | 10.26 | 7.49 | 16.8 | 16.30 | 0.247 | 0.14 |
| | | | 2 | 10.14 | 7.47 | 16.9 | 16.27 | 0.247 | 0.14 |
| | | | 3 | 10.09 | 7.43 | 16.6 | 16.25 | 0.247 | 0.14 |
| | | | 4 | 10.05 | 7.42 | 16.6 | 16.26 | 0.247 | 0.14 |

## Table D-1. Water quality data for the 2011 LPRSA caged bivalve study

| Location ID | Date and Time | Station Depth (ft) | Measurement Depth (ft) | DO (mg/L) | pH | Turbidity (NTU) | Temperature (°C) | Conductivity (mS/cm) | Salinity (ppt) |
|---|---|---|---|---|---|---|---|---|---|
| LPR6VV | 5/24/11 09:28 | 6.9 | 1 | 10.35 | 7.43 | 16.7 | 16.34 | 0.247 | 0.14 |
| | | | 2 | 10.12 | 7.41 | 15.8 | 16.31 | 0.247 | 0.14 |
| | | | 3 | 10.05 | 7.41 | 17.2 | 16.31 | 0.247 | 0.14 |
| | | | 4 | 9.97 | 7.40 | 18.1 | 16.33 | 0.247 | 0.14 |
| | | | 5 | 9.94 | 7.38 | 17.2 | 16.36 | 0.247 | 0.14 |
| | | | 6 | 9.89 | 7.38 | 17.3 | 16.33 | 0.247 | 0.14 |
| LPR2AD | 5/24/11 10:20 | 4.4 | 1 | 10.34 | 7.50 | 16.2 | 17.53 | 0.317 | 0.16 |
| | | | 2 | 9.91 | 7.44 | 16.4 | 17.02 | 0.277 | 0.17 |
| | | | 3 | 9.55 | 7.43 | 16.4 | 16.73 | 0.251 | 0.14 |
| **Day 90** | | | | | | | | | |
| LPR8AC | 6/8/11 07:45 | 4.4 | 1 | 8.18 | 7.68 | 0.9 | 21.49 | 0.556 | 0.29 |
| | | | 2 | 7.38 | 7.54 | 1.7 | 21.43 | 0.550 | 0.29 |
| | | | 3 | 7.36 | 7.55 | 1.7 | 21.42 | 0.550 | 0.29 |
| | | | 4 | 7.35 | 7.54 | 1.1 | 21.41 | 0.550 | 0.29 |
| LPR7AB | 6/8/11 08:06 | 7.9 | 1 | 8.05 | 7.66 | 1.4 | 21.46 | 0.569 | 0.30 |
| | | | 2 | 7.52 | 7.62 | 2.3 | 21.45 | 0.570 | 0.30 |
| | | | 3 | 7.30 | 7.60 | 2.0 | 21.46 | 0.570 | 0.30 |
| | | | 4 | 7.21 | 7.60 | 2.0 | 21.47 | 0.569 | 0.30 |
| | | | 5 | 7.19 | 7.59 | 0.9 | 21.47 | 0.569 | 0.30 |
| | | | 6 | 7.16 | 7.58 | 1.4 | 21.46 | 0.569 | 0.30 |
| | | | 7 | 7.13 | 7.58 | 1.9 | 21.47 | 0.571 | 0.30 |

## Table D-1. Water quality data for the 2011 LPRSA caged bivalve study

| Location ID | Date and Time | Station Depth (ft) | Measurement Depth (ft) | DO (mg/L) | pH | Turbidity (NTU) | Temperature (°C) | Conductivity (mS/cm) | Salinity (ppt) |
|---|---|---|---|---|---|---|---|---|---|
| LPR7ZZ | 6/8/11 08:34 | 6.7 | 1 | 8.54 | 7.82 | 2.1 | 22.24 | 0.569 | 0.29 |
| | | | 2 | 8.25 | 7.80 | 2.1 | 22.22 | 0.568 | 0.29 |
| | | | 3 | 8.22 | 7.79 | 2.6 | 22.19 | 0.568 | 0.29 |
| | | | 4 | 8.14 | 7.79 | 2.9 | 22.22 | 0.568 | 0.29 |
| | | | 5 | 8.13 | 7.79 | 3.1 | 22.26 | 0.568 | 0.29 |
| | | | 6 | 8.16 | 7.80 | 3.7 | 22.29 | 0.568 | 0.29 |
| LPR6UU | 6/8/11 08:58 | 3.3 | 1 | 8.66 | 7.97 | 25.8 | 22.19 | 0.573 | 0.29 |
| | | | 2 | 9.71 | 7.97 | 30.1 | 22.17 | 0.572 | 0.29 |
| | | | 3 | 9.88 | 7.97 | 24.6 | 22.20 | 0.572 | 0.29 |
| LPR6VV | 6/8/11 09:11 | 5.6 | 1 | 9.36 | 8.01 | 3.4 | 21.99 | 0.569 | 0.29 |
| | | | 2 | 9.78 | 8.00 | 4.0 | 21.98 | 0.570 | 0.29 |
| | | | 3 | 9.91 | 7.99 | 4.7 | 21.90 | 0.569 | 0.29 |
| | | | 4 | 9.92 | 7.98 | 4.8 | 21.92 | 0.568 | 0.29 |
| | | | 5 | 9.91 | 7.99 | 6.1 | 21.89 | 0.568 | 0.29 |

[a] Salinity was calculated from conductivity and temperature parameters measured using a multi-probe meter.

[b] Cable from the multi-probe meter was not long enough to measure down to 10 feet.

C – Celsius

DO – dissolved oxygen

ID – identification

LPRSA – Lower Passaic River Study Area

na – not available (multi-probe meter was not functioning properly)

NTU – nephelometric turbidity units

ppt – parts per thousand

# APPENDIX E. CAGED BIVALVE SURVIVAL SUMMARY TABLE

## Table E-1. Summary of survival results for the 2011 LPRSA caged bivalve study

| Location ID | Specimen ID & number | Status/Shell Length (mm) | | | | | | | Comments |
|---|---|---|---|---|---|---|---|---|---|
| | | $D_0$ | $D_{14}$ | $D_{35}$ | $D_{56}$ | $D_{61}$ | $D_{75}$ | $D_{90}$ | |
| LPR1XX | GD001 | 91 | 92 | 93.5 | 93.5 | 93.5 | | | sent to lab for analysis on $D_{61}$ |
| LPR1XX | GD002 | 88 | 88 | 87.5 | 88 | 87.5 | | | sent to lab for analysis on $D_{61}$ |
| LPR1XX | GD003 | 103 | 103.5 | 102.5 | 102.5 | 103 | | | sent to lab for analysis on $D_{61}$ |
| LPR1XX | GD004 | 107 | 106.5 | 107 | 107 | 107 | | | sent to lab for analysis on $D_{61}$ |
| LPR1XX | GD005 | 81 | 81 | 80.5 | 80.5 | 80 | | | sent to lab for analysis on $D_{61}$ |
| LPR1XX | GD006 | 95 | 94.5 | 95 | 95 | 95 | | | sent to lab for analysis on $D_{61}$ |
| LPR1XX | GD007 | 74 | 73.5 | 72 | 73 | 73.5 | | | sent to lab for analysis on $D_{61}$ |
| LPR1XX | GD008 | 82.5 | 85.5 | 86 | 86 | 86 | | | sent to lab for analysis on $D_{61}$ |
| LPR1XX | GD009 | 76 | 76.5 | | | | | | sacrificed for health assessment on $D_{14}$ |
| LPR1XX | GD010 | 88 | 87 | | | | | | sacrificed for health assessment on $D_{14}$ |
| LPR1XX | GD011 | 79.5 | alive | 79 | | | | | sacrificed for health assessment on $D_{35}$ |
| LPR1XX | GD012 | 78 | alive | 78 | | | | | sacrificed for health assessment on $D_{35}$ |
| LPR1XX | GD013 | 96.5 | alive | alive | 96.5 | | | | sacrificed for health assessment on $D_{56}$ |
| LPR1XX | GD014 | 77.5 | alive | alive | 78 | | | | sacrificed for health assessment on $D_{56}$ |
| LPR1XX | GD015 | 96 | alive | alive | dead | | | | |
| LPR1XX | GD016 | 101.5 | alive | alive | alive | 102 | | | sent to lab for analysis on $D_{61}$ |
| LPR1XX | GD017 | 97 | alive | alive | alive | 97.5 | | | sent to lab for analysis on $D_{61}$ |
| LPR1XX | GD018 | 85 | alive | alive | alive | 86 | | | sent to lab for analysis on $D_{61}$ |
| LPR1XX | GD019 | 77 | alive | alive | alive | 78 | | | sent to lab for analysis on $D_{61}$ |
| LPR1XX | GD020 | 85 | alive | alive | alive | 85 | | | sent to lab for analysis on $D_{61}$ |

## Table E-1. Summary of survival results for the 2011 LPRSA caged bivalve study

| Location ID | Specimen ID & number | Status/Shell Length (mm) | | | | | | | Comments |
|---|---|---|---|---|---|---|---|---|---|
| | | $D_0$ | $D_{14}$ | $D_{35}$ | $D_{56}$ | $D_{61}$ | $D_{75}$ | $D_{90}$ | |
| LPR1XX | GD021 | 81 | alive | alive | lost | lost | lost | lost | |
| LPR1XX | GD022 | 83 | alive | alive | lost | lost | lost | lost | |
| LPR1XX | GD023 | 84 | alive | alive | lost | lost | lost | lost | |
| LPR1XX | GD024 | 83 | alive | alive | lost | lost | lost | lost | |
| LPR1XX | GD025 | 84 | alive | alive | lost | lost | lost | lost | |
| LPR1XX | GD026 | 96 | alive | alive | lost | lost | lost | lost | |
| LPR1XX | GD027 | 82.5 | alive | alive | lost | lost | lost | lost | |
| LPR1XX | GD028 | 84 | alive | alive | lost | lost | lost | lost | |
| LPR1XX | GD029 | 85 | alive | alive | lost | lost | lost | lost | |
| LPR1XX | GD030 | 87 | alive | alive | lost | lost | lost | lost | |
| LPR1XX | GD031 | 90 | alive | alive | alive | 93 | | | sent to lab for analysis on $D_{61}$ |
| LPR1XX | GD032 | 88 | alive | alive | alive | 90.5 | | | sent to lab for analysis on $D_{61}$ |
| LPR1XX | GD033 | 76 | alive | alive | alive | 79 | | | sent to lab for analysis on $D_{61}$ |
| LPR1XX | GD034 | 76.5 | alive | alive | alive | 79 | | | sent to lab for analysis on $D_{61}$ |
| LPR1XX | GD035 | 82 | alive | alive | alive | 85 | | | sent to lab for analysis on $D_{61}$ |
| LPR1XX | GD036 | 81 | alive | alive | alive | 85 | | | sent to lab for analysis on $D_{61}$ |
| LPR1XX | GD037 | 80 | alive | alive | alive | 83 | | | sent to lab for analysis on $D_{61}$ |
| LPR1XX | GD038 | 85.5 | alive | alive | alive | 88.5 | | | sent to lab for analysis on $D_{61}$ |
| LPR1XX | GD039 | 90 | alive | alive | alive | 93 | | | sent to lab for analysis on $D_{61}$ |
| LPR1XX | GD040 | 72 | alive | alive | alive | 75 | | | sent to lab for analysis on $D_{61}$ |
| LPR1XX | GD041 | 85 | alive | alive | alive | 88.5 | | | sent to lab for analysis on $D_{61}$ |
| LPR1XX | GD042 | 78 | alive | alive | alive | 81.5 | | | sent to lab for analysis on $D_{61}$ |

## Table E-1. Summary of survival results for the 2011 LPRSA caged bivalve study

| Location ID | Specimen ID & number | Status/Shell Length (mm) | | | | | | | Comments |
|---|---|---|---|---|---|---|---|---|---|
| | | $D_0$ | $D_{14}$ | $D_{35}$ | $D_{56}$ | $D_{61}$ | $D_{75}$ | $D_{90}$ | |
| LPR1XX | GD043 | 93 | alive | alive | alive | 94 | | | sent to lab for analysis on $D_{61}$ |
| LPR1XX | GD044 | 87 | alive | alive | alive | 90 | | | sent to lab for analysis on $D_{61}$ |
| LPR1XX | GD045 | 92 | alive | alive | alive | 95 | | | sent to lab for analysis on $D_{61}$ |
| LPR1XX | GD046 | 91 | alive | alive | alive | 94.5 | | | sent to lab for analysis on $D_{61}$ |
| LPR1XX | GD047 | 76.5 | alive | alive | alive | 79 | | | sent to lab for analysis on $D_{61}$ |
| LPR1XX | GD048 | 92 | alive | alive | alive | 95.5 | | | sent to lab for analysis on $D_{61}$ |
| LPR1XX | GD049 | 88 | alive | alive | alive | 91 | | | sent to lab for analysis on $D_{61}$ |
| LPR1XX | GD050 | 91 | alive | alive | alive | 92.5 | | | sent to lab for analysis on $D_{61}$ |
| LPR1XX | GD051 | 91 | alive | alive | lost | lost | lost | lost | |
| LPR1XX | GD052 | 79 | alive | alive | lost | lost | lost | lost | |
| LPR1XX | GD053 | 82 | alive | alive | lost | lost | lost | lost | |
| LPR1XX | GD054 | 76 | alive | alive | lost | lost | lost | lost | |
| LPR1XX | GD055 | 85 | alive | alive | lost | lost | lost | lost | |
| LPR1XX | GD056 | 88 | alive | alive | lost | lost | lost | lost | |
| LPR1XX | GD057 | 80 | alive | alive | lost | lost | lost | lost | |
| LPR1XX | GD058 | 80 | alive | alive | lost | lost | lost | lost | |
| LPR1XX | GD059 | 99 | alive | alive | lost | lost | lost | lost | |
| LPR1XX | GD060 | 79 | alive | alive | lost | lost | lost | lost | |
| LPR1XX | GD061 | 96 | alive | alive | lost | lost | lost | lost | |
| LPR1XX | GD062 | 82 | alive | alive | lost | lost | lost | lost | |
| LPR1XX | GD063 | 85 | alive | alive | lost | lost | lost | lost | |
| LPR1XX | GD064 | 72 | alive | alive | lost | lost | lost | lost | |

## Table E-1. Summary of survival results for the 2011 LPRSA caged bivalve study

| Location ID | Specimen ID & number | Status/Shell Length (mm) | | | | | | | Comments |
|---|---|---|---|---|---|---|---|---|---|
| | | $D_0$ | $D_{14}$ | $D_{35}$ | $D_{56}$ | $D_{61}$ | $D_{75}$ | $D_{90}$ | |
| LPR1XX | GD065 | 76 | alive | alive | lost | lost | lost | lost | |
| LPR1XX | GD066 | 84 | alive | alive | lost | lost | lost | lost | |
| LPR1XX | GD067 | 92 | alive | alive | lost | lost | lost | lost | |
| LPR1XX | GD068 | 71 | alive | alive | lost | lost | lost | lost | |
| LPR1XX | GD069 | 100.5 | alive | alive | lost | lost | lost | lost | |
| LPR1XX | GD070 | 89 | alive | alive | lost | lost | lost | lost | |
| LPR1XX | GD071 | 93.5 | alive | alive | lost | lost | lost | lost | |
| LPR1XX | GD072 | 74 | alive | alive | lost | lost | lost | lost | |
| LPR1XX | GD073 | 81 | alive | alive | lost | lost | lost | lost | |
| LPR1XX | GD074 | 85.5 | alive | alive | lost | lost | lost | lost | |
| LPR1XX | GD075 | 87 | alive | alive | lost | lost | lost | lost | |
| LPR1XX | GD076 | 92 | alive | alive | lost | lost | lost | lost | |
| LPR1XX | GD077 | 82.5 | alive | alive | lost | lost | lost | lost | |
| LPR1XX | GD078 | 94 | alive | alive | lost | lost | lost | lost | |
| LPR1XX | GD079 | 89 | alive | alive | lost | lost | lost | lost | |
| LPR1XX | GD080 | 97.5 | alive | alive | lost | lost | lost | lost | |
| LPR2AD | GD081 | 75 | 75 | 74.5 | 75 | alive | 73.5 | lost | |
| LPR2AD | GD082 | 96 | 96 | 94.5 | 95 | alive | 96 | lost | |
| LPR2AD | GD083 | 95.5 | 95 | 95 | 95 | alive | 94.5 | lost | |
| LPR2AD | GD084 | 85 | 84 | 84.5 | 84.5 | alive | 84 | lost | |
| LPR2AD | GD085 | 83 | 82.5 | 82 | 82.5 | alive | 82.5 | lost | |
| LPR2AD | GD086 | 97 | 96 | 96.5 | 96.5 | alive | 95 | lost | |

## Table E-1. Summary of survival results for the 2011 LPRSA caged bivalve study

| Location ID | Specimen ID & number | Status/Shell Length (mm) | | | | | | | Comments |
|---|---|---|---|---|---|---|---|---|---|
| | | $D_0$ | $D_{14}$ | $D_{35}$ | $D_{56}$ | $D_{61}$ | $D_{75}$ | $D_{90}$ | |
| LPR2AD | GD087 | 97 | 97 | 96.5 | 97 | alive | 97 | lost | |
| LPR2AD | GD088 | 93 | 92 | 92.5 | 92 | dead | | | |
| LPR2AD | GD089 | 90 | 89.5 | | | | | | sacrificed for health assessment on $D_{35}$ |
| LPR2AD | GD090 | 80.5 | 80 | | | | | | sacrificed for health assessment on $D_{35}$ |
| LPR2AD | GD091 | 77 | alive | 76.5 | | | | | sacrificed for health assessment on $D_{35}$ |
| LPR2AD | GD092 | 77 | alive | dead | | | | | |
| LPR2AD | GD093 | 76.5 | alive | 76 | | | | | sacrificed for health assessment on $D_{35}$ |
| LPR2AD | GD094 | 77.5 | alive | alive | 77.5 | | | | sacrificed for health assessment on $D_{56}$ |
| LPR2AD | GD095 | 76 | alive | alive | dead | | | | |
| LPR2AD | GD096 | 75.5 | alive | alive | 75.5 | | | | sacrificed for health assessment on $D_{56}$ |
| LPR2AD | GD097 | 74 | alive | alive | alive | alive | alive | lost | |
| LPR2AD | GD098 | 76 | alive | alive | alive | alive | alive | lost | |
| LPR2AD | GD099 | 81 | alive | alive | alive | alive | alive | lost | |
| LPR2AD | GD100 | 75 | alive | alive | alive | dead | | | |
| LPR2AD | GD101 | 103 | alive | alive | dead | | | | |
| LPR2AD | GD102 | 106 | alive | alive | dead | | | | |
| LPR2AD | GD103 | 90.5 | alive | alive | alive | 91 | | | sent to lab for analysis on Day 61 |
| LPR2AD | GD104 | 94.5 | alive | alive | dead | | | | |
| LPR2AD | GD105 | 90 | alive | alive | alive | 90 | | | sent to lab for analysis on Day 61 |
| LPR2AD | GD106 | 95.5 | alive | alive | alive | 96 | | | sent to lab for analysis on Day 61 |

## Table E-1. Summary of survival results for the 2011 LPRSA caged bivalve study

| Location ID | Specimen ID & number | Status/Shell Length (mm) | | | | | | | Comments |
|---|---|---|---|---|---|---|---|---|---|
| | | $D_0$ | $D_{14}$ | $D_{35}$ | $D_{56}$ | $D_{61}$ | $D_{75}$ | $D_{90}$ | |
| LPR2AD | GD107 | 90.5 | alive | alive | alive | 90.5 | | | sent to lab for analysis on $D_{61}$ |
| LPR2AD | GD108 | 88 | alive | alive | alive | 87 | | | sent to lab for analysis on $D_{61}$ |
| LPR2AD | GD109 | 82 | alive | dead | | | | | |
| LPR2AD | GD110 | 90.5 | alive | alive | alive | 90.5 | | | sent to lab for analysis on $D_{61}$ |
| LPR2AD | GD111 | 91 | alive | alive | alive | 91 | | | sent to lab for analysis on $D_{61}$ |
| LPR2AD | GD112 | 89 | alive | alive | alive | 90 | | | sent to lab for analysis on $D_{61}$ |
| LPR2AD | GD113 | 91.5 | alive | alive | alive | 91 | | | sent to lab for analysis on $D_{61}$ |
| LPR2AD | GD114 | 85.5 | alive | alive | dead | | | | |
| LPR2AD | GD115 | 80 | alive | alive | alive | 80 | | | sent to lab for analysis on $D_{61}$ |
| LPR2AD | GD116 | 84 | alive | alive | alive | dead | | | |
| LPR2AD | GD117 | 92 | alive | alive | alive | 92 | | | sent to lab for analysis on $D_{61}$ |
| LPR2AD | GD118 | 87 | alive | alive | alive | 87 | | | sent to lab for analysis on $D_{61}$ |
| LPR2AD | GD119 | 80 | alive | alive | alive | 80.5 | | | sent to lab for analysis on $D_{61}$ |
| LPR2AD | GD120 | 89 | alive | alive | alive | 88.5 | | | sent to lab for analysis on $D_{61}$ |
| LPR2AD | GD121 | 98 | alive | alive | alive | 98 | | | sent to lab for analysis on $D_{61}$ |
| LPR2AD | GD122 | 97 | alive | alive | alive | 97 | | | sent to lab for analysis on $D_{61}$ |
| LPR2AD | GD123 | 95.5 | alive | alive | alive | 95.5 | | | sent to lab for analysis on $D_{61}$ |
| LPR2AD | GD124 | 94 | alive | alive | alive | 94.5 | | | sent to lab for analysis on $D_{61}$ |
| LPR2AD | GD125 | 94.5 | alive | alive | alive | 94.5 | | | sent to lab for analysis on $D_{61}$ |
| LPR2AD | GD126 | 100.5 | alive | alive | alive | 100.5 | | | sent to lab for analysis on $D_{61}$ |
| LPR2AD | GD127 | 101.5 | alive | alive | alive | 101.5 | | | sent to lab for analysis on $D_{61}$ |
| LPR2AD | GD128 | 96 | alive | alive | alive | 96 | | | sent to lab for analysis on $D_{61}$ |

## Table E-1. Summary of survival results for the 2011 LPRSA caged bivalve study

| Location ID | Specimen ID & number | Status/Shell Length (mm) | | | | | | | Comments |
|---|---|---|---|---|---|---|---|---|---|
| | | $D_0$ | $D_{14}$ | $D_{35}$ | $D_{56}$ | $D_{61}$ | $D_{75}$ | $D_{90}$ | |
| LPR2AD | GD129 | 92 | alive | alive | alive | 92.5 | | | sent to lab for analysis on $D_{61}$ |
| LPR2AD | GD130 | 94.5 | alive | alive | alive | 94.5 | | | sent to lab for analysis on $D_{61}$ |
| LPR2AD | GD131 | 91.5 | alive | alive | alive | alive | alive | lost | |
| LPR2AD | GD132 | 91.5 | alive | alive | alive | alive | alive | lost | |
| LPR2AD | GD133 | 82 | alive | alive | alive | alive | alive | lost | |
| LPR2AD | GD134 | 89 | alive | alive | alive | alive | alive | lost | |
| LPR2AD | GD135 | 86.5 | alive | alive | alive | alive | alive | lost | |
| LPR2AD | GD136 | 92 | alive | alive | alive | alive | alive | lost | |
| LPR2AD | GD137 | 86.5 | alive | alive | alive | alive | dead | | |
| LPR2AD | GD138 | 90 | alive | alive | alive | alive | alive | lost | |
| LPR2AD | GD139 | 96 | alive | alive | alive | alive | dead | | |
| LPR2AD | GD140 | 87.5 | alive | alive | alive | alive | alive | lost | |
| LPR2AD | GD141 | 87.5 | alive | alive | alive | 87 | | | sent to lab for analysis on $D_{61}$ |
| LPR2AD | GD142 | 82 | alive | alive | alive | 82.5 | | | sent to lab for analysis on $D_{61}$ |
| LPR2AD | GD143 | 92 | alive | alive | alive | 92 | | | sent to lab for analysis on $D_{61}$ |
| LPR2AD | GD144 | 94 | alive | alive | alive | 94 | | | sent to lab for analysis on $D_{61}$ |
| LPR2AD | GD145 | 90.5 | alive | alive | alive | 91 | | | sent to lab for analysis on $D_{61}$ |
| LPR2AD | GD146 | 80.5 | alive | alive | alive | 81.5 | | | sent to lab for analysis on $D_{61}$ |
| LPR2AD | GD147 | 81 | alive | alive | alive | 82 | | | sent to lab for analysis on $D_{61}$ |
| LPR2AD | GD148 | 84 | alive | alive | alive | 84 | | | sent to lab for analysis on $D_{61}$ |
| LPR2AD | GD149 | 88 | alive | alive | dead | | | | |
| LPR2AD | GD150 | 83.5 | alive | alive | dead | | | | |

## Table E-1. Summary of survival results for the 2011 LPRSA caged bivalve study

| Location ID | Specimen ID & number | Status/Shell Length (mm) | | | | | | | Comments |
|---|---|---|---|---|---|---|---|---|---|
| | | $D_0$ | $D_{14}$ | $D_{35}$ | $D_{56}$ | $D_{61}$ | $D_{75}$ | $D_{90}$ | |
| LPR2AD | GD151 | 78 | alive | alive | alive | alive | alive | lost | |
| LPR2AD | GD152 | 74 | alive | alive | alive | alive | alive | lost | |
| LPR2AD | GD153 | 79.5 | alive | alive | alive | alive | alive | lost | |
| LPR2AD | GD154 | 80 | alive | alive | alive | alive | alive | lost | |
| LPR2AD | GD155 | 78 | alive | alive | alive | alive | alive | lost | |
| LPR2AD | GD156 | 80 | alive | alive | alive | alive | alive | lost | |
| LPR2AD | GD157 | 77 | alive | alive | alive | alive | alive | lost | |
| LPR2AD | GD158 | 78 | alive | alive | alive | alive | alive | lost | |
| LPR2AD | GD159 | 80 | alive | alive | alive | alive | alive | lost | |
| LPR2AD | GD160 | 75.5 | alive | alive | alive | alive | dead | | |
| LPR3SS | GD161 | 75 | 78.5 | 78 | 78.5 | 78.5 | | | sent to lab for analysis on $D_{61}$ |
| LPR3SS | GD162 | 97 | 101 | 101 | 100.5 | dead | | | |
| LPR3SS | GD163 | 83 | 86.5 | 86 | dead | | | | |
| LPR3SS | GD164 | 87 | 91 | dead | | | | | |
| LPR3SS | GD165 | 92.5 | 95 | 95.5 | 95.5 | dead | | | |
| LPR3SS | GD166 | 74 | 77 | 75.5 | dead | | | | |
| LPR3SS | GD167 | 78 | 81 | 81 | dead | | | | |
| LPR3SS | GD168 | 90.5 | 91 | 92 | dead | | | | shell eroded |
| LPR3SS | GD169 | 78 | 81 | | | | | | sacrificed for health assessment on $D_{14}$ |
| LPR3SS | GD170 | 86 | 88 | | | | | | sacrificed for health assessment on $D_{14}$ |
| LPR3SS | GD171 | 102.5 | alive | 105.5 | | | | | sacrificed for health assessment on $D_{35}$ |

## Table E-1. Summary of survival results for the 2011 LPRSA caged bivalve study

| Location ID | Specimen ID & number | Status/Shell Length (mm) | | | | | | | Comments |
|---|---|---|---|---|---|---|---|---|---|
| | | $D_0$ | $D_{14}$ | $D_{35}$ | $D_{56}$ | $D_{61}$ | $D_{75}$ | $D_{90}$ | |
| LPR3SS | GD172 | 85 | alive | 88.5 | | | | | sacrificed for health assessment on $D_{35}$ |
| LPR3SS | GD173 | 93 | alive | alive | alive | 96.5 | | | sent to lab for analysis on $D_{61}$ |
| LPR3SS | GD174 | 92 | alive | alive | alive | dead | | | |
| LPR3SS | GD175 | 88 | alive | alive | alive | dead | | | |
| LPR3SS | GD176 | 92 | alive | alive | alive | dead | | | |
| LPR3SS | GD177 | 90 | alive | alive | alive | dead | | | |
| LPR3SS | GD178 | 86 | alive | alive | alive | dead | | | |
| LPR3SS | GD179 | 86 | alive | alive | alive | dead | | | |
| LPR3SS | GD180 | 82 | alive | alive | alive | dead | | | |
| LPR3SS | GD181 | 74 | alive | alive | dead | | | | |
| LPR3SS | GD182 | 72 | alive | alive | dead | | | | |
| LPR3SS | GD183 | 67.5 | alive | alive | dead | | | | |
| LPR3SS | GD184 | 75 | alive | alive | alive | 78 | | | sent to lab for analysis on $D_{61}$ |
| LPR3SS | GD185 | 70 | alive | alive | dead | | | | |
| LPR3SS | GD186 | 69 | alive | dead | | | | | |
| LPR3SS | GD187 | 73 | alive | alive | alive | 77 | | | sent to lab for analysis on $D_{61}$ |
| LPR3SS | GD188 | 73 | alive | alive | dead | | | | |
| LPR3SS | GD189 | 78 | alive | alive | dead | | | | |
| LPR3SS | GD190 | 73 | alive | alive | dead | | | | |
| LPR3SS | GD191 | 69 | alive | alive | dead | | | | |
| LPR3SS | GD192 | 76 | alive | alive | dead | | | | |
| LPR3SS | GD193 | 78 | alive | alive | alive | dead | | | |

## Table E-1. Summary of survival results for the 2011 LPRSA caged bivalve study

| Location ID | Specimen ID & number | Status/Shell Length (mm) | | | | | | | Comments |
|---|---|---|---|---|---|---|---|---|---|
| | | $D_0$ | $D_{14}$ | $D_{35}$ | $D_{56}$ | $D_{61}$ | $D_{75}$ | $D_{90}$ | |
| LPR3SS | GD194 | 73 | alive | alive | alive | dead | | | |
| LPR3SS | GD195 | 76 | alive | alive | dead | | | | |
| LPR3SS | GD196 | 75 | alive | alive | dead | | | | |
| LPR3SS | GD197 | 76 | alive | alive | dead | | | | |
| LPR3SS | GD198 | 76.5 | alive | alive | dead | | | | |
| LPR3SS | GD199 | 76 | alive | alive | alive | 79 | | | sent to lab for analysis on $D_{61}$ |
| LPR3SS | GD200 | 77 | alive | alive | dead | | | | |
| LPR3SS | GD201 | 84 | alive | alive | dead | | | | |
| LPR3SS | GD202 | 86 | alive | alive | dead | | | | |
| LPR3SS | GD203 | 82.5 | alive | alive | alive | 86 | | | sent to lab for analysis on $D_{61}$ |
| LPR3SS | GD204 | 85 | alive | alive | alive | 88 | | | sent to lab for analysis on $D_{61}$ |
| LPR3SS | GD205 | 91 | alive | alive | dead | | | | |
| LPR3SS | GD206 | 73 | dead | | | | | | |
| LPR3SS | GD207 | 82 | alive | alive | dead | | | | |
| LPR3SS | GD208 | 82 | alive | alive | dead | | | | |
| LPR3SS | GD209 | 85 | alive | alive | dead | | | | |
| LPR3SS | GD210 | 77 | dead | | | | | | |
| LPR3SS | GD211 | 78 | alive | alive | alive | | | | |
| LPR3SS | GD212 | 83 | alive | alive | dead | | | | |
| LPR3SS | GD213 | 90 | alive | alive | dead | | | | |
| LPR3SS | GD214 | 90 | alive | alive | dead | | | | |
| LPR3SS | GD215 | 82 | alive | alive | alive | 85 | | | sent to lab for analysis on $D_{61}$ |

## Table E-1. Summary of survival results for the 2011 LPRSA caged bivalve study

| Location ID | Specimen ID & number | Status/Shell Length (mm) | | | | | | | Comments |
|---|---|---|---|---|---|---|---|---|---|
| | | $D_0$ | $D_{14}$ | $D_{35}$ | $D_{56}$ | $D_{61}$ | $D_{75}$ | $D_{90}$ | |
| LPR3SS | GD216 | 76.5 | alive | alive | dead | | | | |
| LPR3SS | GD217 | 88 | alive | alive | dead | | | | |
| LPR3SS | GD218 | 85 | alive | alive | dead | | | | |
| LPR3SS | GD219 | 82 | alive | alive | dead | | | | |
| LPR3SS | GD220 | 88 | alive | dead | | | | | |
| LPR3SS | GD221 | 79 | alive | alive | dead | | | | |
| LPR3SS | GD222 | 80 | alive | alive | dead | | | | |
| LPR3SS | GD223 | 82 | alive | alive | dead | | | | |
| LPR3SS | GD224 | 92 | alive | alive | dead | | | | |
| LPR3SS | GD225 | 82 | alive | alive | dead | | | | |
| LPR3SS | GD226 | 79 | alive | alive | dead | | | | |
| LPR3SS | GD227 | 91 | alive | alive | dead | | | | |
| LPR3SS | GD228 | 82 | alive | alive | alive | 85 | | | sent to lab for analysis on $D_{61}$ |
| LPR3SS | GD229 | 83.5 | alive | alive | alive | 87 | | | sent to lab for analysis on $D_{61}$ |
| LPR3SS | GD230 | 88 | alive | alive | dead | | | | |
| LPR3SS | GD231 | 91 | alive | alive | dead | | | | |
| LPR3SS | GD232 | 86 | alive | alive | dead | | | | |
| LPR3SS | GD233 | 78 | alive | alive | dead | | | | |
| LPR3SS | GD234 | 81 | alive | alive | alive | dead | | | |
| LPR3SS | GD235 | 92 | alive | alive | dead | | | | |
| LPR3SS | GD236 | 93 | alive | alive | dead | | | | |
| LPR3SS | GD237 | 109 | alive | alive | dead | | | | |

## Table E-1. Summary of survival results for the 2011 LPRSA caged bivalve study

| Location ID | Specimen ID & number | Status/Shell Length (mm) | | | | | | | Comments |
|---|---|---|---|---|---|---|---|---|---|
| | | $D_0$ | $D_{14}$ | $D_{35}$ | $D_{56}$ | $D_{61}$ | $D_{75}$ | $D_{90}$ | |
| LPR3SS | GD238 | 86 | alive | alive | dead | | | | |
| LPR3SS | GD239 | 81.5 | alive | alive | dead | | | | |
| LPR3SS | GD240 | 85 | alive | alive | dead | | | | |
| LPR4AB | GD241 | 112.5 | 112 | 112 | dead | | | | |
| LPR4AB | GD242 | 94.5 | 94 | 94.5 | dead | | | | |
| LPR4AB | GD243 | 87.5 | 86 | 85 | dead | | | | |
| LPR4AB | GD244 | 91.5 | 91 | 91.5 | dead | | | | |
| LPR4AB | GD245 | 91.5 | 91 | 91.5 | dead | | | | |
| LPR4AB | GD246 | 89 | 88 | 87 | dead | | | | |
| LPR4AB | GD247 | 90.5 | dead | | | | | | |
| LPR4AB | GD248 | 85 | 85 | 85 | dead | | | | |
| LPR4AB | GD249 | 98 | 96.5 | | | | | | sacrificed for health assessment on $D_{14}$ |
| LPR4AB | GD250 | 95.5 | 95 | | | | | | sacrificed for health assessment on $D_{14}$ |
| LPR4AB | GD251 | 84 | 84 | dead | | | | | |
| LPR4AB | GD252 | 86 | alive | 85.5 | | | | | sacrificed for health assessment on $D_{35}$ |
| LPR4AB | GD253 | 79 | alive | 79 | | | | | sacrificed for health assessment on $D_{35}$ |
| LPR4AB | GD254 | 78.5 | alive | alive | dead | | | | |
| LPR4AB | GD255 | 84 | alive | alive | dead | | | | |
| LPR4AB | GD256 | 81.5 | alive | alive | dead | | | | |
| LPR4AB | GD257 | 84 | alive | alive | dead | | | | |
| LPR4AB | GD258 | 81 | alive | alive | dead | | | | |

## Table E-1. Summary of survival results for the 2011 LPRSA caged bivalve study

| Location ID | Specimen ID & number | Status/Shell Length (mm) | | | | | | | Comments |
|---|---|---|---|---|---|---|---|---|---|
| | | $D_0$ | $D_{14}$ | $D_{35}$ | $D_{56}$ | $D_{61}$ | $D_{75}$ | $D_{90}$ | |
| LPR4AB | GD259 | 78 | alive | alive | dead | | | | |
| LPR4AB | GD260 | 78.5 | alive | alive | dead | | | | |
| LPR4AB | GD261 | 91 | alive | alive | dead | | | | |
| LPR4AB | GD262 | 90.5 | alive | alive | dead | | | | |
| LPR4AB | GD263 | 82 | alive | alive | dead | | | | |
| LPR4AB | GD264 | 86 | alive | alive | dead | | | | |
| LPR4AB | GD265 | 80 | alive | alive | dead | | | | |
| LPR4AB | GD266 | 85 | alive | alive | dead | | | | |
| LPR4AB | GD267 | 89 | alive | alive | dead | | | | |
| LPR4AB | GD268 | 88 | alive | alive | dead | | | | |
| LPR4AB | GD269 | 85 | alive | alive | dead | | | | |
| LPR4AB | GD270 | 84.5 | alive | alive | dead | | | | |
| LPR4AB | GD271 | 80 | alive | alive | dead | | | | |
| LPR4AB | GD272 | 71.5 | alive | alive | dead | | | | |
| LPR4AB | GD273 | 79 | alive | alive | dead | | | | |
| LPR4AB | GD274 | 74 | alive | dead | | | | | |
| LPR4AB | GD275 | 73.5 | alive | alive | dead | | | | |
| LPR4AB | GD276 | 74.5 | alive | alive | dead | | | | |
| LPR4AB | GD277 | 79 | alive | alive | dead | | | | |
| LPR4AB | GD278 | 73 | alive | alive | dead | | | | |
| LPR4AB | GD279 | 72 | alive | alive | dead | | | | |
| LPR4AB | GD280 | 75.5 | alive | alive | dead | | | | |

## Table E-1. Summary of survival results for the 2011 LPRSA caged bivalve study

| Location ID | Specimen ID & number | Status/Shell Length (mm) | | | | | | | Comments |
|---|---|---|---|---|---|---|---|---|---|
| | | $D_0$ | $D_{14}$ | $D_{35}$ | $D_{56}$ | $D_{61}$ | $D_{75}$ | $D_{90}$ | |
| LPR4AB | GD281 | 111 | alive | alive | dead | | | | |
| LPR4AB | GD282 | 102 | alive | alive | dead | | | | |
| LPR4AB | GD283 | 108 | alive | dead | | | | | |
| LPR4AB | GD284 | 96 | alive | alive | dead | | | | |
| LPR4AB | GD285 | 101 | alive | dead | | | | | |
| LPR4AB | GD286 | 99 | alive | alive | dead | | | | |
| LPR4AB | GD287 | 97 | alive | alive | dead | | | | |
| LPR4AB | GD288 | 93 | alive | alive | dead | | | | |
| LPR4AB | GD289 | 103 | alive | alive | dead | | | | |
| LPR4AB | GD290 | 94.5 | alive | alive | dead | | | | |
| LPR4AB | GD291 | 87.5 | alive | dead | | | | | |
| LPR4AB | GD292 | 90 | alive | alive | dead | | | | |
| LPR4AB | GD293 | 81 | alive | alive | dead | | | | |
| LPR4AB | GD294 | 89 | alive | alive | dead | | | | |
| LPR4AB | GD295 | 84 | alive | alive | dead | | | | |
| LPR4AB | GD296 | 87.5 | alive | alive | dead | | | | |
| LPR4AB | GD297 | 79 | alive | alive | dead | | | | |
| LPR4AB | GD298 | 83 | alive | dead | | | | | |
| LPR4AB | GD299 | 88 | alive | alive | dead | | | | |
| LPR4AB | GD300 | 94 | alive | alive | dead | | | | |
| LPR4AB | GD301 | 88 | alive | alive | dead | | | | |
| LPR4AB | GD302 | 85 | alive | alive | dead | | | | |

## Table E-1. Summary of survival results for the 2011 LPRSA caged bivalve study

| Location ID | Specimen ID & number | Status/Shell Length (mm) | | | | | | | Comments |
|---|---|---|---|---|---|---|---|---|---|
| | | $D_0$ | $D_{14}$ | $D_{35}$ | $D_{56}$ | $D_{61}$ | $D_{75}$ | $D_{90}$ | |
| LPR4AB | GD303 | 91 | alive | alive | dead | | | | |
| LPR4AB | GD304 | 90 | alive | alive | dead | | | | |
| LPR4AB | GD305 | 89 | alive | alive | dead | | | | |
| LPR4AB | GD306 | 82.5 | alive | dead | | | | | |
| LPR4AB | GD307 | 85 | alive | alive | dead | | | | |
| LPR4AB | GD308 | 85 | alive | alive | dead | | | | |
| LPR4AB | GD309 | 86 | alive | alive | dead | | | | |
| LPR4AB | GD310 | 82 | alive | alive | dead | | | | |
| LPR4AB | GD311 | 87 | alive | alive | dead | | | | |
| LPR4AB | GD312 | 79 | alive | alive | dead | | | | |
| LPR4AB | GD313 | 82.5 | alive | alive | dead | | | | |
| LPR4AB | GD314 | 81.5 | alive | alive | dead | | | | |
| LPR4AB | GD315 | 78 | alive | alive | dead | | | | |
| LPR4AB | GD316 | 84 | alive | alive | dead | | | | |
| LPR4AB | GD317 | 80 | alive | alive | dead | | | | |
| LPR4AB | GD318 | 80 | alive | alive | dead | | | | |
| LPR4AB | GD319 | 78 | alive | alive | dead | | | | |
| LPR4AB | GD320 | 75 | alive | alive | dead | | | | |
| LPR4ZZ | GD321 | 99 | 101 | 100 | dead | | | | |
| LPR4ZZ | GD322 | 88 | 91 | 90.5 | dead | | | | |
| LPR4ZZ | GD323 | 87 | 90 | 90 | dead | | | | |
| LPR4ZZ | GD324 | 96 | 98 | dead | | | | | |

## Table E-1. Summary of survival results for the 2011 LPRSA caged bivalve study

| Location ID | Specimen ID & number | Status/Shell Length (mm) | | | | | | | Comments |
|---|---|---|---|---|---|---|---|---|---|
| | | $D_0$ | $D_{14}$ | $D_{35}$ | $D_{56}$ | $D_{61}$ | $D_{75}$ | $D_{90}$ | |
| LPR4ZZ | GD325 | 97 | 100 | 101 | dead | | | | |
| LPR4ZZ | GD326 | 99 | 105 | dead | | | | | |
| LPR4ZZ | GD327 | 103 | 106 | 105 | dead | | | | |
| LPR4ZZ | GD328 | 95 | 98 | 96.5 | dead | | | | |
| LPR4ZZ | GD329 | 94 | 97 | | | | | | sacrificed for health assessment on $D_{14}$ |
| LPR4ZZ | GD330 | 100 | 104 | | | | | | sacrificed for health assessment on $D_{14}$ |
| LPR4ZZ | GD331 | 89 | 91 | 91 | dead | | | | |
| LPR4ZZ | GD332 | 92 | 94 | 96 | dead | | | | |
| LPR4ZZ | GD333 | 87 | 89 | dead | | | | | |
| LPR4ZZ | GD334 | 107 | 110 | dead | | | | | |
| LPR4ZZ | GD335 | 104 | 105 | 106.5 | dead | | | | |
| LPR4ZZ | GD336 | 85 | 85 | 87 | dead | | | | |
| LPR4ZZ | GD337 | 83 | 85 | 86 | | | | | sacrificed for health assessment on $D_{35}$ |
| LPR4ZZ | GD338 | 84 | 87 | dead | | | | | |
| LPR4ZZ | GD339 | 88 | alive | 102 | | | | | sacrificed for health assessment on $D_{35}$ |
| LPR4ZZ | GD340 | 99 | alive | dead | | | | | |
| LPR4ZZ | GD341 | 92 | alive | alive | dead | | | | |
| LPR4ZZ | GD342 | 98 | alive | alive | dead | | | | |
| LPR4ZZ | GD343 | 103 | alive | alive | dead | | | | |
| LPR4ZZ | GD344 | 95 | alive | alive | dead | | | | |
| LPR4ZZ | GD345 | 108 | alive | dead | | | | | |

## Table E-1. Summary of survival results for the 2011 LPRSA caged bivalve study

| Location ID | Specimen ID & number | Status/Shell Length (mm) | | | | | | | Comments |
|---|---|---|---|---|---|---|---|---|---|
| | | $D_0$ | $D_{14}$ | $D_{35}$ | $D_{56}$ | $D_{61}$ | $D_{75}$ | $D_{90}$ | |
| LPR4ZZ | GD346 | 88 | alive | alive | dead | | | | |
| LPR4ZZ | GD347 | 94 | alive | alive | dead | | | | |
| LPR4ZZ | GD348 | 88 | alive | alive | dead | | | | |
| LPR4ZZ | GD349 | 95 | alive | alive | dead | | | | |
| LPR4ZZ | GD350 | 88 | alive | alive | dead | | | | |
| LPR4ZZ | GD351 | 76 | alive | alive | dead | | | | |
| LPR4ZZ | GD352 | 73 | alive | alive | dead | | | | |
| LPR4ZZ | GD353 | 88 | alive | alive | dead | | | | |
| LPR4ZZ | GD354 | 83 | alive | alive | dead | | | | |
| LPR4ZZ | GD355 | 80 | alive | dead | | | | | |
| LPR4ZZ | GD356 | 81 | alive | alive | dead | | | | |
| LPR4ZZ | GD357 | 75 | alive | alive | dead | | | | |
| LPR4ZZ | GD358 | 81 | alive | alive | dead | | | | |
| LPR4ZZ | GD359 | 87 | alive | alive | dead | | | | |
| LPR4ZZ | GD360 | 80 | alive | alive | dead | | | | |
| LPR4ZZ | GD361 | 95.5 | alive | alive | dead | | | | |
| LPR4ZZ | GD362 | 112.5 | alive | alive | dead | | | | |
| LPR4ZZ | GD363 | 84 | alive | alive | dead | | | | |
| LPR4ZZ | GD364 | 80 | alive | alive | dead | | | | |
| LPR4ZZ | GD365 | 88 | alive | alive | dead | | | | |
| LPR4ZZ | GD366 | 82 | alive | alive | dead | | | | |
| LPR4ZZ | GD367 | 94 | alive | alive | dead | | | | |

## Table E-1. Summary of survival results for the 2011 LPRSA caged bivalve study

| Location ID | Specimen ID & number | Status/Shell Length (mm) | | | | | | | Comments |
|---|---|---|---|---|---|---|---|---|---|
| | | $D_0$ | $D_{14}$ | $D_{35}$ | $D_{56}$ | $D_{61}$ | $D_{75}$ | $D_{90}$ | |
| LPR4ZZ | GD368 | 89 | alive | alive | dead | | | | |
| LPR4ZZ | GD369 | 81 | alive | alive | dead | | | | |
| LPR4ZZ | GD370 | 85 | alive | alive | dead | | | | |
| LPR4ZZ | GD371 | 92 | alive | alive | dead | | | | |
| LPR4ZZ | GD372 | 88 | alive | alive | dead | | | | |
| LPR4ZZ | GD373 | 96 | alive | alive | dead | | | | |
| LPR4ZZ | GD374 | 83 | alive | alive | dead | | | | |
| LPR4ZZ | GD375 | 92 | alive | alive | dead | | | | |
| LPR4ZZ | GD376 | 80 | alive | alive | dead | | | | |
| LPR4ZZ | GD377 | 77 | alive | alive | dead | | | | |
| LPR4ZZ | GD378 | 79 | alive | alive | dead | | | | |
| LPR4ZZ | GD379 | 73 | alive | alive | dead | | | | |
| LPR4ZZ | GD380 | 75 | alive | alive | dead | | | | |
| LPR4ZZ | GD381 | 82 | alive | alive | dead | | | | |
| LPR4ZZ | GD382 | 85 | alive | alive | dead | | | | |
| LPR4ZZ | GD383 | 75 | alive | alive | dead | | | | |
| LPR4ZZ | GD384 | 77 | alive | alive | dead | | | | |
| LPR4ZZ | GD385 | 84 | alive | alive | dead | | | | |
| LPR4ZZ | GD386 | 82 | alive | alive | dead | | | | |
| LPR4ZZ | GD387 | 88 | alive | alive | dead | | | | |
| LPR4ZZ | GD388 | 80 | alive | alive | dead | | | | |
| LPR4ZZ | GD389 | 81 | alive | alive | dead | | | | |

## Table E-1. Summary of survival results for the 2011 LPRSA caged bivalve study

| Location ID | Specimen ID & number | Status/Shell Length (mm) | | | | | | | Comments |
|---|---|---|---|---|---|---|---|---|---|
| | | $D_0$ | $D_{14}$ | $D_{35}$ | $D_{56}$ | $D_{61}$ | $D_{75}$ | $D_{90}$ | |
| LPR4ZZ | GD390 | 78 | alive | alive | dead | | | | |
| LPR4ZZ | GD391 | 95 | alive | alive | dead | | | | |
| LPR4ZZ | GD392 | 99 | alive | alive | dead | | | | |
| LPR4ZZ | GD393 | 108 | alive | alive | dead | | | | |
| LPR4ZZ | GD394 | 90 | alive | alive | dead | | | | |
| LPR4ZZ | GD395 | 85 | alive | alive | dead | | | | |
| LPR4ZZ | GD396 | 73 | alive | alive | dead | | | | |
| LPR4ZZ | GD397 | 82 | alive | alive | dead | | | | |
| LPR4ZZ | GD398 | 76 | alive | alive | dead | | | | |
| LPR4ZZ | GD399 | 76 | alive | alive | dead | | | | |
| LPR4ZZ | GD400 | 84 | alive | alive | dead | | | | |
| LPR4ZZ | GD401 | 91 | alive | alive | dead | | | | |
| LPR4ZZ | GD402 | 74 | alive | alive | dead | | | | |
| LPR4ZZ | GD403 | 78 | alive | alive | dead | | | | |
| LPR4ZZ | GD404 | 81.5 | alive | alive | dead | | | | |
| LPR4ZZ | GD405 | 79 | alive | alive | dead | | | | |
| LPR4ZZ | GD406 | 76 | alive | alive | dead | | | | |
| LPR4ZZ | GD407 | 85 | alive | alive | dead | | | | |
| LPR4ZZ | GD408 | 83 | alive | alive | dead | | | | |
| LPR4ZZ | GD409 | 76 | alive | alive | dead | | | | |
| LPR4ZZ | GD410 | 91 | alive | dead | | | | | |
| LPR4ZZ | GD411 | 92 | alive | alive | dead | | | | |

## Table E-1. Summary of survival results for the 2011 LPRSA caged bivalve study

| Location ID | Specimen ID & number | Status/Shell Length (mm) | | | | | | | Comments |
|---|---|---|---|---|---|---|---|---|---|
| | | $D_0$ | $D_{14}$ | $D_{35}$ | $D_{56}$ | $D_{61}$ | $D_{75}$ | $D_{90}$ | |
| LPR4ZZ | GD412 | 86 | alive | dead | | | | | |
| LPR4ZZ | GD413 | 97 | alive | alive | dead | | | | |
| LPR4ZZ | GD414 | 91 | alive | alive | alive | dead | | | |
| LPR4ZZ | GD415 | 87 | alive | alive | dead | | | | |
| LPR4ZZ | GD416 | 88 | alive | alive | dead | | | | |
| LPR4ZZ | GD417 | 100 | alive | alive | dead | | | | |
| LPR4ZZ | GD418 | 92 | alive | alive | dead | | | | |
| LPR4ZZ | GD419 | 84 | alive | alive | dead | | | | |
| LPR4ZZ | GD420 | 85 | alive | alive | dead | | | | |
| LPR4ZZ | GD421 | 90 | alive | alive | dead | | | | |
| LPR4ZZ | GD422 | 84 | alive | alive | dead | | | | |
| LPR4ZZ | GD423 | 83 | alive | alive | dead | | | | |
| LPR4ZZ | GD424 | 75 | alive | alive | dead | | | | |
| LPR4ZZ | GD425 | 86 | alive | alive | dead | | | | |
| LPR4ZZ | GD426 | 79 | alive | alive | dead | | | | |
| LPR4ZZ | GD427 | 78 | alive | alive | dead | | | | |
| LPR4ZZ | GD428 | 73 | alive | alive | dead | | | | |
| LPR4ZZ | GD429 | 85 | alive | dead | | | | | |
| LPR4ZZ | GD430 | 73 | alive | alive | dead | | | | |
| LPR4ZZ | GD431 | 77 | alive | alive | dead | | | | |
| LPR4ZZ | GD432 | 91 | alive | alive | dead | | | | |
| LPR4ZZ | GD433 | 75 | alive | alive | dead | | | | |

## Table E-1. Summary of survival results for the 2011 LPRSA caged bivalve study

| Location ID | Specimen ID & number | Status/Shell Length (mm) | | | | | | | Comments |
|---|---|---|---|---|---|---|---|---|---|
| | | $D_0$ | $D_{14}$ | $D_{35}$ | $D_{56}$ | $D_{61}$ | $D_{75}$ | $D_{90}$ | |
| LPR4ZZ | GD434 | 71 | alive | alive | dead | | | | |
| LPR4ZZ | GD435 | 73 | alive | alive | dead | | | | |
| LPR4ZZ | GD436 | 83 | alive | alive | dead | | | | |
| LPR4ZZ | GD437 | 80 | alive | alive | dead | | | | |
| LPR4ZZ | GD438 | 74 | alive | alive | dead | | | | |
| LPR4ZZ | GD439 | 76 | alive | alive | dead | | | | |
| LPR4ZZ | GD440 | 73 | alive | alive | dead | | | | |
| LPR4ZZ | GD441 | 90.5 | alive | alive | dead | | | | |
| LPR4ZZ | GD442 | 102 | alive | alive | dead | | | | |
| LPR4ZZ | GD443 | 108 | alive | alive | dead | | | | |
| LPR4ZZ | GD444 | 101 | alive | alive | dead | | | | |
| LPR4ZZ | GD445 | 90 | alive | alive | dead | | | | |
| LPR4ZZ | GD446 | 90.5 | alive | alive | dead | | | | |
| LPR4ZZ | GD447 | 88 | alive | alive | dead | | | | |
| LPR4ZZ | GD448 | 81.5 | alive | alive | dead | | | | |
| LPR4ZZ | GD449 | 81 | alive | alive | dead | | | | |
| LPR4ZZ | GD450 | 75 | alive | alive | dead | | | | |
| LPR4ZZ | GD451 | 98 | alive | alive | dead | | | | |
| LPR4ZZ | GD452 | 92 | alive | alive | dead | | | | |
| LPR4ZZ | GD453 | 82 | alive | alive | dead | | | | |
| LPR4ZZ | GD454 | 86 | alive | alive | dead | | | | |
| LPR4ZZ | GD455 | 78 | alive | alive | dead | | | | |

## Table E-1. Summary of survival results for the 2011 LPRSA caged bivalve study

| Location ID | Specimen ID & number | Status/Shell Length (mm) | | | | | | | Comments |
|---|---|---|---|---|---|---|---|---|---|
| | | $D_0$ | $D_{14}$ | $D_{35}$ | $D_{56}$ | $D_{61}$ | $D_{75}$ | $D_{90}$ | |
| LPR4ZZ | GD456 | 84.5 | alive | alive | dead | | | | |
| LPR4ZZ | GD457 | 94 | alive | dead | | | | | |
| LPR4ZZ | GD458 | 94 | alive | alive | alive | dead | | | |
| LPR4ZZ | GD459 | 80 | alive | alive | dead | | | | |
| LPR4ZZ | GD460 | 79 | alive | alive | dead | | | | |
| LPR4ZZ | GD461 | 89 | alive | alive | alive | dead | | | |
| LPR4ZZ | GD462 | 89.5 | alive | alive | dead | | | | |
| LPR4ZZ | GD463 | 103 | alive | alive | dead | | | | |
| LPR4ZZ | GD464 | 98 | alive | alive | dead | | | | |
| LPR4ZZ | GD465 | 88 | alive | alive | dead | | | | |
| LPR4ZZ | GD466 | 85 | alive | alive | dead | | | | |
| LPR4ZZ | GD467 | 84 | alive | alive | dead | | | | |
| LPR4ZZ | GD468 | 83 | alive | alive | dead | | | | |
| LPR4ZZ | GD469 | 88 | alive | alive | dead | | | | |
| LPR4ZZ | GD470 | 78 | alive | alive | dead | | | | |
| LPR4ZZ | GD471 | 81 | alive | alive | dead | | | | |
| LPR4ZZ | GD472 | 75 | alive | alive | dead | | | | |
| LPR4ZZ | GD473 | 80 | alive | alive | dead | | | | |
| LPR4ZZ | GD474 | 78 | alive | alive | dead | | | | |
| LPR4ZZ | GD475 | 85 | alive | alive | dead | | | | |
| LPR4ZZ | GD476 | 75 | alive | alive | dead | | | | |
| LPR4ZZ | GD477 | 86.5 | alive | alive | dead | | | | |

## Table E-1. Summary of survival results for the 2011 LPRSA caged bivalve study

| Location ID | Specimen ID & number | Status/Shell Length (mm) | | | | | | | Comments |
|---|---|---|---|---|---|---|---|---|---|
| | | $D_0$ | $D_{14}$ | $D_{35}$ | $D_{56}$ | $D_{61}$ | $D_{75}$ | $D_{90}$ | |
| LPR4ZZ | GD478 | 79 | alive | dead | | | | | |
| LPR4ZZ | GD479 | 81.5 | alive | alive | alive | 82.5 | | | sent to lab for analysis on $D_{61}$ |
| LPR4ZZ | GD480 | 80 | alive | alive | dead | | | | |
| LPR5XX | GD481 | 106.5 | 106 | 105.5 | dead | | | | |
| LPR5XX | GD482 | 98 | 97.5 | 98 | dead | | | | |
| LPR5XX | GD483 | 91.5 | 90 | dead | | | | | |
| LPR5XX | GD484 | 95 | 93.5 | 93.5 | dead | | | | |
| LPR5XX | GD485 | 100 | alive | alive | dead | | | | |
| LPR5XX | GD486 | 88 | alive | alive | dead | | | | |
| LPR5XX | GD487 | 89 | alive | alive | dead | | | | |
| LPR5XX | GD488 | 87 | alive | dead | | | | | |
| LPR5XX | GD489 | 90.5 | alive | alive | dead | | | | |
| LPR5XX | GD490 | 99.5 | 99 | | | | | | sacrificed for health assessment on $D_{14}$ |
| LPR5XX | GD491 | 87 | alive | alive | dead | | | | |
| LPR5XX | GD492 | 89 | alive | alive | dead | | | | |
| LPR5XX | GD493 | 97.5 | alive | alive | dead | | | | |
| LPR5XX | GD494 | 90 | alive | alive | dead | | | | |
| LPR5XX | GD495 | 89 | alive | alive | dead | | | | |
| LPR5XX | GD496 | 87 | alive | alive | dead | | | | |
| LPR5XX | GD497 | 89 | alive | alive | dead | | | | |
| LPR5XX | GD498 | 89 | alive | alive | dead | | | | |
| LPR5XX | GD499 | 85 | alive | alive | dead | | | | |

## Table E-1. Summary of survival results for the 2011 LPRSA caged bivalve study

| Location ID | Specimen ID & number | Status/Shell Length (mm) | | | | | | | Comments |
|---|---|---|---|---|---|---|---|---|---|
| | | $D_0$ | $D_{14}$ | $D_{35}$ | $D_{56}$ | $D_{61}$ | $D_{75}$ | $D_{90}$ | |
| LPR5XX | GD500 | 91 | alive | alive | dead | | | | |
| LPR5XX | GD501 | 84 | lost | lost | lost | lost | lost | lost | |
| LPR5XX | GD502 | 87 | lost | lost | lost | lost | lost | lost | |
| LPR5XX | GD503 | 84.5 | lost | lost | lost | lost | lost | lost | |
| LPR5XX | GD504 | 88.5 | lost | lost | lost | lost | lost | lost | |
| LPR5XX | GD505 | 76.5 | lost | lost | lost | lost | lost | lost | |
| LPR5XX | GD506 | 83.5 | lost | lost | lost | lost | lost | lost | |
| LPR5XX | GD507 | 82 | lost | lost | lost | lost | lost | lost | |
| LPR5XX | GD508 | 86 | lost | lost | lost | lost | lost | lost | |
| LPR5XX | GD509 | 82.5 | lost | lost | lost | lost | lost | lost | |
| LPR5XX | GD510 | 78.5 | lost | lost | lost | lost | lost | lost | |
| LPR5XX | GD511 | 83.5 | alive | alive | dead | | | | |
| LPR5XX | GD512 | 77 | alive | alive | dead | | | | |
| LPR5XX | GD513 | 76 | alive | alive | dead | | | | |
| LPR5XX | GD514 | 79 | alive | alive | dead | | | | |
| LPR5XX | GD515 | 77 | alive | alive | dead | | | | |
| LPR5XX | GD516 | 78 | alive | alive | dead | | | | |
| LPR5XX | GD517 | 74 | alive | alive | dead | | | | |
| LPR5XX | GD518 | 77 | alive | alive | dead | | | | |
| LPR5XX | GD519 | 78.5 | alive | alive | dead | | | | |
| LPR5XX | GD520 | 70 | alive | alive | dead | | | | |
| LPR5XX | GD521 | 111 | alive | alive | dead | | | | |

## Table E-1. Summary of survival results for the 2011 LPRSA caged bivalve study

| Location ID | Specimen ID & number | Status/Shell Length (mm) | | | | | | | Comments |
|---|---|---|---|---|---|---|---|---|---|
| | | $D_0$ | $D_{14}$ | $D_{35}$ | $D_{56}$ | $D_{61}$ | $D_{75}$ | $D_{90}$ | |
| LPR5XX | GD522 | 101.5 | alive | dead | | | | | |
| LPR5XX | GD523 | 100.5 | alive | alive | dead | | | | |
| LPR5XX | GD524 | 90 | alive | alive | dead | | | | |
| LPR5XX | GD525 | 105 | alive | dead | | | | | |
| LPR5XX | GD526 | 99 | alive | dead | | | | | |
| LPR5XX | GD527 | 96 | alive | alive | dead | | | | |
| LPR5XX | GD528 | 94.5 | alive | alive | dead | | | | |
| LPR5XX | GD529 | 92 | alive | dead | | | | | |
| LPR5XX | GD530 | 90.5 | alive | alive | dead | | | | |
| LPR5XX | GD531 | 94 | lost | lost | lost | lost | lost | lost | |
| LPR5XX | GD532 | 92 | lost | lost | lost | lost | lost | lost | |
| LPR5XX | GD533 | 90 | lost | lost | lost | lost | lost | lost | |
| LPR5XX | GD534 | 91 | lost | lost | lost | lost | lost | lost | |
| LPR5XX | GD535 | 94 | lost | lost | lost | lost | lost | lost | |
| LPR5XX | GD536 | 87.5 | lost | lost | lost | lost | lost | lost | |
| LPR5XX | GD537 | 93 | lost | lost | lost | lost | lost | lost | |
| LPR5XX | GD538 | 85.5 | lost | lost | lost | lost | lost | lost | |
| LPR5XX | GD539 | 85 | lost | lost | lost | lost | lost | lost | |
| LPR5XX | GD540 | 89.5 | lost | lost | lost | lost | lost | lost | |
| LPR5XX | GD541 | 95 | lost | lost | lost | lost | lost | lost | |
| LPR5XX | GD542 | 89 | lost | lost | lost | lost | lost | lost | |
| LPR5XX | GD543 | 90 | lost | lost | lost | lost | lost | lost | |

## Table E-1. Summary of survival results for the 2011 LPRSA caged bivalve study

| Location ID | Specimen ID & number | Status/Shell Length (mm) | | | | | | | Comments |
|---|---|---|---|---|---|---|---|---|---|
| | | $D_0$ | $D_{14}$ | $D_{35}$ | $D_{56}$ | $D_{61}$ | $D_{75}$ | $D_{90}$ | |
| LPR5XX | GD544 | 92 | lost | lost | lost | lost | lost | lost | |
| LPR5XX | GD545 | 92 | lost | lost | lost | lost | lost | lost | |
| LPR5XX | GD546 | 88 | lost | lost | lost | lost | lost | lost | |
| LPR5XX | GD547 | 82 | lost | lost | lost | lost | lost | lost | |
| LPR5XX | GD548 | 87.5 | lost | lost | lost | lost | lost | lost | |
| LPR5XX | GD549 | 79 | lost | lost | lost | lost | lost | lost | |
| LPR5XX | GD550 | 81 | lost | lost | lost | lost | lost | lost | |
| LPR5XX | GD551 | 85 | lost | lost | lost | lost | lost | lost | |
| LPR5XX | GD552 | 83 | lost | lost | lost | lost | lost | lost | |
| LPR5XX | GD553 | 86 | lost | lost | lost | lost | lost | lost | |
| LPR5XX | GD554 | 77.5 | lost | lost | lost | lost | lost | lost | |
| LPR5XX | GD555 | 83 | lost | lost | lost | lost | lost | lost | |
| LPR5XX | GD556 | 79 | lost | lost | lost | lost | lost | lost | |
| LPR5XX | GD557 | 88 | lost | lost | lost | lost | lost | lost | |
| LPR5XX | GD558 | 79 | lost | lost | lost | lost | lost | lost | |
| LPR5XX | GD559 | 75.5 | lost | lost | lost | lost | lost | lost | |
| LPR5XX | GD560 | 89 | lost | lost | lost | lost | lost | lost | |
| LPR5YY | GD561 | 86 | 84 | 84.5 | dead | | | | |
| LPR5YY | GD562 | 90 | 89 | 88.5 | dead | | | | |
| LPR5YY | GD563 | 88 | 87.5 | dead | | | | | |
| LPR5YY | GD564 | 80.5 | 83.5 | dead | | | | | |
| LPR5YY | GD565 | 85.5 | dead | | | | | | |

## Table E-1. Summary of survival results for the 2011 LPRSA caged bivalve study

| Location ID | Specimen ID & number | Status/Shell Length (mm) | | | | | | | Comments |
|---|---|---|---|---|---|---|---|---|---|
| | | $D_0$ | $D_{14}$ | $D_{35}$ | $D_{56}$ | $D_{61}$ | $D_{75}$ | $D_{90}$ | |
| LPR5YY | GD566 | 87 | 87.5 | 86 | dead | | | | |
| LPR5YY | GD567 | 82 | 82.5 | 82 | dead | | | | |
| LPR5YY | GD568 | 88 | 87.5 | 87.5 | dead | | | | |
| LPR5YY | GD569 | 76 | 76 | | | | | | sacrificed for health assessment on $D_{14}$ |
| LPR5YY | GD570 | 80.5 | 81 | | | | | | sacrificed for health assessment on $D_{14}$ |
| LPR5YY | GD571 | 91 | alive | 90 | | | | | sacrificed for health assessment on $D_{35}$ |
| LPR5YY | GD572 | 91 | alive | 91 | | | | | sacrificed for health assessment on $D_{35}$ |
| LPR5YY | GD573 | 107 | alive | alive | dead | | | | |
| LPR5YY | GD574 | 98 | alive | alive | dead | | | | |
| LPR5YY | GD575 | 100 | alive | dead | | | | | |
| LPR5YY | GD576 | 90 | alive | dead | | | | | |
| LPR5YY | GD577 | 89 | alive | alive | dead | | | | |
| LPR5YY | GD578 | 86 | alive | alive | dead | | | | |
| LPR5YY | GD579 | 85 | alive | alive | dead | | | | |
| LPR5YY | GD580 | 83 | alive | alive | dead | | | | |
| LPR5YY | GD581 | 80 | 79.5 | alive | dead | | | | |
| LPR5YY | GD582 | 82 | alive | alive | dead | | | | |
| LPR5YY | GD583 | 80 | alive | alive | dead | | | | |
| LPR5YY | GD584 | 86 | alive | alive | dead | | | | |
| LPR5YY | GD585 | 77.5 | alive | alive | dead | | | | |
| LPR5YY | GD586 | 82 | alive | alive | dead | | | | |

## Table E-1. Summary of survival results for the 2011 LPRSA caged bivalve study

| Location ID | Specimen ID & number | Status/Shell Length (mm) | | | | | | | Comments |
|---|---|---|---|---|---|---|---|---|---|
| | | $D_0$ | $D_{14}$ | $D_{35}$ | $D_{56}$ | $D_{61}$ | $D_{75}$ | $D_{90}$ | |
| LPR5YY | GD587 | 80 | alive | alive | dead | | | | |
| LPR5YY | GD588 | 75.5 | alive | alive | dead | | | | |
| LPR5YY | GD589 | 78 | alive | alive | dead | | | | |
| LPR5YY | GD590 | 74 | alive | alive | dead | | | | |
| LPR5YY | GD591 | 80 | alive | alive | dead | | | | |
| LPR5YY | GD592 | 85 | alive | alive | dead | | | | |
| LPR5YY | GD593 | 82.5 | alive | alive | dead | | | | |
| LPR5YY | GD594 | 82 | alive | alive | dead | | | | |
| LPR5YY | GD595 | 85 | alive | alive | dead | | | | |
| LPR5YY | GD596 | 77.5 | alive | alive | dead | | | | |
| LPR5YY | GD597 | 72.5 | alive | alive | dead | | | | |
| LPR5YY | GD598 | 81 | alive | alive | dead | | | | |
| LPR5YY | GD599 | 81 | alive | alive | dead | | | | |
| LPR5YY | GD600 | 81.5 | alive | alive | dead | | | | |
| LPR5YY | GD601 | 100.5 | alive | alive | dead | | | | |
| LPR5YY | GD602 | 92 | alive | alive | dead | | | | |
| LPR5YY | GD603 | 94.5 | alive | alive | dead | | | | |
| LPR5YY | GD604 | 87 | alive | alive | dead | | | | |
| LPR5YY | GD605 | 95 | alive | alive | dead | | | | |
| LPR5YY | GD606 | 108 | alive | dead | | | | | |
| LPR5YY | GD607 | 93 | alive | alive | dead | | | | |
| LPR5YY | GD608 | 86 | alive | alive | dead | | | | |

## Table E-1. Summary of survival results for the 2011 LPRSA caged bivalve study

| Location ID | Specimen ID & number | Status/Shell Length (mm) | | | | | | | Comments |
|---|---|---|---|---|---|---|---|---|---|
| | | $D_0$ | $D_{14}$ | $D_{35}$ | $D_{56}$ | $D_{61}$ | $D_{75}$ | $D_{90}$ | |
| LPR5YY | GD609 | 83 | alive | alive | dead | | | | |
| LPR5YY | GD610 | 91.5 | alive | alive | dead | | | | |
| LPR5YY | GD611 | 89 | alive | alive | dead | | | | |
| LPR5YY | GD612 | 85.5 | alive | dead | | | | | |
| LPR5YY | GD613 | 88.5 | alive | alive | dead | | | | |
| LPR5YY | GD614 | 99 | alive | alive | dead | | | | |
| LPR5YY | GD615 | 93.5 | alive | alive | dead | | | | |
| LPR5YY | GD616 | 84 | alive | alive | dead | | | | |
| LPR5YY | GD617 | 100 | alive | dead | | | | | |
| LPR5YY | GD618 | 86 | alive | alive | dead | | | | |
| LPR5YY | GD619 | 88 | alive | alive | dead | | | | |
| LPR5YY | GD620 | 87 | alive | alive | dead | | | | |
| LPR5YY | GD621 | 89 | alive | alive | dead | | | | |
| LPR5YY | GD622 | 89 | alive | alive | dead | | | | |
| LPR5YY | GD623 | 78 | alive | alive | dead | | | | |
| LPR5YY | GD624 | 93 | alive | alive | dead | | | | |
| LPR5YY | GD625 | 81 | alive | dead | | | | | |
| LPR5YY | GD626 | 103.5 | alive | alive | dead | | | | |
| LPR5YY | GD627 | 94.5 | alive | alive | dead | | | | |
| LPR5YY | GD628 | 75 | alive | alive | dead | | | | |
| LPR5YY | GD629 | 80 | alive | dead | | | | | |
| LPR5YY | GD630 | 81 | alive | alive | dead | | | | |

## Table E-1. Summary of survival results for the 2011 LPRSA caged bivalve study

| Location ID | Specimen ID & number | Status/Shell Length (mm) | | | | | | | Comments |
|---|---|---|---|---|---|---|---|---|---|
| | | $D_0$ | $D_{14}$ | $D_{35}$ | $D_{56}$ | $D_{61}$ | $D_{75}$ | $D_{90}$ | |
| LPR5YY | GD631 | 81.5 | alive | alive | dead | | | | |
| LPR5YY | GD632 | 80 | alive | alive | dead | | | | |
| LPR5YY | GD633 | 79 | alive | alive | dead | | | | |
| LPR5YY | GD634 | 93 | alive | alive | dead | | | | |
| LPR5YY | GD635 | 99 | alive | dead | | | | | |
| LPR5YY | GD636 | 89 | alive | alive | dead | | | | |
| LPR5YY | GD637 | 95 | alive | alive | dead | | | | |
| LPR5YY | GD638 | 92 | alive | alive | dead | | | | |
| LPR5YY | GD639 | 99 | alive | alive | dead | | | | |
| LPR5YY | GD640 | 99 | alive | alive | dead | | | | |
| LPR6UU | EC041 | 82 | 82 | 82 | 82 | alive | 82 | 82.5 | |
| LPR6UU | EC042 | 87 | 86 | 86 | 84.5 | alive | 87.5 | 85.5 | |
| LPR6UU | EC043 | 91.5 | 93 | 93 | 93 | alive | 93.5 | 93 | |
| LPR6UU | EC044 | 92 | 90.5 | 90 | 89.5 | alive | 90 | 91 | |
| LPR6UU | EC045 | 84 | 83.5 | 82 | 82.5 | alive | 82.5 | 83 | |
| LPR6UU | EC046 | 97 | 95 | 95 | 95.5 | alive | 95 | 96 | |
| LPR6UU | EC047 | 97 | alive | 95.5 | | | | | sacrificed for health assessment on $D_{35}$ |
| LPR6UU | EC048 | 89.5 | alive | 88.5 | | | | | sacrificed for health assessment on $D_{35}$ |
| LPR6UU | EC049 | 80 | 78 | | | | | | sacrificed for health assessment on $D_{14}$ |
| LPR6UU | EC050 | 89 | 90 | | | | | | sacrificed for health assessment on $D_{14}$ |
| LPR6UU | EC051 | 102 | alive | alive | alive | alive | alive | 102.5 | |

## Table E-1. Summary of survival results for the 2011 LPRSA caged bivalve study

| Location ID | Specimen ID & number | Status/Shell Length (mm) | | | | | | | Comments |
|---|---|---|---|---|---|---|---|---|---|
| | | $D_0$ | $D_{14}$ | $D_{35}$ | $D_{56}$ | $D_{61}$ | $D_{75}$ | $D_{90}$ | |
| LPR6UU | EC052 | 85 | alive | alive | alive | alive | alive | 85 | |
| LPR6UU | EC053 | 81 | alive | alive | alive | alive | alive | 82 | |
| LPR6UU | EC054 | 82 | alive | alive | alive | alive | alive | 82 | |
| LPR6UU | EC055 | 89 | alive | alive | alive | alive | alive | 89 | |
| LPR6UU | EC056 | 90 | alive | alive | alive | alive | alive | 90 | |
| LPR6UU | EC057 | 88 | alive | alive | alive | alive | 88 | | sacrificed for health assessment on $D_{75}$ |
| LPR6UU | EC058 | 80 | alive | alive | alive | alive | 80 | | sacrificed for health assessment on $D_{75}$ |
| LPR6UU | EC059 | 79 | alive | alive | 79.5 | | | | sacrificed for health assessment on $D_{56}$ |
| LPR6UU | EC060 | 83 | alive | alive | 83.5 | | | | sacrificed for health assessment on $D_{56}$ |
| LPR6UU | EC061 | 86 | alive | alive | alive | alive | alive | 87 | |
| LPR6UU | EC062 | 90 | alive | alive | alive | alive | alive | 90 | |
| LPR6UU | EC063 | 88 | alive | alive | alive | alive | alive | 88 | |
| LPR6UU | EC064 | 76 | alive | alive | alive | alive | alive | 75 | |
| LPR6UU | EC065 | 87.5 | alive | alive | alive | alive | alive | 86.5 | |
| LPR6UU | EC066 | 89 | alive | alive | alive | alive | alive | 89 | |
| LPR6UU | EC067 | 88 | alive | alive | alive | alive | alive | 88 | |
| LPR6UU | EC068 | 80 | alive | alive | alive | alive | alive | 80 | |
| LPR6UU | EC069 | 77 | alive | alive | alive | alive | alive | 77 | |
| LPR6UU | EC070 | 78 | alive | alive | alive | alive | alive | 78 | |
| LPR6UU | EC071 | 83 | alive | alive | alive | alive | alive | 83 | |
| LPR6UU | EC072 | 91 | alive | alive | alive | alive | alive | 92 | |

## Table E-1. Summary of survival results for the 2011 LPRSA caged bivalve study

| Location ID | Specimen ID & number | Status/Shell Length (mm) | | | | | | | Comments |
|---|---|---|---|---|---|---|---|---|---|
| | | $D_0$ | $D_{14}$ | $D_{35}$ | $D_{56}$ | $D_{61}$ | $D_{75}$ | $D_{90}$ | |
| LPR6UU | EC073 | 83 | alive | alive | alive | alive | alive | 83 | |
| LPR6UU | EC074 | 87 | alive | alive | alive | alive | alive | 87 | |
| LPR6UU | EC075 | 79 | alive | alive | alive | alive | alive | 79.5 | |
| LPR6UU | EC076 | 80 | alive | alive | alive | alive | alive | 80.5 | |
| LPR6UU | EC077 | 94 | alive | alive | alive | alive | alive | 94.5 | |
| LPR6UU | EC078 | 85 | alive | alive | alive | alive | alive | 86 | |
| LPR6UU | EC079 | 81.5 | alive | alive | alive | alive | alive | 81 | |
| LPR6UU | EC080 | 105 | alive | alive | alive | alive | alive | 103.5 | |
| LPR6UU | EC081 | 90 | alive | alive | alive | alive | alive | 89 | |
| LPR6UU | EC082 | 90.5 | alive | alive | alive | alive | alive | 90.5 | |
| LPR6UU | EC083 | 82.5 | alive | alive | alive | alive | alive | 84 | |
| LPR6UU | EC084 | 81 | alive | alive | alive | alive | alive | 81 | |
| LPR6UU | EC085 | 87 | alive | alive | alive | alive | alive | 86.5 | |
| LPR6UU | EC086 | 91 | alive | alive | alive | alive | alive | 90 | |
| LPR6UU | EC087 | 77.5 | alive | alive | alive | alive | alive | 76.5 | |
| LPR6UU | EC088 | 78 | alive | alive | alive | alive | alive | 78 | |
| LPR6UU | EC089 | 95 | alive | alive | alive | alive | alive | 96 | |
| LPR6UU | EC090 | 80 | alive | alive | alive | alive | alive | 80 | |
| LPR6UU | EC091 | 90 | alive | alive | alive | alive | alive | 90.5 | |
| LPR6UU | EC092 | 82 | alive | alive | alive | alive | alive | 83 | |
| LPR6UU | EC093 | 87 | alive | alive | alive | alive | alive | 87 | |
| LPR6UU | EC094 | 87.5 | alive | alive | alive | alive | alive | 87 | |

## Table E-1. Summary of survival results for the 2011 LPRSA caged bivalve study

| Location ID | Specimen ID & number | Status/Shell Length (mm) | | | | | | | Comments |
|---|---|---|---|---|---|---|---|---|---|
| | | $D_0$ | $D_{14}$ | $D_{35}$ | $D_{56}$ | $D_{61}$ | $D_{75}$ | $D_{90}$ | |
| LPR6UU | EC095 | 98 | alive | alive | alive | alive | alive | 98 | |
| LPR6UU | EC096 | 88.5 | alive | alive | alive | alive | alive | 88 | |
| LPR6UU | EC097 | 82.5 | alive | alive | alive | alive | alive | 82 | |
| LPR6UU | EC098 | 99 | alive | alive | alive | alive | alive | 98 | |
| LPR6UU | EC099 | 79 | alive | alive | alive | alive | alive | 79 | |
| LPR6UU | EC100 | 83 | alive | alive | alive | alive | alive | 83 | |
| LPR7ZZ | EC101 | 94 | lost | lost | lost | lost | lost | lost | |
| LPR7ZZ | EC102 | 90 | lost | lost | lost | lost | lost | lost | |
| LPR7ZZ | EC103 | 84.5 | lost | lost | lost | lost | lost | lost | |
| LPR7ZZ | EC104 | 94 | lost | lost | lost | lost | lost | lost | |
| LPR7ZZ | EC105 | 80.5 | lost | lost | lost | lost | lost | lost | |
| LPR7ZZ | EC106 | 85 | lost | lost | lost | lost | lost | lost | |
| LPR7ZZ | EC107 | 77 | lost | lost | lost | lost | lost | lost | |
| LPR7ZZ | EC108 | 93 | lost | lost | lost | lost | lost | lost | |
| LPR7ZZ | EC109 | 81.5 | lost | lost | lost | lost | lost | lost | |
| LPR7ZZ | EC110 | 80.5 | lost | lost | lost | lost | lost | lost | |
| LPR7ZZ | EC111 | 96.5 | lost | lost | lost | lost | lost | lost | |
| LPR7ZZ | EC112 | 90 | lost | lost | lost | lost | lost | lost | |
| LPR7ZZ | EC113 | 108 | lost | lost | lost | lost | lost | lost | |
| LPR7ZZ | EC114 | 96 | lost | lost | lost | lost | lost | lost | |
| LPR7ZZ | EC115 | 89 | lost | lost | lost | lost | lost | lost | |
| LPR7ZZ | EC116 | 82 | lost | lost | lost | lost | lost | lost | |

## Table E-1. Summary of survival results for the 2011 LPRSA caged bivalve study

| Location ID | Specimen ID & number | Status/Shell Length (mm) | | | | | | | Comments |
|---|---|---|---|---|---|---|---|---|---|
| | | $D_0$ | $D_{14}$ | $D_{35}$ | $D_{56}$ | $D_{61}$ | $D_{75}$ | $D_{90}$ | |
| LPR7ZZ | EC117 | 100 | lost | lost | lost | lost | lost | lost | |
| LPR7ZZ | EC118 | 85 | lost | lost | lost | lost | lost | lost | |
| LPR7ZZ | EC119 | 74.5 | lost | lost | lost | lost | lost | lost | |
| LPR7ZZ | EC120 | 76 | lost | lost | lost | lost | lost | lost | |
| LPR7ZZ | EC121 | 85.5 | 85 | 84 | 85 | alive | 86 | 86 | |
| LPR7ZZ | EC122 | 90 | 89 | 89 | 90 | alive | 90 | 89.5 | |
| LPR7ZZ | EC123 | 79 | 78 | 78 | 78 | alive | 77.5 | 78 | |
| LPR7ZZ | EC124 | 96 | 97 | 96 | 95.5 | alive | 96 | 96 | |
| LPR7ZZ | EC125 | 91 | 91 | 90 | 91.5 | alive | 90.5 | 90.5 | |
| LPR7ZZ | EC126 | 86 | 85.5 | 86 | 84 | alive | 86.5 | 86 | |
| LPR7ZZ | EC127 | 84 | 84 | 84.5 | 84 | alive | 83.5 | 84 | |
| LPR7ZZ | EC128 | 94.5 | 94 | 94.5 | 94.5 | alive | 95 | 94 | |
| LPR7ZZ | EC129 | 79 | 78 | 78 | 78 | alive | 78 | 78 | |
| LPR7ZZ | EC130 | 89 | dead | | | | | | |
| LPR7ZZ | EC131 | 87 | alive | alive | alive | alive | alive | 87.5 | |
| LPR7ZZ | EC132 | 86 | alive | alive | alive | alive | alive | 86 | |
| LPR7ZZ | EC133 | 80 | alive | alive | alive | alive | alive | 80.5 | |
| LPR7ZZ | EC134 | 101 | alive | alive | alive | alive | 101 | | sacrificed for health assessment on $D_{75}$ |
| LPR7ZZ | EC135 | 80 | alive | alive | alive | alive | 79.5 | | sacrificed for health assessment on $D_{75}$ |
| LPR7ZZ | EC136 | 80.5 | alive | alive | 80 | | | | sacrificed for health assessment on $D_{56}$ |
| LPR7ZZ | EC137 | 85 | alive | alive | 84.5 | | | | sacrificed for health assessment on $D_{56}$ |

## Table E-1. Summary of survival results for the 2011 LPRSA caged bivalve study

| Location ID | Specimen ID & number | Status/Shell Length (mm) | | | | | | | Comments |
|---|---|---|---|---|---|---|---|---|---|
| | | $D_0$ | $D_{14}$ | $D_{35}$ | $D_{56}$ | $D_{61}$ | $D_{75}$ | $D_{90}$ | |
| LPR7ZZ | EC138 | 90.5 | alive | 90.5 | | | | | sacrificed for health assessment on $D_{35}$ |
| LPR7ZZ | EC139 | 82.5 | alive | 81 | | | | | sacrificed for health assessment on $D_{35}$ |
| LPR7ZZ | EC140 | 78.5 | 77.5 | | | | | | sacrificed for health assessment on $D_{14}$ |
| LPR7ZZ | EC141 | 85 | alive | alive | alive | alive | alive | 85.5 | |
| LPR7ZZ | EC142 | 87 | alive | alive | alive | alive | alive | 87 | |
| LPR7ZZ | EC143 | 85 | alive | alive | alive | alive | alive | 85.5 | |
| LPR7ZZ | EC144 | 93 | alive | alive | alive | alive | alive | 93 | |
| LPR7ZZ | EC145 | 91.5 | alive | alive | alive | alive | alive | 90.5 | |
| LPR7ZZ | EC146 | 97 | alive | alive | alive | alive | alive | 97.5 | |
| LPR7ZZ | EC147 | 95.5 | alive | alive | alive | alive | alive | 95.5 | |
| LPR7ZZ | EC148 | 85.5 | alive | alive | alive | alive | alive | 85 | |
| LPR7ZZ | EC149 | 84.5 | alive | alive | alive | alive | alive | 85 | |
| LPR7ZZ | EC150 | 76 | alive | alive | alive | alive | alive | 75 | |
| LPR7ZZ | EC151 | 82 | alive | alive | alive | alive | alive | 83 | |
| LPR7ZZ | EC152 | 88 | alive | alive | alive | alive | alive | 88 | |
| LPR7ZZ | EC153 | 78 | alive | alive | alive | alive | alive | 78 | |
| LPR7ZZ | EC154 | 96 | alive | alive | alive | alive | alive | 96 | |
| LPR7ZZ | EC155 | 91 | alive | alive | alive | alive | alive | 91 | |
| LPR7ZZ | EC156 | 90 | alive | alive | alive | alive | alive | 90.5 | |
| LPR7ZZ | EC157 | 80 | alive | alive | alive | alive | alive | 80 | |
| LPR7ZZ | EC158 | 92 | alive | alive | alive | alive | alive | 92.5 | |

## Table E-1. Summary of survival results for the 2011 LPRSA caged bivalve study

| Location ID | Specimen ID & number | Status/Shell Length (mm) | | | | | | | Comments |
|---|---|---|---|---|---|---|---|---|---|
| | | $D_0$ | $D_{14}$ | $D_{35}$ | $D_{56}$ | $D_{61}$ | $D_{75}$ | $D_{90}$ | |
| LPR7ZZ | EC159 | 91 | alive | alive | alive | alive | alive | 91 | |
| LPR7ZZ | EC160 | 90 | alive | alive | alive | alive | alive | 90.5 | |
| LPR7ZZ | EC161 | 88 | alive | alive | alive | alive | alive | 88.5 | |
| LPR7ZZ | EC162 | 82 | alive | alive | alive | alive | alive | 82 | |
| LPR7ZZ | EC163 | 85 | alive | alive | alive | alive | alive | dead | empty shell |
| LPR7ZZ | EC164 | 91 | alive | alive | alive | alive | alive | 90 | |
| LPR7ZZ | EC165 | 80 | alive | alive | alive | alive | alive | 80.5 | |
| LPR7ZZ | EC166 | 96.5 | alive | alive | alive | alive | alive | 96 | |
| LPR7ZZ | EC167 | 84 | alive | alive | alive | alive | alive | 86 | |
| LPR7ZZ | EC168 | 84.5 | alive | alive | alive | alive | alive | 84 | |
| LPR7ZZ | EC169 | 78 | alive | alive | alive | alive | alive | 78 | |
| LPR7ZZ | EC170 | 82 | alive | alive | alive | alive | alive | 81.5 | |
| LPR7ZZ | EC171 | 91 | alive | alive | alive | alive | alive | 91.5 | |
| LPR7ZZ | EC172 | 86 | alive | alive | alive | alive | alive | 88 | |
| LPR7ZZ | EC173 | 87 | alive | alive | alive | alive | alive | 86.5 | |
| LPR7ZZ | EC174 | 82.5 | alive | alive | alive | alive | alive | 82.5 | |
| LPR7ZZ | EC175 | 81 | alive | alive | alive | alive | alive | 81 | |
| LPR7ZZ | EC176 | 98 | alive | alive | alive | alive | alive | 89 | |
| LPR7ZZ | EC177 | 85 | alive | alive | alive | alive | alive | 85 | |
| LPR7ZZ | EC178 | 83 | alive | alive | alive | alive | alive | 83 | |
| LPR7ZZ | EC179 | 88 | alive | alive | alive | alive | alive | 89 | |
| LPR7ZZ | EC180 | 85.5 | alive | alive | alive | alive | alive | 85 | |

## Table E-1. Summary of survival results for the 2011 LPRSA caged bivalve study

| Location ID | Specimen ID & number | Status/Shell Length (mm) | | | | | | | Comments |
|---|---|---|---|---|---|---|---|---|---|
| | | $D_0$ | $D_{14}$ | $D_{35}$ | $D_{56}$ | $D_{61}$ | $D_{75}$ | $D_{90}$ | |
| LPR7ZZ | EC181 | 90 | alive | alive | alive | alive | alive | 89 | |
| LPR7ZZ | EC182 | 98.5 | alive | alive | alive | alive | alive | 97.5 | |
| LPR7ZZ | EC183 | 84 | alive | alive | alive | alive | alive | 83.5 | |
| LPR7ZZ | EC184 | 86 | alive | alive | alive | alive | alive | 86.5 | |
| LPR7ZZ | EC185 | 91 | alive | alive | alive | alive | alive | 91.5 | |
| LPR7ZZ | EC186 | 83 | alive | alive | alive | alive | alive | 82.5 | |
| LPR7ZZ | EC187 | 91 | alive | alive | alive | alive | alive | 91 | |
| LPR7ZZ | EC188 | 85 | alive | alive | alive | alive | alive | 85 | |
| LPR7ZZ | EC189 | 83 | alive | alive | alive | alive | alive | 83.5 | |
| LPR7ZZ | EC190 | 83.5 | alive | alive | alive | alive | alive | 84 | |
| LPR7ZZ | EC191 | 82.5 | lost | lost | lost | lost | lost | lost | |
| LPR7ZZ | EC192 | 87.5 | lost | lost | lost | lost | lost | lost | |
| LPR7ZZ | EC193 | 102 | lost | lost | lost | lost | lost | lost | |
| LPR7ZZ | EC194 | 89 | lost | lost | lost | lost | lost | lost | |
| LPR7ZZ | EC195 | 100.5 | lost | lost | lost | lost | lost | lost | |
| LPR7ZZ | EC196 | 79 | lost | lost | lost | lost | lost | lost | |
| LPR7ZZ | EC197 | 93 | lost | lost | lost | lost | lost | lost | |
| LPR7ZZ | EC198 | 79 | lost | lost | lost | lost | lost | lost | |
| LPR7ZZ | EC199 | 81 | lost | lost | lost | lost | lost | lost | |
| LPR7ZZ | EC200 | 83 | lost | lost | lost | lost | lost | lost | |
| LPR7ZZ | EC201 | 87.5 | alive | alive | alive | alive | alive | 88.5 | |
| LPR7ZZ | EC202 | 97 | alive | alive | alive | alive | alive | 96 | |

## Table E-1. Summary of survival results for the 2011 LPRSA caged bivalve study

| Location ID | Specimen ID & number | Status/Shell Length (mm) | | | | | | | Comments |
|---|---|---|---|---|---|---|---|---|---|
| | | $D_0$ | $D_{14}$ | $D_{35}$ | $D_{56}$ | $D_{61}$ | $D_{75}$ | $D_{90}$ | |
| LPR7ZZ | EC203 | 97.5 | alive | alive | alive | alive | alive | 97.5 | |
| LPR7ZZ | EC204 | 81.5 | alive | alive | alive | alive | alive | 81 | |
| LPR7ZZ | EC205 | 85 | alive | alive | alive | alive | alive | 85 | |
| LPR7ZZ | EC206 | 92.5 | alive | alive | alive | alive | alive | 92.5 | |
| LPR7ZZ | EC207 | 78 | alive | alive | alive | alive | alive | 78 | |
| LPR7ZZ | EC208 | 89 | alive | alive | alive | alive | alive | 88.5 | |
| LPR7ZZ | EC209 | 82 | alive | alive | alive | alive | alive | 81.5 | |
| LPR7ZZ | EC210 | 86 | alive | alive | alive | alive | alive | 85 | |
| LPR7ZZ | EC211 | 98 | alive | alive | alive | alive | alive | 97 | |
| LPR7ZZ | EC212 | 86 | alive | alive | alive | alive | alive | 87 | |
| LPR7ZZ | EC213 | 83 | alive | alive | alive | alive | alive | dead | empty shell |
| LPR7ZZ | EC214 | 89 | alive | alive | alive | alive | alive | 89.5 | |
| LPR7ZZ | EC215 | 82 | alive | alive | alive | alive | alive | 81 | |
| LPR7ZZ | EC216 | 90 | alive | alive | alive | alive | alive | 90 | |
| LPR7ZZ | EC217 | 83 | alive | alive | alive | alive | alive | 83.5 | |
| LPR7ZZ | EC218 | 90.5 | alive | alive | alive | alive | alive | 91 | |
| LPR7ZZ | EC219 | 86 | alive | alive | alive | alive | alive | 86.5 | |
| LPR7ZZ | EC220 | 84 | alive | alive | alive | alive | alive | 83 | |
| LPR7AB | EC221 | 81 | 80 | 79.5 | 80 | alive | 80 | 80.5 | |
| LPR7AB | EC222 | 85 | 85.5 | 85.5 | 85.5 | alive | 84.5 | 85.5 | |
| LPR7AB | EC223 | 95 | 90 | 90.5 | 91 | alive | 91 | 91 | |
| LPR7AB | EC224 | 82.5 | 83.5 | 83 | 83 | alive | 83 | 82.5 | |

## Table E-1. Summary of survival results for the 2011 LPRSA caged bivalve study

| Location ID | Specimen ID & number | Status/Shell Length (mm) | | | | | | | Comments |
|---|---|---|---|---|---|---|---|---|---|
| | | $D_0$ | $D_{14}$ | $D_{35}$ | $D_{56}$ | $D_{61}$ | $D_{75}$ | $D_{90}$ | |
| LPR7AB | EC225 | 78.5 | 79 | 78 | 78 | alive | 78 | 79 | |
| LPR7AB | EC226 | 98 | 98 | 97 | 97.5 | alive | 97.5 | 97.5 | |
| LPR7AB | EC227 | 84 | alive | 84.5 | | | | | sacrificed for health assessment on $D_{35}$ |
| LPR7AB | EC228 | 88 | alive | 88 | | | | | sacrificed for health assessment on $D_{35}$ |
| LPR7AB | EC229 | 81 | 79 | | | | | | sacrificed for health assessment on $D_{14}$ |
| LPR7AB | EC230 | 89.5 | 89 | | | | | | sacrificed for health assessment on $D_{14}$ |
| LPR7AB | EC231 | 98.5 | alive | alive | alive | alive | alive | 98 | |
| LPR7AB | EC232 | 89 | alive | alive | alive | alive | alive | 89.5 | |
| LPR7AB | EC233 | 87.5 | alive | alive | alive | alive | alive | 88.5 | |
| LPR7AB | EC234 | 83 | alive | alive | alive | alive | alive | 82.5 | |
| LPR7AB | EC235 | 89 | alive | alive | alive | alive | alive | 89 | |
| LPR7AB | EC236 | 84 | alive | alive | alive | alive | alive | 83 | |
| LPR7AB | EC237 | 96.5 | alive | alive | alive | alive | 96.5 | | sacrificed for health assessment on $D_{75}$ |
| LPR7AB | EC238 | 82 | alive | alive | alive | alive | 84.5 | | sacrificed for health assessment on $D_{75}$ |
| LPR7AB | EC239 | 88.5 | alive | alive | 81 | | | | sacrificed for health assessment on $D_{56}$ |
| LPR7AB | EC240 | 84.5 | alive | alive | 84.5 | | | | sacrificed for health assessment on $D_{56}$ |
| LPR7AB | EC241 | 89.5 | alive | alive | alive | alive | alive | 89 | |
| LPR7AB | EC242 | 88 | alive | alive | alive | alive | alive | 88 | |
| LPR7AB | EC243 | 80 | alive | alive | alive | alive | alive | 81 | |
| LPR7AB | EC244 | 88 | alive | alive | alive | alive | alive | 88.5 | |

## Table E-1. Summary of survival results for the 2011 LPRSA caged bivalve study

| Location ID | Specimen ID & number | Status/Shell Length (mm) | | | | | | | Comments |
|---|---|---|---|---|---|---|---|---|---|
| | | $D_0$ | $D_{14}$ | $D_{35}$ | $D_{56}$ | $D_{61}$ | $D_{75}$ | $D_{90}$ | |
| LPR7AB | EC245 | 95 | alive | alive | alive | alive | alive | 96 | |
| LPR7AB | EC246 | 90 | alive | alive | alive | alive | alive | 89.5 | |
| LPR7AB | EC247 | 85 | alive | alive | alive | alive | alive | 85 | |
| LPR7AB | EC248 | 77 | alive | alive | alive | alive | alive | 77.5 | |
| LPR7AB | EC249 | 82.5 | alive | alive | alive | alive | alive | 83 | |
| LPR7AB | EC250 | 93.5 | alive | alive | alive | alive | alive | 94 | |
| LPR7AB | EC251 | 88 | alive | alive | alive | alive | alive | 89 | |
| LPR7AB | EC252 | 93 | alive | alive | alive | alive | alive | 95 | |
| LPR7AB | EC253 | 109.5 | alive | alive | alive | alive | alive | 109.5 | |
| LPR7AB | EC254 | 79.5 | alive | alive | alive | alive | alive | 80 | |
| LPR7AB | EC255 | 87 | alive | alive | alive | alive | alive | 86.5 | |
| LPR7AB | EC256 | 97.5 | alive | alive | alive | alive | alive | 98 | |
| LPR7AB | EC257 | 88.5 | alive | alive | alive | alive | alive | 88.5 | |
| LPR7AB | EC258 | 88 | alive | alive | alive | alive | alive | 87.5 | |
| LPR7AB | EC259 | 87.5 | alive | alive | alive | alive | alive | 88 | |
| LPR7AB | EC260 | 77 | alive | alive | alive | alive | alive | 78 | |
| LPR7AB | EC261 | 78 | alive | alive | alive | alive | alive | 79 | |
| LPR7AB | EC262 | 85 | alive | alive | alive | alive | alive | 84.5 | |
| LPR7AB | EC263 | 87 | alive | alive | alive | alive | alive | 87 | |
| LPR7AB | EC264 | 79 | alive | alive | alive | alive | alive | 79 | |
| LPR7AB | EC265 | 86.5 | alive | alive | alive | alive | alive | 87 | |
| LPR7AB | EC266 | 82.5 | alive | alive | alive | alive | alive | 83 | |

## Table E-1. Summary of survival results for the 2011 LPRSA caged bivalve study

| Location ID | Specimen ID & number | Status/Shell Length (mm) | | | | | | | Comments |
|---|---|---|---|---|---|---|---|---|---|
| | | $D_0$ | $D_{14}$ | $D_{35}$ | $D_{56}$ | $D_{61}$ | $D_{75}$ | $D_{90}$ | |
| LPR7AB | EC267 | 80.5 | alive | alive | alive | alive | alive | 81 | |
| LPR7AB | EC268 | 79.5 | alive | alive | alive | alive | alive | 79.5 | |
| LPR7AB | EC269 | 87 | alive | alive | alive | alive | alive | 87 | |
| LPR7AB | EC270 | 80 | alive | alive | alive | alive | alive | dead | empty shell |
| LPR7AB | EC271 | 86 | alive | alive | alive | alive | alive | 86.5 | |
| LPR7AB | EC272 | 84 | alive | alive | alive | alive | alive | 83.5 | |
| LPR7AB | EC273 | 91.5 | alive | alive | alive | alive | alive | 91.5 | |
| LPR7AB | EC274 | 87 | alive | alive | alive | alive | alive | 86.5 | |
| LPR7AB | EC275 | 80.5 | alive | alive | alive | alive | alive | 83.5 | |
| LPR7AB | EC276 | 85 | alive | alive | alive | alive | alive | 85.5 | |
| LPR7AB | EC277 | 82 | alive | alive | alive | alive | alive | 83 | |
| LPR7AB | EC278 | 91 | alive | alive | alive | alive | alive | 91 | |
| LPR7AB | EC279 | 87.5 | alive | alive | alive | alive | alive | 90 | |
| LPR7AB | EC280 | 86 | alive | alive | alive | alive | alive | 85 | |
| LPR8AC | EC281 | 92 | 92 | 89.5 | 90.5 | alive | dead | | |
| LPR8AC | EC282 | 82 | 82.5 | 83 | 82 | alive | 83 | dead | empty shell |
| LPR8AC | EC283 | 90 | 89.5 | 88 | 90 | alive | 88 | dead | empty shell |
| LPR8AC | EC284 | 93 | 92 | 92 | dead | | | | |
| LPR8AC | EC285 | 91 | 91.5 | 91 | 92 | alive | 91 | 92.5 | |
| LPR8AC | EC286 | 87 | 86 | 87 | 87 | alive | 86 | 86.5 | |
| LPR8AC | EC287 | 83 | alive | 82 | dead | | | | sacrificed for health assessment on $D_{35}$ |
| LPR8AC | EC288 | 99 | alive | 98 | dead | | | | sacrificed for health assessment on $D_{35}$ |

## Table E-1. Summary of survival results for the 2011 LPRSA caged bivalve study

| Location ID | Specimen ID & number | Status/Shell Length (mm) | | | | | | | Comments |
|---|---|---|---|---|---|---|---|---|---|
| | | $D_0$ | $D_{14}$ | $D_{35}$ | $D_{56}$ | $D_{61}$ | $D_{75}$ | $D_{90}$ | |
| LPR8AC | EC289 | 71.5 | 71 | dead | | | | | sacrificed for health assessment on $D_{14}$ |
| LPR8AC | EC290 | 80 | 78 | dead | | | | | sacrificed for health assessment on $D_{14}$ |
| LPR8AC | EC291 | 97 | alive | alive | alive | alive | alive | dead | empty shell |
| LPR8AC | EC292 | 82 | alive | alive | alive | alive | alive | dead | empty shell |
| LPR8AC | EC293 | 83 | alive | alive | alive | alive | alive | dead | empty shell |
| LPR8AC | EC294 | 84 | alive | alive | alive | alive | alive | dead | empty shell |
| LPR8AC | EC295 | 83 | alive | alive | alive | alive | alive | dead | empty shell |
| LPR8AC | EC296 | 82 | alive | alive | dead | | | | |
| LPR8AC | EC297 | 83 | alive | alive | dead | | | | |
| LPR8AC | EC298 | 73 | alive | alive | dead | | | | |
| LPR8AC | EC299 | 82 | alive | alive | dead | | | | |
| LPR8AC | EC300 | 94 | alive | alive | dead | | | | |
| LPR8AC | EC301 | 103 | alive | alive | dead | | | | |
| LPR8AC | EC302 | 89 | alive | alive | dead | | | | |
| LPR8AC | EC303 | 118 | alive | alive | dead | | | | |
| LPR8AC | EC304 | 85 | alive | alive | alive | alive | alive | dead | empty shell |
| LPR8AC | EC305 | 91 | alive | alive | alive | alive | alive | 91.5 | |
| LPR8AC | EC306 | 90 | alive | alive | alive | alive | alive | dead | |
| LPR8AC | EC307 | 92 | alive | alive | alive | alive | alive | 92.5 | |
| LPR8AC | EC308 | 96 | alive | alive | dead | | | | |
| LPR8AC | EC309 | 85 | alive | alive | dead | | | | |
| LPR8AC | EC310 | 81 | alive | alive | dead | | | | |

## Table E-1. Summary of survival results for the 2011 LPRSA caged bivalve study

| Location ID | Specimen ID & number | Status/Shell Length (mm) | | | | | | | Comments |
|---|---|---|---|---|---|---|---|---|---|
| | | $D_0$ | $D_{14}$ | $D_{35}$ | $D_{56}$ | $D_{61}$ | $D_{75}$ | $D_{90}$ | |
| LPR8AC | EC311 | 94 | alive | alive | dead | | | | |
| LPR8AC | EC312 | 83 | alive | alive | dead | | | | |
| LPR8AC | EC313 | 80.5 | alive | dead | | | | | |
| LPR8AC | EC314 | 85 | alive | alive | alive | alive | alive | dead | empty shell |
| LPR8AC | EC315 | 79 | alive | dead | | | | | |
| LPR8AC | EC316 | 83 | alive | dead | | | | | |
| LPR8AC | EC317 | 80 | alive | dead | | | | | |
| LPR8AC | EC318 | 85 | alive | dead | | | | | |
| LPR8AC | EC319 | 83 | alive | alive | dead | | | | |
| LPR8AC | EC320 | 104 | alive | alive | dead | | | | |
| LPR8AC | EC321 | 89 | alive | alive | dead | | | | |
| LPR8AC | EC322 | 83 | alive | alive | dead | | | | |
| LPR8AC | EC323 | 79 | alive | alive | dead | | | | |
| LPR8AC | EC324 | 84 | alive | alive | | | | | |
| LPR8AC | EC325 | 90.5 | alive | alive | alive | alive | alive | dead | empty shell |
| LPR8AC | EC326 | 87 | alive | alive | dead | | | | |
| LPR8AC | EC327 | 91.5 | alive | dead | | | | | |
| LPR8AC | EC328 | 80 | alive | dead | | | | | |
| LPR8AC | EC329 | 76.5 | alive | alive | alive | alive | dead | | |
| LPR8AC | EC330 | 84 | alive | alive | dead | | | | |
| LPR8AC | EC331 | 95 | alive | alive | alive | alive | alive | dead | empty shell |
| LPR8AC | EC332 | 84 | alive | alive | dead | | | | |

## Table E-1. Summary of survival results for the 2011 LPRSA caged bivalve study

| Location ID | Specimen ID & number | Status/Shell Length (mm) | | | | | | | Comments |
|---|---|---|---|---|---|---|---|---|---|
| | | $D_0$ | $D_{14}$ | $D_{35}$ | $D_{56}$ | $D_{61}$ | $D_{75}$ | $D_{90}$ | |
| LPR8AC | EC333 | 78 | alive | alive | dead | | | | |
| LPR8AC | EC334 | 80 | alive | alive | dead | | | | |
| LPR8AC | EC335 | 89 | alive | alive | dead | | | | |
| LPR8AC | EC336 | 82.5 | alive | dead | | | | | |
| LPR8AC | EC337 | 80 | alive | alive | dead | | | | |
| LPR8AC | EC338 | 77 | alive | alive | dead | | | | |
| LPR8AC | EC339 | 93 | alive | dead | | | | | |
| LPR8AC | EC340 | 83 | alive | alive | dead | | | | |
| LPR6VV | EC341 | 84 | 83 | 83 | 84 | alive | 84 | 83 | |
| LPR6VV | EC342 | 89 | 89 | 89 | 87 | alive | 89 | 89 | |
| LPR6VV | EC343 | 84.5 | 84 | 85 | 84 | alive | 85 | 84.5 | |
| LPR6VV | EC344 | 87.5 | 87 | 87 | 87.5 | alive | 86.5 | 88 | |
| LPR6VV | EC345 | 91 | 95 | 91 | 93 | alive | 92 | 92.5 | |
| LPR6VV | EC346 | 84 | 81 | 83 | 82.5 | alive | 83 | 83.5 | |
| LPR6VV | EC347 | 79 | alive | 79 | | | | | sacrificed for health assessment on $D_{35}$ |
| LPR6VV | EC348 | 81 | alive | 80 | | | | | sacrificed for health assessment on $D_{35}$ |
| LPR6VV | EC349 | 88 | 86 | | | | | | sacrificed for health assessment on $D_{14}$ |
| LPR6VV | EC350 | 81 | 81.5 | | | | | | sacrificed for health assessment on $D_{14}$ |
| LPR6VV | EC351 | 92 | alive | alive | alive | alive | alive | 91.5 | |
| LPR6VV | EC352 | 95 | alive | alive | alive | alive | alive | 95 | |
| LPR6VV | EC353 | 76 | alive | alive | alive | alive | alive | 76.5 | |

## Table E-1. Summary of survival results for the 2011 LPRSA caged bivalve study

| Location ID | Specimen ID & number | Status/Shell Length (mm) | | | | | | | Comments |
|---|---|---|---|---|---|---|---|---|---|
| | | $D_0$ | $D_{14}$ | $D_{35}$ | $D_{56}$ | $D_{61}$ | $D_{75}$ | $D_{90}$ | |
| LPR6VV | EC354 | 90 | alive | alive | alive | alive | alive | 92 | |
| LPR6VV | EC355 | 94 | alive | alive | alive | alive | alive | 95 | |
| LPR6VV | EC356 | 89 | alive | alive | alive | alive | alive | 88 | |
| LPR6VV | EC357 | 89 | alive | alive | alive | alive | 90 | | sacrificed for health assessment on $D_{75}$ |
| LPR6VV | EC358 | 82.5 | alive | alive | alive | alive | 83 | | sacrificed for health assessment on $D_{75}$ |
| LPR6VV | EC359 | 93 | alive | alive | 94 | | | | sacrificed for health assessment on $D_{56}$ |
| LPR6VV | EC360 | 80 | alive | alive | 81 | | | | sacrificed for health assessment on $D_{56}$ |
| LPR6VV | EC361 | 78.5 | alive | alive | alive | alive | alive | 80 | |
| LPR6VV | EC362 | 90 | alive | alive | alive | alive | alive | 90.5 | |
| LPR6VV | EC363 | 95.5 | alive | alive | alive | alive | alive | 95 | |
| LPR6VV | EC364 | 95.5 | alive | alive | alive | alive | alive | 96 | |
| LPR6VV | EC365 | 89 | alive | alive | alive | alive | alive | 89 | |
| LPR6VV | EC366 | 84 | alive | alive | alive | alive | alive | 84 | |
| LPR6VV | EC367 | 78 | alive | alive | alive | alive | alive | 79 | |
| LPR6VV | EC368 | 89 | alive | alive | alive | alive | alive | 90 | |
| LPR6VV | EC369 | 83 | alive | alive | alive | alive | alive | 83 | |
| LPR6VV | EC370 | 90 | alive | alive | alive | alive | alive | 89 | |
| LPR6VV | EC371 | 76 | alive | alive | alive | alive | alive | 76.5 | |
| LPR6VV | EC372 | 78.5 | alive | alive | alive | alive | alive | 79 | |
| LPR6VV | EC373 | 80 | alive | alive | alive | alive | alive | 80.5 | |
| LPR6VV | EC374 | 90 | alive | alive | alive | alive | alive | 90 | |

## Table E-1. Summary of survival results for the 2011 LPRSA caged bivalve study

| Location ID | Specimen ID & number | Status/Shell Length (mm) | | | | | | | Comments |
|---|---|---|---|---|---|---|---|---|---|
| | | $D_0$ | $D_{14}$ | $D_{35}$ | $D_{56}$ | $D_{61}$ | $D_{75}$ | $D_{90}$ | |
| LPR6VV | EC375 | 81 | alive | alive | alive | alive | alive | 82 | |
| LPR6VV | EC376 | 76 | alive | alive | alive | alive | alive | 77.5 | |
| LPR6VV | EC377 | 81.5 | alive | alive | alive | alive | alive | 83 | |
| LPR6VV | EC378 | 82.5 | alive | alive | alive | alive | alive | 83 | |
| LPR6VV | EC379 | 81 | alive | alive | alive | alive | alive | 83 | |
| LPR6VV | EC380 | 81.5 | alive | alive | alive | alive | alive | 83 | |
| LPR6VV | EC381 | 81 | alive | alive | alive | alive | alive | 81 | |
| LPR6VV | EC382 | 84 | alive | alive | alive | alive | alive | 84 | |
| LPR6VV | EC383 | 81 | alive | alive | alive | alive | alive | 81.5 | |
| LPR6VV | EC384 | 82 | alive | alive | alive | alive | alive | 82 | |
| LPR6VV | EC385 | 77 | alive | alive | alive | alive | alive | 78 | |
| LPR6VV | EC386 | 79.5 | alive | alive | alive | alive | alive | 80 | |
| LPR6VV | EC387 | 79.5 | alive | alive | alive | alive | alive | 80 | |
| LPR6VV | EC388 | 86 | alive | alive | alive | alive | alive | 86 | |
| LPR6VV | EC389 | 81 | alive | alive | alive | alive | alive | 81 | |
| LPR6VV | EC390 | 81.5 | alive | alive | alive | alive | alive | dead | empty shell |
| LPR6VV | EC391 | 83.5 | alive | alive | alive | alive | alive | 84 | |
| LPR6VV | EC392 | 84 | alive | alive | alive | alive | alive | 84 | |
| LPR6VV | EC393 | 82 | alive | alive | alive | alive | alive | 82 | |
| LPR6VV | EC394 | 81 | alive | alive | alive | alive | alive | 81 | |
| LPR6VV | EC395 | 79.5 | alive | alive | alive | alive | alive | 80 | |
| LPR6VV | EC396 | 77.5 | alive | alive | alive | alive | alive | 79 | |

## Table E-1. Summary of survival results for the 2011 LPRSA caged bivalve study

| Location ID | Specimen ID & number | Status/Shell Length (mm) | | | | | | | Comments |
|---|---|---|---|---|---|---|---|---|---|
| | | $D_0$ | $D_{14}$ | $D_{35}$ | $D_{56}$ | $D_{61}$ | $D_{75}$ | $D_{90}$ | |
| LPR6VV | EC397 | 78 | alive | alive | alive | alive | alive | 78 | |
| LPR6VV | EC398 | 78.5 | alive | alive | alive | alive | alive | 78.5 | |
| LPR6VV | EC399 | 79 | alive | alive | alive | alive | alive | 79 | |
| LPR6VV | EC400 | 88.5 | alive | alive | alive | alive | alive | 90 | |

D – day
ID –identification
LPRSA – Lower Passaic River Study Area

# APPENDIX F. CAGED BIVALVE HEALTH ASSESSMENT SUMMARY TABLE

## Table F-1. Health assessment data for the 2011 LPRSA cage bivalve study

| Exam Date & Time | Location ID | Bivalve Species | Specimen ID | Length (mm) | Gape | Mantle condition | Color | Tone | Odor | Parasites |
|---|---|---|---|---|---|---|---|---|---|---|
| **Day 0[a]** | | | | | | | | | | |
| 03.08.11 12:10 | LPRBG | GD | none | 80 | closed tight | thick | yellow | firm | none | no |
| 03.08.11 12:10 | LPRBG | GD | none | 83 | closed tight | thick | yellow | firm | none | no |
| 03.08.11 12:10 | LPRBG | GD | none | 92 | closed tight | thick | yellow | firm | none | no |
| 03.08.11 12:10 | LPRBG | GD | none | 74 | closed tight | thick | yellow | firm | none | no |
| 03.08.11 12:10 | LPRBG | GD | none | 94 | closed tight | thick | yellow | firm | none | no |
| 03.08.11 12:30 | LPRBG | GD | none | 106 | closed tight | thick | yellow | firm | none | no |
| 03.08.11 12:30 | LPRBG | GD | none | 99 | closed tight | thick | yellow | firm | none | no |
| 03.08.11 12:30 | LPRBG | GD | none | 92 | closed tight | thick | yellow | firm | none | no |
| 03.08.11 12:30 | LPRBG | GD | none | 94 | closed tight | thick | yellow | firm | none | no |
| 03.08.11 12:30 | LPRBG | GD | none | 81 | closed tight | thick | yellow | firm | none | no |
| 03.09.11 15:00 | LPRBG | EC | none | 81 | closed tight | thick | tan | firm | none | no |
| 03.09.11 15:00 | LPRBG | EC | none | 88 | closed tight | thick | tan | firm | none | no |
| 03.09.11 15:00 | LPRBG | EC | none | 89 | closed tight | thick | tan | firm | none | no |
| 03.09.11 15:00 | LPRBG | EC | none | 90 | closed tight | thick | tan | firm | none | no |
| 03.09.11 15:00 | LPRBG | EC | none | 96 | closed tight | thick | tan | firm | none | no |
| **Day 14** | | | | | | | | | | |
| 03.23.11 08:16 | LPR1XX | GD | LPR1XX-GD009 | 76.5 | closed tight | thick | yellow | firm | none | no |
| 03.23.11 08:16 | LPR1XX | GD | LPR1XX-GD010 | 87 | closed tight | thick | yellow | firm | none | no |
| 03.23.11 09:32 | LPR2AD | GD | LPR2AD-GD089 | 89.5 | closed tight | thick | yellow | firm | none | no |
| 03.23.11 09:32 | LPR2AD | GD | LPR2AD-GD090 | 80 | closed tight | thick | yellow | firm | none | no |
| 03.23.11 10:23 | LPR3SS | GD | LPR3SS-GD169 | 81 | closed tight | thick | yellow | firm | none | no |

## Table F-1. Health assessment data for the 2011 LPRSA cage bivalve study

| Exam Date & Time | Location ID | Bivalve Species | Specimen ID | Length (mm) | Gape | Mantle condition | Color | Tone | Odor | Parasites |
|---|---|---|---|---|---|---|---|---|---|---|
| 03.23.11 10:23 | LPR3SS | GD | LPR3SS-GD170 | 88 | closed tight | thick | yellow | firm | none | no |
| 03.23.11 11:49 | LPR4ZZ | GD | LPR4ZZ-GD329 | 97 | closed tight | thick | yellow | firm | none | no |
| 03.23.11 11:49 | LPR4ZZ | GD | LPR4ZZ-GD330 | 104 | closed tight | thick | yellow | firm | none | no |
| 03.23.11 12:12 | LPR4AB | GD | LPR4AB-GD249 | 96.5 | closed tight | thick | yellow | firm | none | no |
| 03.23.11 12:12 | LPR4AB | GD | LPR4AB-GD250 | 95 | closed tight | thick | yellow | firm | none | no |
| 03.23.11 13:15 | LPR5XX | GD | LPR5XX-GD490 | 99 | closed tight | thick | yellow | firm | none | no |
| 03.23.11 13:34 | LPR5YY | GD | LPR5YY-GD569 | 76 | closed tight | thick | yellow | firm | none | no |
| 03.23.11 13:34 | LPR5YY | GD | LPR5YY-GD570 | 81 | closed tight | thick | yellow | firm | none | no |
| 03.24.11 08:45 | LPR6VV | EC | LPR6VV-EC349 | 86 | closed tight | thick | tan | firm | none | no |
| 03.24.11 08:45 | LPR6VV | EC | LPR6VV-EC350 | 81.5 | closed tight | thick | tan | firm | none | no |
| 03.24.11 09:08 | LPR6UU | EC | LPR6UU-EC049 | 78 | closed tight | thick | tan | firm | none | no |
| 03.24.11 09:08 | LPR6UU | EC | LPR6UU-EC050 | 90 | closed tight | thick | tan | firm | none | no |
| 03.24.11 10:20 | LPR7ZZ | EC | LPR7ZZ-EC140 | 77.5 | closed tight | thick | tan | firm | none | no |
| 03.24.11 11:06 | LPR7AB | EC | LPR7AB-EC229 | 79 | closed tight | thick | tan | firm | none | no |
| 03.24.11 11:06 | LPR7AB | EC | LPR7AB-EC230 | 89 | closed tight | thick | tan | firm | none | no |
| 03.24.11 11:44 | LPR8AC | EC | LPR8AC-EC289 | 71 | closed tight | thick | tan | firm | none | no |
| 03.24.11 11:44 | LPR8AC | EC | LPR8AC-EC290 | 78 | closed tight | thick | tan | firm | none | no |
| **Day 35** | | | | | | | | | | |
| 04.13.11 08:30 | LPR1XX | GD | LPR1XX-GD011 | 79 | closed tight | thick | yellow | firm | none | no |
| 04.13.11 08:30 | LPR1XX | GD | LPR1XX-GD012 | 78 | closed tight | thick | yellow | firm | none | no |
| 04.13.11 09:15 | LPR2AD | GD | LPR2AD-GD091 | 76.5 | closed tight | thick | yellow | firm | none | no |
| 04.13.11 09:15 | LPR2AD | GD | LPR2AD-GD093 | 76 | closed tight | thick | yellow | firm | none | no |

## Table F-1. Health assessment data for the 2011 LPRSA cage bivalve study

| Exam Date & Time | Location ID | Bivalve Species | Specimen ID | Length (mm) | Gape | Mantle condition | Color | Tone | Odor | Parasites |
|---|---|---|---|---|---|---|---|---|---|---|
| 04.13.11 10:30 | LPR3SS | GD | LPR3SS-GD171 | 105.5 | closed tight | thick | yellow | firm | none | no |
| 04.13.11 10:30 | LPR3SS | GD | LPR3SS-GD172 | 88.5 | closed tight | thick | yellow | firm | none | no |
| 04.13.11 11:00 | LPR4ZZ | GD | LPR4ZZ-GD339 | 102 | closed tight | thick | yellow | firm | none | no |
| 04.13.11 11:00 | LPR4ZZ | GD | LPR4ZZ-GD337 | 86 | slightly gaped open | thick | yellow | firm | none | no |
| 04.13.11 12:00 | LPR4AB | GD | LPR4AB-GD252 | 85.5 | closed tight | thick | yellow | firm | none | no |
| 04.13.11 12:00 | LPR4AB | GD | LPR4AB-GD253 | 79 | closed tight | thick | yellow | firm | none | no |
| 04.13.11 13:15 | LPR5YY | GD | LPR5YY-GD571 | 90 | closed tight | thick | yellow | firm | none | no |
| 04.13.11 13:15 | LPR5YY | GD | LPR5YY-GD572 | 91 | closed tight | thick | yellow | firm | none | no |
| 04.14.11 07:10 | LPR6VV | EC | LPR6VV-EC347 | 79 | closed tight | thick | tan | firm | none | no |
| 04.14.11 07:10 | LPR6VV | EC | LPR6VV-EC348 | 80 | closed tight | thick | tan | firm | none | no |
| 04.14.11 08:10 | LPR6UU | EC | LPR6UU-EC047 | 95.5 | closed tight | thick | tan | firm | none | no |
| 04.14.11 08:10 | LPR6UU | EC | LPR6UU-EC048 | 88.5 | closed tight | thick | tan | firm | none | no |
| 04.14.11 08:30 | LPR7ZZ | EC | LPR7ZZ-EC138 | 90.5 | closed tight | thick | tan | firm | none | no |
| 04.14.11 08:30 | LPR7ZZ | EC | LPR7ZZ-EC139 | 81 | closed tight | thick | tan | firm | none | no |
| 04.14.11 09:15 | LPR7AB | EC | LPR7AB-EC227 | 84.5 | closed tight | thick | tan | firm | none | no |
| 04.14.11 09:15 | LPR7AB | EC | LPR7AB-EC228 | 88 | closed tight | thick | tan | firm | none | no |
| 04.14.11 09:40 | LPR8AC | EC | LPR8AC-EC287 | 82 | closed tight | thick | tan | firm | none | no |
| 04.14.11 09:40 | LPR8AC | EC | LPR8AC-EC288 | 98 | closed tight | thick | tan | firm | none | no |
| **Day 56** | | | | | | | | | | |
| 05.04.11 08:25 | LPR1XX | GD | LPR1XX-GD013 | 96.5 | closed tight | thick | yellow | firm | none | no |
| 05.04.11 08:25 | LPR1XX | GD | LPR1XX-GD014 | 78 | closed tight | thick | yellow | firm | none | no |
| 05.04.11 09:19 | LPR2AD | GD | LPR2AD-GD094 | 77.5 | closed tight | thick | yellow | firm | none | no |

## Table F-1. Health assessment data for the 2011 LPRSA cage bivalve study

| Exam Date & Time | Location ID | Bivalve Species | Specimen ID | Length (mm) | Gape | Mantle condition | Color | Tone | Odor | Parasites |
|---|---|---|---|---|---|---|---|---|---|---|
| 05.04.11 09:19 | LPR2AD | GD | LPR2AD-GD096 | 75.5 | closed tight | thick | yellow | firm | none | no |
| 05.05.11 07:44 | LPR6VV | EC | LPR6VV-EC359 | 94 | closed tight | thick | tan | firm | none | no |
| 05.05.11 07:44 | LPR6VV | EC | LPR6VV-EC360 | 81 | closed tight | thick | tan | firm | none | no |
| 05.05.11 08:10 | LPR6UU | EC | LPR6UU-EC059 | 79.5 | closed tight | thick | tan | firm | none | no |
| 05.05.11 08:10 | LPR6UU | EC | LPR6UU-EC060 | 83.5 | closed tight | thick | tan | firm | none | no |
| 05.05.11 08:35 | LPR7ZZ | EC | LPR7ZZ-EC136 | 80 | closed tight | thick | tan | firm | none | no |
| 05.05.11 08:35 | LPR7ZZ | EC | LPR7ZZ-EC137 | 84.5 | closed tight | thick | tan | firm | none | no |
| 05.05.11 09:10 | LPR7AB | EC | LPR7AB-EC239 | 81 | closed tight | thick | tan | firm | none | no |
| 05.05.11 09:10 | LPR7AB | EC | LPR7AB-EC240 | 84.5 | closed tight | thick | tan | firm | none | no |
| **Day 75** | | | | | | | | | | |
| 05.24.11 08:00 | LPR7AB | EC | LPR7AB-EC237 | 96.5 | closed tight | thick | tan | firm | none | no |
| 05.24.11 08:00 | LPR7AB | EC | LPR7AB-EC238 | 84.5 | closed tight | thick | tan | firm | none | no |
| 05.24.11 08:30 | LPR7ZZ | EC | LPR7ZZ-EC134 | 101 | closed tight | thick | tan | firm | none | no |
| 05.24.11 08:30 | LPR7ZZ | EC | LPR7ZZ-EC135 | 79.5 | closed tight | thick | tan | firm | none | no |
| 05.24.11 09:07 | LPR6UU | EC | LPR6UU-EC057 | 88 | closed tight | thick | tan | firm | none | no |
| 05.24.11 09:07 | LPR6UU | EC | LPR6UU-EC058 | 80 | closed tight | thick | tan | firm | none | no |
| 05.24.11 09:28 | LPR6VV | EC | LPR6VV-EC357 | 90 | closed tight | thick | tan | firm | none | no |
| 05.24.11 09:28 | LPR6VV | EC | LPR6VV-EC358 | 83 | closed tight | thick | tan | firm | none | no |

EC – freshwater mussel (*Elliptio complanata*)
GD – ribbed mussel (*Geukensia demissa*)
ID – identification
LPRSA – Lower Passaic River Study Area

# APPENDIX G. PROTOCOL MODIFICATION FORMS

## Protocol Modification Form No. 1: Benthic QAPP Addendum No. 4

**Project Name and Number:** Passaic RI (Task 23.2)

**Material to be Sampled:** Caged bivalve tissue

**Measurement Parameter:** Target freshwater sampling locations LPR8AC (at River Mile 15.3) and LPR8AD (at River Mile 16.1).

---

**Standard Procedure for Field Collection & Laboratory Analysis (cite reference):**

Worksheet 18 in the Benthic QAPP Addendum 4, Proposed Sampling Locations/SOP Requirements Table

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**Reason for Change in Field Procedure or Analysis Variation:**

Due to the high water levels carrying large debris from recent spring storms, access above 8th Street Bridge (River Mile 14.9) by boat was not possible.

---

**Variation from Field or Analytical Procedure:**

Location LPR8AC was relocated downriver within Reach 8 to River Mile 14.3. As an alternate sampling location for LPR8AD, location LPR6VV at River Mile 11.7 was selected further downstream to maintain a relatively equal spatial distribution of freshwater locations in the LPRSA and not in the vicinity of combined sewer overflows, tributaries, docks, or other public-access areas, consistent with the rationale provided in Benthic QAPP Addendum 4. USEPA oversight personnel (George Molnar, CDM) was present and consulted with on the alternate location.

---

**Special Equipment, Materials or Personnel Required:**

None.

| | | | |
|---|---|---|---|
| Initiator's Name: | | Date: | 03.10.11 |
| Project Manager: | | Date: | 11.09.11 |
| QA Manager: | | Date: | 11.09.11 |
| USEPA Authority: | | Date: | |

## Protocol Modification Form No. 2: Benthic QAPP Addendum No. 4

**Project Name and Number:** Passaic RI (Task 23.2)

**Material to be Sampled:** Caged bivalve tissue

**Measurement Parameter:** During each monitoring event (e.g., Day 14, Day 35, Day 56, and Day 75), two bivalves from each location will be removed, opened, and inspected for general tissue health.

---

**Standard Procedure for Field Collection & Laboratory Analysis (cite reference):**

Attachment U: SOP—Deployment, Monitoring and Sample Field Processing for the Caged Bivalve Study of the Benthic QAPP Addendum 4.

---

**Reason for Change in Field Procedure or Analysis Variation:**

Higher than expected losses (i.e., lost cages and mortality) were observed at several locations throughout the study period. Cages were lost during monitoring at Day 14 (one cage at LPR5XX and one cage at LPR7ZZ [USEPA split sample location]); Day 56 (one cage at LPR1XX); and Day 91 (one cage at LPR2AD). Higher mortality occurred at LPR3SS, LPR4ZZ (USEPA split sample location), LPR4AB, LPR5XX, LPR5YY and LPR8AC.

---

**Variation from Field or Analytical Procedure:**

Sacrificing mussels for health assessments was either reduced in frequency or number, or discontinued in favor of obtaining enough tissue mass for chemical analysis. USEPA oversight personnel (George Molnar, CDM) was present and consulted on the change initiated during the Day 14 monitoring.

---

**Special Equipment, Materials or Personnel Required:**

None.

| | | | |
|---|---|---|---|
| Initiator's Name: | | Date: | 03.24.11 |
| Project Manager: | | Date: | 11.09.11 |
| QA Manager: | | Date: | 11.09.11 |
| USEPA Authority: | | Date: | |

## Protocol Modification Form No. 3: Benthic QAPP Addendum No.4

**Project Name and Number:** Passaic RI (Task 23.2)

**Material to be Sampled:** Caged bivalve tissue

**Measurement Parameter:**

The caged bivalve study will be performed for 90 days. The bivalves will be monitored two weeks after deployment (Day 14), and approximately every three weeks thereafter (e.g., Day 35, Day 56, Day 75), and at test termination (Day 90).

---

**Standard Procedure for Field Collection & Laboratory Analysis (cite reference):**

Attachment U: SOP—Deployment, Monitoring and Sample Field Processing for the Caged Bivalve Study of the Benthic QAPP Addendum 4.

---

**Reason for Change in Field Procedure or Analysis Variation:**

During the Day 56 check, one cage was lost at LPR1XX, leaving 33 survivors (estimate 149 g of tissue); at LPR2AD there were 65 survivors (estimate 293 g of tissue); at LPR3SS there were only 23 survivors (estimate 104 g of tissue); at USEPA split sample location LPR4ZZ, there were only 4 survivors. There were no surviving mussels in any of the cages at the remaining three estuarine locations in Reaches 4 (LPR4AB) and 5 (LPR5XX and LPR5YY).

---

**Variation from Field or Analytical Procedure:**

After discussions between the CPG and USEPA (Yeh 2011), cages from the estuarine zone of the LPRSA were retrieved on May 9, 2011 (Day 61). Mussels were assessed for survival, measured for length, and sent to the analytical laboratory to be frozen until processing. One cage in the estuarine zone at LPR2AD was left in place for the remainder of the study period (i.e., until Day 90) to provide information on tissue concentrations of ribbed mussels for comparison to tissue concentrations of freshwater mussels which were left for the duration of the 90-day study period.

---

**Special Equipment, Materials or Personnel Required:**

None.

| | | | |
|---|---|---|---|
| Initiator's Name: | | Date: | 05.09.11 |
| Project Manager: | | Date: | 11.09.11 |
| QA Manager: | | Date: | 11.09.11 |
| USEPA Authority: | | Date: | |

## References

Yeh A. 2011. Personal communication (e-mail message dated May 6, 2011 to Karen Tobiason, Windward: termination of estuarine mussel exposure in the caged bivalve study). US Environmental Protection Agency Region 2, New York, NY.

# APPENDIX H. CHAIN OF CUSTODY FORMS

# Field to Alpha Analyical

# CHAIN-OF-CUSTODY/TEST REQUEST FORM

L1103127

| | | | | | |
|---|---|---|---|---|---|
| Project/Client Name: | **Passaic RI/FS Caged Bivalve Study** | Ship to: | **Alpha Analytical** | | # LPR-AA030911-1 |
| Project Number: | Task 23.2 | Attn: | Peter Henriksen | Shipping Date: | 03.09.11 |
| Contact Name: | Jennifer Parker | Shipper: | Lab Pick-up | Airbill Number: | N/A |
| Sampled By: | Thai Do, Angelita Rodriquez | Form filled out by: | Thai Do | Turnaround requested: | Standard |

| | Sample Collection Date (m/d/y) | Time | Sample Identification | Volume of Sample / # of Containers | Matrix | Test(s) Requested (check test(s) required) Archive | | | | | Comments / Instructions [Jar tag number(s)] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 03.08.11 | 1830 | LPRBG-GD641 | 1 | Tissue | x | | | | | |
| 2 | 03.08.11 | 1830 | LPRBG-GD642 | 1 | Tissue | x | | | | | |
| 3 | 03.08.11 | 1830 | LPRBG-GD643 | 1 | Tissue | x | | | | | |
| 4 | 03.08.11 | 1830 | LPRBG-GD644 | 1 | Tissue | x | | | | | |
| 5 | 03.08.11 | 1830 | LPRBG-GD645 | 1 | Tissue | x | | | | | |
| 6 | 03.08.11 | 1830 | LPRBG-GD646 | 1 | Tissue | x | | | | | |
| 7 | 03.08.11 | 1830 | LPRBG-GD647 | 1 | Tissue | x | | | | | |
| 8 | 03.08.11 | 1830 | LPRBG-GD648 | 1 | Tissue | x | | | | | |
| 9 | 03.08.11 | 1830 | LPRBG-GD649 | 1 | Tissue | x | | | | | |
| 10 | 03.08.11 | 1830 | LPRBG-GD650 | 1 | Tissue | x | | | | | |
| 11 | 03.08.11 | 1830 | LPRBG-GD651 | 1 | Tissue | x | | | | | |
| | | | **Total Number of Containers** | 11 | Purchase Order / Statement of Work # | | | | | | |

| 1) Released by: | 2) Released by: | 3) Released by: | 4) Released by: | 5) Released by: |
|---|---|---|---|---|
| Company: **Windward Environmental** | Company: | Company: | Company: | Company: |
| Date/Time: 03.09.11/1650 | Date/Time: | Date/Time: 3/9/11 18:10 | Date/Time: | Date/Time: |
| Rec'd by: Lou Lugo 3/9/11 1650 | Rec'd by: | Rec'd by: | Rec'd by: | Rec'd by: |
| Company: **Alpha Analytical** | Company: | Company: | Company: | Company: |
| Date/Time: | Date/Time: | Date/Time: 3/9/11 22:50 | Date/Time: | Date/Time: |

Lou Lugo 3/9/11 1700

**To be completed by Laboratory upon sample receipt:**

| | |
|---|---|
| Date of receipt: 3-9-11 | Laboratory W.O. #: L1103127 |
| Condition upon receipt: satisfactory | Time of receipt: 22:50 |
| Cooler temperature: 4.2° | Received by: |

Wind Ward environmental LLC
200 West Mercer Street
Suite 401
Seattle, WA 98119
Tel: (206) 378-1364
Fax: (206) 217-9343

L1103127

# CHAIN-OF-CUSTODY/TEST REQUEST FORM

| | | | | | |
|---|---|---|---|---|---|
| Project/Client Name: | **Passaic RI/FS Caged Bivalve Study** | Ship to: | **Alpha Analytical** | | # LPR-AA030911-2 |
| Project Number: | Task 23.2 | Attn: | Peter Henriksen | Shipping Date: | 03.09.11 |
| Contact Name: | Jennifer Parker | Shipper: | Lab Pick-up | Airbill Number: | N/A |
| Sampled By: | Thai Do, Angelita Rodriquez | Form filled out by: | Thai Do | Turnaround requested: | Standard |

| | Sample Collection Date (m/d/y) | Time | Sample Identification | Volume of Sample / # of Containers | Matrix | Test(s) Requested (check test(s) required) Archive | | | | | Comments / Instructions [Jar tag number(s)] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 12 | 03.08.11 | 1830 | LPRBG-GD652 | 1 | Tissue | x | | | | | |
| 13 | 03.08.11 | 1830 | LPRBG-GD653 | 1 | Tissue | x | | | | | |
| 14 | 03.08.11 | 1830 | LPRBG-GD654 | 1 | Tissue | x | | | | | |
| 15 | 03.08.11 | 1830 | LPRBG-GD655 | 1 | Tissue | x | | | | | |
| 16 | 03.08.11 | 1830 | LPRBG-GD656 | 1 | Tissue | x | | | | | |
| 17 | 03.08.11 | 1830 | LPRBG-GD657 | 1 | Tissue | x | | | | | |
| 18 | 03.08.11 | 1830 | LPRBG-GD658 | 1 | Tissue | x | | | | | |
| 19 | 03.08.11 | 1830 | LPRBG-GD659 | 1 | Tissue | x | | | | | |
| 20 | 03.08.11 | 1830 | LPRBG-GD660 | 1 | Tissue | x | | | | | |
| 21 | 03.08.11 | 1830 | LPRBG-GD661 | 1 | Tissue | x | | | | | |
| 22 | 03.08.11 | 1830 | LPRBG-GD662 | 1 | Tissue | x | | | | | |
| | | | **Total Number of Containers** | 11 | Purchase Order / Statement of Work # | | | | | | |

| 1) Released by: | 2) Released by: Lou Lugo 3/9/11 1700 | 3) Released by: | 4) Released by: | 5) Released by: |
|---|---|---|---|---|
| Company: **Windward Environmental** | Company: | Company: | Company: | Company: |
| Date/Time: 03.09.11/ 1650 | Date/Time: | Date/Time: 3/9/11 18:10 | Date/Time: | Date/Time: |
| **Rec'd by:** Lou Lugo 3/9/11 1658 | **Rec'd by:** | **Rec'd by:** | **Rec'd by:** | **Rec'd by:** |
| Company: **Alpha Analytical** | Company: | Company: | Company: | Company: |
| Date/Time: | Date/Time: | Date/Time: 3/9/11 22:50 | Date/Time: | Date/Time: |

Windward environmental LLC
200 West Mercer Street
Suite 401
Seattle, WA 98119
Tel: (206) 378-1364
Fax: (206) 217-9343

**To be completed by Laboratory upon sample receipt:**

| | |
|---|---|
| Date of receipt: 3-9-11 | Laboratory W.O. #: L1103127 |
| Condition upon receipt: satisfactory | Time of receipt: 22:50 |
| Cooler temperature: 4.2° | Received by: |

# CHAIN-OF-CUSTODY/TEST REQUEST FORM

L1103127

| | | | | | |
|---|---|---|---|---|---|
| Project/Client Name: | Passaic RI/FS Caged Bivalve Study | Ship to: | Alpha Analytical | | # LPR-AA030911-3 |
| Project Number: | Task 23.2 | Attn: | Peter Henriksen | Shipping Date: | 03.09.11 |
| Contact Name: | Jennifer Parker | Shipper: | Lab Pick-up | Airbill Number: | N/A |
| Sampled By: | Thai Do, Angelita Rodriquez | Form filled out by: | Thai Do | Turnaround requested: | Standard |

| | Sample Collection Date (m/d/y) | Time | Sample Identification | Volume of Sample / # of Containers | Matrix | Test(s) Requested (check test(s) required) Archive | | | | | Comments / Instructions [Jar tag number(s)] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 23 | 03.08.11 | 1830 | LPRBG-GD663 | 1 | Tissue | x | | | | | |
| 24 | 03.08.11 | 1830 | LPRBG-GD664 | 1 | Tissue | x | | | | | |
| 25 | 03.08.11 | 1830 | LPRBG-GD665 | 1 | Tissue | x | | | | | |
| 26 | 03.08.11 | 1830 | LPRBG-GD666 | 1 | Tissue | x | | | | | |
| 27 | 03.08.11 | 1830 | LPRBG-GD667 | 1 | Tissue | x | | | | | |
| 28 | 03.08.11 | 1830 | LPRBG-GD668 | 1 | Tissue | x | | | | | |
| 29 | 03.08.11 | 1830 | LPRBG-GD669 | 1 | Tissue | x | | | | | |
| 30 | 03.08.11 | 1830 | LPRBG-GD670 | 1 | Tissue | x | | | | | |
| 31 | 03.08.11 | 1830 | LPRBG-GD671 | 1 | Tissue | x | | | | | |
| 32 | 03.08.11 | 1830 | LPRBG-GD672 | 1 | Tissue | x | | | | | |
| 33 | 03.08.11 | 1830 | LPRBG-GD673 | 1 | Tissue | x | | | | | |
| | | | **Total Number of Containers** | 11 | Purchase Order / Statement of Work # | | | | | | |

| 200 Released by: | 2) Released by: Lou Lugo 3/9/11 1700 | 3) Released by: | 4) Released by: | 5) Released by: |
|---|---|---|---|---|
| Company: **Windward Environmental** | Company: | Company: | Company: | Company: |
| Date/Time: 03.09.11/1650 | Date/Time: | Date/Time: 3/9/11 18:20 | Date/Time: | Date/Time: |
| Rec'd by: Lou Lugo 3/9/11 1650 | Rec'd by: | Rec'd by: | Rec'd by: | Rec'd by: |
| Company: **Alpha Analytical** | Company: | Company: | Company: | Company: |
| Date/Time: | Date/Time: | Date/Time: 3/9/11 22:50 | Date/Time: | Date/Time: |

Wind Ward environmental LLC
200 West Mercer Street
Suite 401
Seattle, WA 98119
Tel: (206) 378-1364
Fax: (206) 217-9343

**To be completed by Laboratory upon sample receipt:**

| | |
|---|---|
| Date of receipt: 3-9-11 | Laboratory W.O. #: L1103127 |
| Condition upon receipt: satisfactory | Time of receipt: 2250 |
| Cooler temperature: 4.2° | Received by: |

# CHAIN-OF-CUSTODY/TEST REQUEST FORM

L1103127

| | | | |
|---|---|---|---|
| Project/Client Name: | Passaic RI/FS Caged Bivalve Study | Ship to: | Alpha Analytical # LPR-AA030911-4 |
| Project Number: | Task 23.2 | Attn: | Peter Henriksen |
| Contact Name: | Jennifer Parker | Shipper: | Lab Pick-up |
| Sampled By: | Thai Do, Angelita Rodriquez | Form filled out by: | Thai Do |
| Shipping Date: | 03.09.11 | Airbill Number: | N/A |
| Turnaround requested: | Standard | | |

| | Sample Collection Date (m/d/y) | Time | Sample Identification | Volume of Sample / # of Containers | Matrix | Test(s) Requested (check test(s) required) Archive | | | | | Comments / Instructions [Jar tag number(s)] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 34 | 03.08.11 | 1830 | LPRBG-GD674 | 1 | Tissue | x | | | | | |
| 35 | 03.08.11 | 1830 | LPRBG-GD675 | 1 | Tissue | x | | | | | |
| 36 | 03.08.11 | 1830 | LPRBG-GD676 | 1 | Tissue | x | | | | | |
| 37 | 03.08.11 | 1830 | LPRBG-GD677 | 1 | Tissue | x | | | | | |
| 38 | 03.08.11 | 1830 | LPRBG-GD678 | 1 | Tissue | x | | | | | |
| 39 | 03.08.11 | 1830 | LPRBG-GD679 | 1 | Tissue | x | | | | | |
| 40 | 03.08.11 | 1830 | LPRBG-GD680 | 1 | Tissue | x | | | | | |
| 41 | 03.09.11 | 1500 | LPRBG-EC001 | 1 | Tissue | x | | | | | |
| 42 | 03.09.11 | 1500 | LPRBG-EC002 | 1 | Tissue | x | | | | | |
| 43 | 03.09.11 | 1500 | LPRBG-EC003 | 1 | Tissue | x | | | | | |
| 44 | 03.09.11 | 1500 | LPRBG-EC004 | 1 | Tissue | x | | | | | |
| | **Total Number of Containers** | | | 11 | Purchase Order / Statement of Work # | | | | | | |

| 200 Released by: | 2) Released by: Lou Lugo 3/9/11 1700 | 3) Released by: | 4) Released by: | 5) Released by: |
|---|---|---|---|---|
| Company: Windward Environmental | Company: | Company: | Company: | Company: |
| Date/Time: 03.09.11/ 1650 | Date/Time: | Date/Time: 3/9/11 18:10 | Date/Time: | Date/Time: |
| Rec'd by: Lou Lugo 3/9/11 1658 | Rec'd by: | Rec'd by: | Rec'd by: | Rec'd by: |
| Company: Alpha Analytical | Company: | Company: | Company: | Company: |
| Date/Time: | Date/Time: | Date/Time: 3/9/11 22:50 | Date/Time: | Date/Time: |

Wind Ward environmental LLC
200 West Mercer Street
Suite 401
Seattle, WA 98119
Tel: (206) 378-1364
Fax: (206) 217-9343

**To be completed by Laboratory upon sample receipt:**

| | |
|---|---|
| Date of receipt: 3-9-11 | Laboratory W.O. #: L1103127 |
| Condition upon receipt: satisfactory | Time of receipt: 2250 |
| Cooler temperature: 4.2° / 2° | Received by: [illegible] |

# CHAIN-OF-CUSTODY/TEST REQUEST FORM

L1103127

| | | | |
|---|---|---|---|
| Project/Client Name: | Passaic RI/FS Caged Bivalve Study | Ship to: | Alpha Analytical # LPR-AA030911-5 |
| Project Number: | Task 23.2 | Attn: | Peter Henriksen |
| Contact Name: | Jennifer Parker | Shipper: | Lab Pick-up |
| Sampled By: | Thai Do, Angelita Rodriquez | Form filled out by: | Thai Do |
| Shipping Date: | 03.09.11 | Airbill Number: | N/A |
| Turnaround requested: | Standard | | |

| | Sample Collection Date (m/d/y) | Time | Sample Identification | Volume of Sample / # of Containers | Matrix | Test(s) Requested (check test(s) required) Archive | | | | | Comments / Instructions [Jar tag number(s)] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 45 | 03.09.11 | 1500 | LPRBG-EC005 | 1 | Tissue | x | | | | | |
| 46 | 03.09.11 | 1500 | LPRBG-EC006 | 1 | Tissue | x | | | | | |
| 47 | 03.09.11 | 1500 | LPRBG-EC007 | 1 | Tissue | x | | | | | |
| 48 | 03.09.11 | 1500 | LPRBG-EC008 | 1 | Tissue | x | | | | | |
| 49 | 03.09.11 | 1500 | LPRBG-EC009 | 1 | Tissue | x | | | | | |
| 50 | 03.09.11 | 1500 | LPRBG-EC010 | 1 | Tissue | x | | | | | |
| 51 | 03.09.11 | 1500 | LPRBG-EC011 | 1 | Tissue | x | | | | | |
| 52 | 03.09.11 | 1500 | LPRBG-EC012 | 1 | Tissue | x | | | | | |
| 53 | 03.09.11 | 1500 | LPRBG-EC013 | 1 | Tissue | x | | | | | |
| 54 | 03.09.11 | 1500 | LPRBG-EC014 | 1 | Tissue | x | | | | | |
| 55 | 03.09.11 | 1500 | LPRBG-EC015 | 1 | Tissue | x | | | | | |
| | | | **Total Number of Containers** | 11 | Purchase Order / Statement of Work # | | | | | | |

| 200 Released by: | 2) Released by: Lou Hugo 3/9/11 1700 | 3) Released by: | 4) Released by: | 5) Released by: |
|---|---|---|---|---|
| Company: **Windward Environmental** | Company: | Company: | Company: | Company: |
| Date/Time: 03.09.11/1650 | Date/Time: | Date/Time: 3/9/11 18:10 | Date/Time: | Date/Time: |
| **Rec'd by:** Lou Hugo 3/9/11 1650 | **Rec'd by:** | **Rec'd by:** | **Rec'd by:** | **Rec'd by:** |
| Company: **Alpha Analytical** | Company: | Company: | Company: | Company: |
| Date/Time: | Date/Time: | Date/Time: 3/9/11 22:50 | Date/Time: | Date/Time: |

Windward environmental LLC
200 West Mercer Street
Suite 401
Seattle, WA 98119
Tel: (206) 378-1364
Fax: (206) 217-9343

**To be completed by Laboratory upon sample receipt:**

| | |
|---|---|
| Date of receipt: 3-9-11 | Laboratory W.O. #: L1103127 |
| Condition upon receipt: satisfactory | Time of receipt: 2250 |
| Cooler temperature: 2° | Received by: ZB |

# CHAIN-OF-CUSTODY/TEST REQUEST FORM

L1103127

| | | | | | |
|---|---|---|---|---|---|
| Project/Client Name: | **Passaic RI/FS Caged Bivalve Study** | Ship to: | **Alpha Analytical** | | # LPR-AA030911-6 |
| Project Number: | Task 23.2 | Attn: | Peter Henriksen | Shipping Date: | 03.09.11 |
| Contact Name: | Jennifer Parker | Shipper: | Lab Pick-up | Airbill Number: | N/A |
| Sampled By: | Thai Do, Angelita Rodriquez | Form filled out by: | Thai Do | Turnaround requested: | Standard |

| | Sample Collection Date (m/d/y) | Time | Sample Identification | Volume of Sample / # of Containers | Matrix | Test(s) Requested (check test(s) required) Archive | | | | | Comments / Instructions [Jar tag number(s)] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 56 | 03.09.11 | 1500 | LPRBG-EC016 | 1 | Tissue | x | | | | | |
| 57 | 03.09.11 | 1500 | LPRBG-EC017 | 1 | Tissue | x | | | | | |
| 58 | 03.09.11 | 1500 | LPRBG-EC018 | 1 | Tissue | x | | | | | |
| 59 | 03.09.11 | 1500 | LPRBG-EC019 | 1 | Tissue | x | | | | | |
| 60 | 03.09.11 | 1500 | LPRBG-EC020 | 1 | Tissue | x | | | | | |
| 61 | 03.09.11 | 1500 | LPRBG-EC021 | 1 | Tissue | x | | | | | |
| 62 | 03.09.11 | 1500 | LPRBG-EC022 | 1 | Tissue | x | | | | | |
| 63 | 03.09.11 | 1500 | LPRBG-EC023 | 1 | Tissue | x | | | | | |
| 64 | 03.09.11 | 1500 | LPRBG-EC024 | 1 | Tissue | x | | | | | |
| 65 | 03.09.11 | 1500 | LPRBG-EC025 | 1 | Tissue | x | | | | | |
| 66 | 03.09.11 | 1500 | LPRBG-EC026 | 1 | Tissue | x | | | | | |
| | | | **Total Number of Containers** | 11 | Purchase Order / Statement of Work # | | | | | | |

| 200 Released by: | 2) Released by: Lou Lugo 3/9/11 1700 | 3) Released by: | 4) Released by: | 5) Released by: |
|---|---|---|---|---|
| Company: **Windward Environmental** | Company: | Company: | Company: | Company: |
| Date/Time: 03.09.11/1650 | Date/Time: | Date/Time: 3/9/11 18:10 | Date/Time: | Date/Time: |
| Rec'd by: Lou Lugo 3/9/11 1650 | Rec'd by: | Rec'd by: | Rec'd by: | Rec'd by: |
| Company: **Alpha Analytical** | Company: | Company: | Company: | Company: |
| Date/Time: | Date/Time: | Date/Time: 3/9/11 22:50 | Date/Time: | Date/Time: |

Wind Ward environmental LLC

200 West Mercer Street
Suite 401
Seattle, WA 98119
Tel: (206) 378-1364
Fax: (206) 217-9343

**To be completed by Laboratory upon sample receipt:**

| | |
|---|---|
| Date of receipt: 3-9-11 | Laboratory W.O. #: L1103127 |
| Condition upon receipt: satisfactory | Time of receipt: 22:50 |
| Cooler temperature: 2° | Received by: |

# CHAIN-OF-CUSTODY/TEST REQUEST FORM

L1103127

| | | | | | |
|---|---|---|---|---|---|
| Project/Client Name: | Passaic RI/FS Caged Bivalve Study | Ship to: | Alpha Analytical | | # LPR-AA030911-7 |
| Project Number: | Task 23.2 | Attn: | Peter Henriksen | Shipping Date: | 03.09.11 |
| Contact Name: | Jennifer Parker | Shipper: | Lab Pick-up | Airbill Number: | N/A |
| Sampled By: | Thai Do, Angelita Rodriquez | Form filled out by: | Thai Do | Turnaround requested: | Standard |

| | Sample Collection Date (m/d/y) | Time | Sample Identification | Volume of Sample / # of Containers | Matrix | Test(s) Requested (check test(s) required) Archive | | | | | Comments / Instructions [Jar tag number(s)] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 67 | 03.09.11 | 1500 | LPRBG-EC027 | 1 | Tissue | x | | | | | |
| 68 | 03.09.11 | 1500 | LPRBG-EC028 | 1 | Tissue | x | | | | | |
| 69 | 03.09.11 | 1500 | LPRBG-EC029 | 1 | Tissue | x | | | | | |
| 70 | 03.09.11 | 1500 | LPRBG-EC030 | 1 | Tissue | x | | | | | |
| 71 ~~70~~ | 03.09.11 | 1500 | LPRBG-EC031 | 1 | Tissue | x | | | | | |
| 72 | 03.09.11 | 1500 | LPRBG-EC032 | 1 | Tissue | x | | | | | |
| 73 | 03.09.11 | 1500 | LPRBG-EC033 | 1 | Tissue | x | | | | | |
| 74 | 03.09.11 | 1500 | LPRBG-EC034 | 1 | Tissue | x | | | | | |
| 75 | 03.09.11 | 1500 | LPRBG-EC035 | 1 | Tissue | x | | | | | |
| 76 | 03.09.11 | 1500 | LPRBG-EC036 | 1 | Tissue | x | | | | | |
| 77 | 03.09.11 | 1500 | LPRBG-EC037 | 1 | Tissue | x | | | | | |
| | | | **Total Number of Containers** | 11 | Purchase Order / Statement of Work # | | | | | | |

| 1) Released by: | 2) Released by: | 3) Released by: | 4) Released by: | 5) Released by: |
|---|---|---|---|---|
| Company: **Windward Environmental** | Company: | Company: | Company: | Company: |
| Date/Time: 03.09.11/1650 | Date/Time: | Date/Time: 3/9/11 | Date/Time: | Date/Time: |
| Rec'd by: Lou Lugo 3/9/11 1650 | Rec'd by: | Rec'd by: | Rec'd by: | Rec'd by: |
| Company: **Alpha Analytical** | Company: | Company: | Company: | Company: |
| Date/Time: | Date/Time: | Date/Time: 3/9/11 22:50 | Date/Time: | Date/Time: |

Lou Lugo 3/9/11 1700

Windward environmental LLC
200 West Mercer Street
Suite 401
Seattle, WA 98119
Tel: (206) 378-1364
Fax: (206) 217-9343

**To be completed by Laboratory upon sample receipt:**

| | |
|---|---|
| Date of receipt: 3-9-11 | Laboratory W.O. #: L1103127 |
| Condition upon receipt: satisfactory | Time of receipt: 22:50 |
| Cooler temperature: 2° | Received by: |

# CHAIN-OF-CUSTODY/TEST REQUEST FORM

L1103127

| | | | | | |
|---|---|---|---|---|---|
| Project/Client Name: | **Passaic RI/FS Caged Bivalve Study** | Ship to: | **Alpha Analytical** | | # LPR-AA030911-8 |
| Project Number: | Task 23.2 | Attn: | Peter Henriksen | Shipping Date: | 03.09.11 |
| Contact Name: | Jennifer Parker | Shipper: | Lab Pick-up | Airbill Number: | N/A |
| Sampled By: | Thai Do, Angelita Rodriquez | Form filled out by: | Thai Do | Turnaround requested: | Standard |

| | Sample Collection Date (m/d/y) | Time | Sample Identification | Volume of Sample / # of Containers | Matrix | Test(s) Requested (check test(s) required): Archive | | | | | Comments / Instructions [Jar tag number(s)] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 78 | 03.09.11 | 1500 | LPRBG-EC038 | 1 | Tissue | x | | | | | |
| 79 | 03.09.11 | 1500 | LPRBG-EC039 | 1 | Tissue | x | | | | | |
| 80 | 03.09.11 | 1500 | LPRBG-EC040 | 1 | Tissue | x | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
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| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | **Total Number of Containers** | 3 | Purchase Order / Statement of Work # | | | | | | |

| 1) **Released by:** | 2) **Released by:** Lou Lugo 3/9/11 1700 | 3) **Released by:** | 4) **Released by:** | 5) **Released by:** |
|---|---|---|---|---|
| Company: **Windward Environmental** | Company: | Company: | Company: | Company: |
| Date/Time: 03.09.11/ 1650 | Date/Time: | Date/Time: 3/9/11 18:10 | Date/Time: | Date/Time: |
| **Rec'd by:** Lou Lugo 3/9/11 1650 | **Rec'd by:** | **Rec'd by:** | **Rec'd by:** | **Rec'd by:** |
| Company: **Alpha Analytical** | Company: | Company: | Company: | Company: |
| Date/Time: | Date/Time: | Date/Time: 3/9/11 22:50 | Date/Time: | Date/Time: |

**To be completed by Laboratory upon sample receipt:**

| | |
|---|---|
| Date of receipt:: 3-9-11 | Laboratory W.O. #: L1103127 |
| Condition upon receipt: sealed/satisfactory | Time of receipt: 2250 |
| Cooler temperature: 2° | Received by: |

Wind Ward environmental LLC
200 West Mercer Street
Suite 401
Seattle, WA 98119
Tel: (206) 378-1364
Fax: (206) 217-9343

# CHAIN-OF-CUSTODY/TEST REQUEST FORM

L1106544

| | | | |
|---|---|---|---|
| Project/Client Name: | Passaic RI/FS Caged Bivalve Study | Ship to: | Alpha Analytical # LPR-AA050911-1 |
| Project Number: | Task 23.2 | Attn: | Peter Henriksen |
| Contact Name: | Jennifer Parker | Shipper: | Lab Pick-up |
| Sampled By: | Karen Tobiason, Thai Do | Form filled out by: | Thai Do |
| Shipping Date: | 05.09.11 | Airbill Number: | N/A |
| Turnaround requested: | Standard | | |

| | Sample Collection Date (m/d/y) | Time | Sample Identification | Volume of Sample / # of Containers | Matrix | Test(s) Requested (check test(s) required): Archive | | | | | Comments / Instructions [Jar tag number(s)] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 05.09.11 | 10:20 | LPR1XX-GD001 | 1 | Tissue | X | | | | | |
| 2 | 05.09.11 | 10:20 | LPR1XX-GD002 | 1 | Tissue | X | | | | | |
| 3 | 05.09.11 | 10:20 | LPR1XX-GD003 | 1 | Tissue | X | | | | | |
| 4 | 05.09.11 | 10:20 | LPR1XX-GD004 | 1 | Tissue | X | | | | | |
| 5 | 05.09.11 | 10:20 | LPR1XX-GD005 | 1 | Tissue | X | | | | | |
| 6 | 05.09.11 | 10:20 | LPR1XX-GD006 | 1 | Tissue | X | | | | | |
| 7 | 05.09.11 | 10:20 | LPR1XX-GD007 | 1 | Tissue | X | | | | | |
| 8 | 05.09.11 | 10:20 | LPR1XX-GD008 | 1 | Tissue | X | | | | | |
| 9 | 05.09.11 | 10:20 | LPR1XX-GD016 | 1 | Tissue | X | | | | | |
| 10 | 05.09.11 | 10:20 | LPR1XX-GD017 | 1 | Tissue | X | | | | | |
| 11 | 05.09.11 | 10:20 | LPR1XX-GD018 | 1 | Tissue | X | | | | | |
| | | | **Total Number of Containers** | 11 | Purchase Order / Statement of Work # | | | | | | |

| 1) Released by: | 2) Released by: | 3) Released by: | 4) Released by: | 5) Released by: |
|---|---|---|---|---|
| Company: Windward Environmental | Company: | Company: Alpha | Company: | Company: |
| Date/Time: 05.09.11/1445 | Date/Time: 5/9/11 1700 | Date/Time: 5/9/11 | Date/Time: | Date/Time: |
| Rec'd by: | Rec'd by: | Rec'd by: | Rec'd by: | Rec'd by: |
| Company: Alpha Analytical | Company: | Company: ALPHA | Company: | Company: |
| Date/Time: 5/9/11 1445 | Date/Time: 5/9/11 1700 | Date/Time: 5/9/11 2125 | Date/Time: | Date/Time: |

Wind Ward environmental LLC
200 West Mercer Street
Suite 401
Seattle, WA 98119
Tel: (206) 378-1364
Fax: (206) 217-9343

**To be completed by Laboratory upon sample receipt:**

| | | | |
|---|---|---|---|
| Date of receipt: | 5/9/11 | Laboratory W.O. #: | L1106544 |
| Condition upon receipt: | Satisfactory | Time of receipt: | 2125 |
| Cooler temperature: | 4.3°C | Received by: | |

# CHAIN-OF-CUSTODY/TEST REQUEST FORM

L1106544

| | | | | | |
|---|---|---|---|---|---|
| Project/Client Name: | **Passaic RI/FS Caged Bivalve Study** | Ship to: | **Alpha Analytical** | | # LPR-AA050911-2 |
| Project Number: | Task 23.2 | Attn: | Peter Henriksen | Shipping Date: | 05.09.11 |
| Contact Name: | Jennifer Parker | Shipper: | Lab Pick-up | Airbill Number: | N/A |
| Sampled By: | Thai Do, Angelita Rodriquez | Form filled out by: | Thai Do | Turnaround requested: | Standard |

| | Sample Collection Date (m/d/y) | Time | Sample Identification | Volume of Sample / # of Containers | Matrix | Test(s) Requested (check test(s) required): Archive | | | | | Comments / Instructions [Jar tag number(s)] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 12 | 05.09.11 | 10:20 | LPR1XX-GD019 | 1 | Tissue | X | | | | | |
| 13 | 05.09.11 | 10:20 | LPR1XX-GD020 | 1 | Tissue | X | | | | | |
| 14 | 05.09.11 | 10:20 | LPR1XX-GD031 | 1 | Tissue | X | | | | | |
| 15 | 05.09.11 | 10:20 | LPR1XX-GD032 | 1 | Tissue | X | | | | | |
| 16 | 05.09.11 | 10:20 | LPR1XX-GD033 | 1 | Tissue | X | | | | | |
| 17 | 05.09.11 | 10:20 | LPR1XX-GD034 | 1 | Tissue | X | | | | | |
| 18 | 05.09.11 | 10:20 | LPR1XX-GD035 | 1 | Tissue | X | | | | | |
| 19 | 05.09.11 | 10:20 | LPR1XX-GD036 | 1 | Tissue | X | | | | | |
| 20 | 05.09.11 | 10:20 | LPR1XX-GD037 | 1 | Tissue | X | | | | | |
| 21 | 05.09.11 | 10:20 | LPR1XX-GD038 | 1 | Tissue | X | | | | | |
| 22 | 05.09.11 | 10:20 | LPR1XX-GD039 | 1 | Tissue | X | | | | | |
| | | | **Total Number of Containers** | 11 | Purchase Order / Statement of Work # | | | | | | |

| 1) Released by: | 2) Released by: | 3) Released by: | 4) Released by: | 5) Released by: |
|---|---|---|---|---|
| Company: **Windward Environmental** | Company: | Company: | Company: | Company: |
| Date/Time: 05.09.11/1445 | Date/Time: 5/9/11 1200 | Date/Time: 5/9/11 | Date/Time: | Date/Time: |
| **Rec'd by:** | **Rec'd by:** | **Rec'd by:** | **Rec'd by:** | **Rec'd by:** |
| Company: **Alpha Analytical** | Company: | Company: ALOHA | Company: | Company: |
| Date/Time: 5/9/11 1445 | Date/Time: 5/9/11 1200 | Date/Time: 5/9/11 2125 | Date/Time: | Date/Time: |

Windward environmental LLC
200 West Mercer Street
Suite 401
Seattle, WA 98119
Tel: (206) 378-1364
Fax: (206) 217-9343

**To be completed by Laboratory upon sample receipt:**

| | | | |
|---|---|---|---|
| Date of receipt: | 5/9/11 | Laboratory W.O. #: | L1106544 |
| Condition upon receipt: | Satisfactory | Time of receipt: | 2125 |
| Cooler temperature: | 4.3°C | Received by: | |

# CHAIN-OF-CUSTODY/TEST REQUEST FORM

L1106544

| | | | | | |
|---|---|---|---|---|---|
| Project/Client Name: | **Passaic RI/FS Caged Bivalve Study** | Ship to: | **Alpha Analytical** | | # LPR-AA050911-3 |
| Project Number: | Task 23.2 | Attn: | Peter Henriksen | Shipping Date: | 05.09.11 |
| Contact Name: | Jennifer Parker | Shipper: | Lab Pick-up | Airbill Number: | N/A |
| Sampled By: | Thai Do, Angelita Rodriquez | Form filled out by: | Thai Do | Turnaround requested: | Standard |

| | Sample Collection Date (m/d/y) | Time | Sample Identification | Volume of Sample / # of Containers | Matrix | Test(s) Requested (check test(s) required) Archive | | | | | Comments / Instructions [Jar tag number(s)] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 23 | 05.09.11 | 10:20 | LPR1XX-GD040 | 1 | Tissue | X | | | | | |
| 24 | 05.09.11 | 10:20 | LPR1XX-GD041 | 1 | Tissue | X | | | | | |
| 25 | 05.09.11 | 10:20 | LPR1XX-GD042 | 1 | Tissue | X | | | | | |
| 26 | 05.09.11 | 10:20 | LPR1XX-GD043 | 1 | Tissue | X | | | | | |
| 27 | 05.09.11 | 10:20 | LPR1XX-GD044 | 1 | Tissue | X | | | | | |
| 28 | 05.09.11 | 10:20 | LPR1XX-GD045 | 1 | Tissue | X | | | | | |
| 29 | 05.09.11 | 10:20 | LPR1XX-GD046 | 1 | Tissue | X | | | | | |
| 30 | 05.09.11 | 10:20 | LPR1XX-GD047 | 1 | Tissue | X | | | | | |
| 31 | 05.09.11 | 10:20 | LPR1XX-GD048 | 1 | Tissue | X | | | | | |
| 32 | 05.09.11 | 10:20 | LPR1XX-GD049 | 1 | Tissue | X | | | | | |
| 33 | 05.09.11 | 10:20 | LPR1XX-GD050 | 1 | Tissue | X | | | | | |
| | | | **Total Number of Containers** | 11 | Purchase Order / Statement of Work # | | | | | | |

| 1) Released by: | 2) Released by: | 3) Released by: | 4) Released by: | 5) Released by: |
|---|---|---|---|---|
| Company: **Windward Environmental** | Company: | Company: 5/9/11 | Company: | Company: |
| Date/Time: 05.09.11/1445 | Date/Time: 5/9/11 1700 | Date/Time: | Date/Time: | Date/Time: |
| **Rec'd by:** | **Rec'd by:** | **Rec'd by:** | **Rec'd by:** | **Rec'd by:** |
| Company: **Alpha Analytical** | Company: | Company: ALPHA | Company: | Company: |
| Date/Time: 5/9/11 1445 | Date/Time: 5/9/11 1700 | Date/Time: 5/9/11 2125 | Date/Time: | Date/Time: |

Wind Ward environmental LLC
200 West Mercer Street
Suite 401
Seattle, WA 98119
Tel: (206) 378-1364
Fax: (206) 217-9343

**To be completed by Laboratory upon sample receipt:**

| | | | |
|---|---|---|---|
| Date of receipt: | 5/9/11 | Laboratory W.O. #: | L1106544 |
| Condition upon receipt: | Satisfactory | Time of receipt: | 2125 |
| Cooler temperature: | 4.3 °C | Received by: | |

# CHAIN-OF-CUSTODY/TEST REQUEST FORM

L1106544

| | | | | | |
|---|---|---|---|---|---|
| Project/Client Name: | Passaic RI/FS Caged Bivalve Study | Ship to: | Alpha Analytical | | # LPR-AA050911-4 |
| Project Number: | Task 23.2 | Attn: | Peter Henriksen | Shipping Date: | 05.09.11 |
| Contact Name: | Jennifer Parker | Shipper: | Lab Pick-up | Airbill Number: | N/A |
| Sampled By: | Thai Do, Angelita Rodriquez | Form filled out by: | Thai Do | Turnaround requested: | Standard |

| | Sample Collection Date (m/d/y) | Time | Sample Identification | Volume of Sample / # of Containers | Matrix | Test(s) Requested (check test(s) required) Archive | | | | | Comments / Instructions [Jar tag number(s)] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 34 | 05.09.11 | 10:45 | LPR2AD-GD103 | 1 | Tissue | X | | | | | |
| 35 | 05.09.11 | 10:45 | LPR2AD-GD105 | 1 | Tissue | X | | | | | |
| 36 | 05.09.11 | 10:45 | LPR2AD-GD106 | 1 | Tissue | X | | | | | |
| 37 | 05.09.11 | 10:45 | LPR2AD-GD107 | 1 | Tissue | X | | | | | |
| 38 | 05.09.11 | 10:45 | LPR2AD-GD108 | 1 | Tissue | X | | | | | |
| 39 | 05.09.11 | 10:45 | LPR2AD-GD110 | 1 | Tissue | X | | | | | |
| 40 | 05.09.11 | 10:45 | LPR2AD-GD111 | 1 | Tissue | X | | | | | |
| 41 | 05.09.11 | 10:45 | LPR2AD-GD112 | 1 | Tissue | X | | | | | |
| 42 | 05.09.11 | 10:45 | LPR2AD-GD113 | 1 | Tissue | X | | | | | |
| 43 | 05.09.11 | 10:45 | LPR2AD-GD115 | 1 | Tissue | X | | | | | |
| 44 | 05.09.11 | 10:45 | LPR2AD-GD117 | 1 | Tissue | X | | | | | |
| | | | **Total Number of Containers** | 11 | Purchase Order / Statement of Work # | | | | | | |

| 1) Released by: | 2) Released by: | 3) Released by: | 4) Released by: | 5) Released by: |
|---|---|---|---|---|
| Company: **Windward Environmental** | Company: | Company: | Company: | Company: |
| Date/Time: 05.09.11/1445 | Date/Time: 5/9/11 1700 | Date/Time: 5/9/11 | Date/Time: | Date/Time: |
| Rec'd by: | Rec'd by: | Rec'd by: | Rec'd by: | Rec'd by: |
| Company: **Alpha Analytical** | Company: | Company: ALPHA | Company: | Company: |
| Date/Time: 5/9/11 1445 | Date/Time: 5/9/11 17:00 | Date/Time: 5/9/11 2125 | Date/Time: | Date/Time: |

Windward environmental LLC
200 West Mercer Street
Suite 401
Seattle, WA 98119
Tel: (206) 378-1364
Fax: (206) 217-9343

**To be completed by Laboratory upon sample receipt:**

| | | | |
|---|---|---|---|
| Date of receipt:: | 5/9/11 | Laboratory W.O. #: | L1106544 |
| Condition upon receipt: | satisfactory | Time of receipt: | 2125 |
| Cooler temperature: | 3.7°C | Received by: | |

# CHAIN-OF-CUSTODY/TEST REQUEST FORM

L1106544

| | | | |
|---|---|---|---|
| Project/Client Name: | Passaic RI/FS Caged Bivalve Study | Ship to: | Alpha Analytical # LPR-AA050911-5 |
| Project Number: | Task 23.2 | Attn: | Peter Henriksen |
| Contact Name: | Jennifer Parker | Shipper: | Lab Pick-up |
| Sampled By: | Thai Do, Angelita Rodriquez | Form filled out by: | Thai Do |
| Shipping Date: | 05.09.11 | Airbill Number: | N/A |
| Turnaround requested: | Standard | | |

| | Sample Collection Date (m/d/y) | Time | Sample Identification | Volume of Sample / # of Containers | Matrix | Test(s) Requested (check test(s) required): Archive | | | | | Comments / Instructions [Jar tag number(s)] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 45 | 05.09.11 | 10:45 | LPR2AD-GD118 | 1 | Tissue | X | | | | | |
| 46 | 05.09.11 | 10:45 | LPR2AD-GD119 | 1 | Tissue | X | | | | | |
| 47 | 05.09.11 | 10:45 | LPR2AD-GD120 | 1 | Tissue | X | | | | | |
| 48 | 05.09.11 | 10:45 | LPR2AD-GD121 | 1 | Tissue | X | | | | | |
| 49 | 05.09.11 | 10:45 | LPR2AD-GD122 | 1 | Tissue | X | | | | | |
| 50 | 05.09.11 | 10:45 | LPR2AD-GD123 | 1 | Tissue | X | | | | | |
| 51 | 05.09.11 | 10:45 | LPR2AD-GD124 | 1 | Tissue | X | | | | | |
| 52 | 05.09.11 | 10:45 | LPR2AD-GD125 | 1 | Tissue | X | | | | | |
| 53 | 05.09.11 | 10:45 | LPR2AD-GD126 | 1 | Tissue | X | | | | | |
| 54 | 05.09.11 | 10:45 | LPR2AD-GD127 | 1 | Tissue | X | | | | | |
| 55 | 05.09.11 | 10:45 | LPR2AD-GD128 | 1 | Tissue | X | | | | | |
| | | | **Total Number of Containers** | 11 | Purchase Order / Statement of Work # | | | | | | |

| 1) Released by: | 2) Released by: | 3) Released by: | 4) Released by: | 5) Released by: |
|---|---|---|---|---|
| Company: **Windward Environmental** | Company: | Company: | Company: | Company: |
| Date/Time: 05.09.11/1445 | Date/Time: 5/9/11 1700 | Date/Time: 5/9/11 | Date/Time: | Date/Time: |
| Rec'd by: | Rec'd by: | Rec'd by: | Rec'd by: | Rec'd by: |
| Company: **Alpha Analytical** | Company: | Company: ALPHA | Company: | Company: |
| Date/Time: 5/9/11 1415 | Date/Time: 5/9/11 17:00 | Date/Time: 5/9/11 2125 | Date/Time: | Date/Time: |

Windward environmental LLC
200 West Mercer Street
Suite 401
Seattle, WA 98119
Tel: (206) 378-1364
Fax: (206) 217-9343

**To be completed by Laboratory upon sample receipt:**

| | | | |
|---|---|---|---|
| Date of receipt:: | 5/9/11 | Laboratory W.O. #: | L1106544 |
| Condition upon receipt: | Satisfactory | Time of receipt: | 2125 |
| Cooler temperature: | 3.7°C | Received by: | |

# CHAIN-OF-CUSTODY/TEST REQUEST FORM

L1106544

| | | | | | |
|---|---|---|---|---|---|
| Project/Client Name: | **Passaic RI/FS Caged Bivalve Study** | Ship to: | **Alpha Analytical** | | # LPR-AA050911-6 |
| Project Number: | Task 23.2 | Attn: | Peter Henriksen | Shipping Date: | 05.09.11 |
| Contact Name: | Jennifer Parker | Shipper: | Lab Pick-up | Airbill Number: | N/A |
| Sampled By: | Thai Do, Angelita Rodriquez | Form filled out by: | Thai Do | Turnaround requested: | Standard |

| | Sample Collection Date (m/d/y) | Time | Sample Identification | Volume of Sample / # of Containers | Matrix | Test(s) Requested (check test(s) required) Archive | | | | | Comments / Instructions [Jar tag number(s)] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 56 | 05.09.11 | 10:45 | LPR2AD-GD129 | 1 | Tissue | X | | | | | |
| 57 | 05.09.11 | 10:45 | LPR2AD-GD130 | 1 | Tissue | X | | | | | |
| 58 | 05.09.11 | 10:45 | LPR2AD-GD141 | 1 | Tissue | X | | | | | |
| 59 | 05.09.11 | 10:45 | LPR2AD-GD142 | 1 | Tissue | X | | | | | |
| 60 | 05.09.11 | 10:45 | LPR2AD-GD143 | 1 | Tissue | X | | | | | |
| 61 | 05.09.11 | 10:45 | LPR2AD-GD144 | 1 | Tissue | X | | | | | |
| 62 | 05.09.11 | 10:45 | LPR2AD-GD145 | 1 | Tissue | X | | | | | |
| 63 | 05.09.11 | 10:45 | LPR2AD-GD146 | 1 | Tissue | X | | | | | |
| 64 | 05.09.11 | 10:45 | LPR2AD-GD147 | 1 | Tissue | X | | | | | |
| 65 | 05.09.11 | 10:45 | LPR2AD-GD148 | 1 | Tissue | X | | | | | |
| 66 | 05.09.11 | 11:20 | LPR3SS-GD161 | 1 | Tissue | X | | | | | |
| | | | **Total Number of Containers** | 11 | Purchase Order / Statement of Work # | | | | | | |

| 1) **Released by:** | 2) **Released by:** | 3) **Released by:** | 4) **Released by:** | 5) **Released by:** |
|---|---|---|---|---|
| Company: **Windward Environmental** | Company: | Company: 5/9/11 | Company: | Company: |
| Date/Time: 05.09.11/1445 | Date/Time: 5/9/11 1200 | Date/Time: | Date/Time: | Date/Time: |
| **Rec'd by:** | **Rec'd by:** | **Rec'd by:** | **Rec'd by:** | **Rec'd by:** |
| Company: **Alpha Analytical** | Company: | Company: ALPHA | Company: | Company: |
| Date/Time: 5/9/11 1445 | Date/Time: 5/9/11 17:00 | Date/Time: 5/9/11 2125 | Date/Time: | Date/Time: |

Wind Ward environmental LLC

200 West Mercer Street
Suite 401
Seattle, WA 98119
Tel: (206) 378-1364
Fax: (206) 217-9343

**To be completed by Laboratory upon sample receipt:**

| | | | |
|---|---|---|---|
| Date of receipt: | 5/9/11 | Laboratory W.O. #: | L1106544 |
| Condition upon receipt: | SATISFACTORY | Time of receipt: | 2125 |
| Cooler temperature: | 3.7°C | Received by: | |

# CHAIN-OF-CUSTODY/TEST REQUEST FORM

L1106544

| | | | | | |
|---|---|---|---|---|---|
| Project/Client Name: | Passaic RI/FS Caged Bivalve Study | Ship to: | Alpha Analytical | | # LPR-AA050911-7 |
| Project Number: | Task 23.2 | Attn: | Peter Henriksen | Shipping Date: | 05.09.11 |
| Contact Name: | Jennifer Parker | Shipper: | Lab Pick-up | Airbill Number: | N/A |
| Sampled By: | Thai Do, Angelita Rodriquez | Form filled out by: | Thai Do | Turnaround requested: | Standard |

| | Sample Collection Date (m/d/y) | Time | Sample Identification | Volume of Sample / # of Containers | Matrix | Test(s) Requested (check test(s) required) Archive | | | | | Comments / Instructions [Jar tag number(s)] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 67 | 05.09.11 | 11:20 | LPR3SS-GD173 | 1 | Tissue | X | | | | | |
| 68 | 05.09.11 | 11:20 | LPR3SS-GD184 | 1 | Tissue | X | | | | | |
| 69 | 05.09.11 | 11:20 | LPR3SS-GD187 | 1 | Tissue | X | | | | | |
| 70 | 05.09.11 | 11:20 | LPR3S5-GD199 | 1 | Tissue | X | | | | | |
| 71 | 05.09.11 | 11:20 | LPR3SS-GD203 | 1 | Tissue | X | | | | | |
| 72 | 05.09.11 | 11:20 | LPR3SS-GD204 | 1 | Tissue | X | | | | | |
| 73 | 05.09.11 | 11:20 | LPR3SS-GD215 | 1 | Tissue | X | | | | | |
| 74 | 05.09.11 | 11:20 | LPR3SS-GD228 | 1 | Tissue | X | | | | | |
| 75 | 05.09.11 | 11:20 | LPR3SS-GD229 | 1 | Tissue | X | | | | | |
| 76 | 05.09.11 | 11:40 | LPR4ZZ-GD479 | 1 | Tissue | X | | | | | |
| | | | | | | | | | | | |
| | | | **Total Number of Containers** | 10 | Purchase Order / Statement of Work # | | | | | | |

| 1) Released by: | 2) Released by: | 3) Released by: | 4) Released by: | 5) Released by: |
|---|---|---|---|---|
| Company: **Windward Environmental** | Company: | Company: | Company: | Company: |
| Date/Time: 05.09.11/1445 | Date/Time: 5/9/11 1700 | Date/Time: 5/9/11 | Date/Time: | Date/Time: |
| Rec'd by: | Rec'd by: | Rec'd by: | Rec'd by: | Rec'd by: |
| Company: **Alpha Analytical** | Company: | Company: ALPHA | Company: | Company: |
| Date/Time: 5/9/11 1445 | Date/Time: 5/9/11 17:00 | Date/Time: 5/9/11 2125 | Date/Time: | Date/Time: |

Windward environmental LLC
200 West Mercer Street
Suite 401
Seattle, WA 98119
Tel: (206) 378-1364
Fax: (206) 217-9343

**To be completed by Laboratory upon sample receipt:**

| | |
|---|---|
| Date of receipt: 5/9/11 | Laboratory W.O. #: L1106544 |
| Condition upon receipt: satisfactory | Time of receipt: 2125 |
| Cooler temperature: 3.7°C | Received by: |

# CHAIN-OF-CUSTODY/TEST REQUEST FORM

L1108125

| | | | | | |
|---|---|---|---|---|---|
| Project/Client Name: | Passaic RI/FS Caged Bivalve Study | Ship to: | Alpha Analytical | | # LPR-AA060811-1 |
| Project Number: | Task 23.2 | Attn: | Peter Henriksen | Shipping Date: | 06.08.11 |
| Contact Name: | Jennifer Parker | Shipper: | Lab Pick-up | Airbill Number: | N/A |
| Sampled By: | Thai Do | Form filled out by: | Thai Do | Turnaround requested: | Standard |

| | Sample Collection Date (m/d/y) | Time | Sample Identification | Volume of Sample / # of Containers | Matrix | Test(s) Requested (check test(s) required) Archive | | | | | Comments / Instructions [Jar tag number(s)] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 06.08.11 | 848 | LPR6UU-EC041 | 1 | Tissue | X | | | | | |
| 2 | 06.08.11 | 848 | LPR6UU-EC042 | 1 | Tissue | X | | | | | |
| 3 | 06.08.11 | 848 | LPR6UU-EC043 | 1 | Tissue | X | | | | | |
| 4 | 06.08.11 | 848 | LPR6UU-EC044 | 1 | Tissue | X | | | | | |
| 5 | 06.08.11 | 848 | LPR6UU-EC045 | 1 | Tissue | X | | | | | |
| 6 | 06.08.11 | 848 | LPR6UU-EC046 | 1 | Tissue | X | | | | | |
| 7 | 06.08.11 | 848 | LPR6UU-EC051 | 1 | Tissue | X | | | | | |
| 8 | 06.08.11 | 848 | LPR6UU-EC052 | 1 | Tissue | X | | | | | |
| 9 | 06.08.11 | 848 | LPR6UU-EC053 | 1 | Tissue | X | | | | | |
| 10 | 06.08.11 | 848 | LPR6UU-EC054 | 1 | Tissue | X | | | | | |
| 11 | 06.08.11 | 848 | LPR6UU-EC055 | 1 | Tissue | X | | | | | |
| | | | **Total Number of Containers** | 11 | Purchase Order / Statement of Work # | | | | | | |

| 1) Released by: | 2) Released by: Lou Lugo | 3) Released by: | 4) Released by: | 5) Released by: |
|---|---|---|---|---|
| Company: **Windward Environmental** | Company: Alpha | Company: Alpha | Company: | Company: |
| Date/Time: 06.08.11/ 1530 | Date/Time: 6/8/11 17:30 | Date/Time: 6/8/11 12:57 | Date/Time: | Date/Time: |
| Rec'd by: Lou Lugo | Rec'd by: | Rec'd by: | Rec'd by: | Rec'd by: |
| Company: **Alpha Analytical** | Company: Alpha | Company: | Company: | Company: |
| Date/Time: 6/8/11 1530 | Date/Time: 6/8/11 18:00 | Date/Time: | Date/Time: | Date/Time: |

Windward environmental LLC
200 West Mercer Street
Suite 401
Seattle, WA 98119
Tel: (206) 378-1364
Fax: (206) 217-9343

**To be completed by Laboratory upon sample receipt:**

| | |
|---|---|
| Date of receipt:: 6-9-11 | Laboratory W.O. #: L1108125 |
| Condition upon receipt: satisfactory | Time of receipt: 1 am (01:00) |
| Cooler temperature: 2°c | Received by: [illegible] |

# CHAIN-OF-CUSTODY/TEST REQUEST FORM

L1108125

| | | | |
|---|---|---|---|
| Project/Client Name: | Passaic RI/FS Caged Bivalve Study | Ship to: | Alpha Analytical # LPR-AA060811-2 |
| Project Number: | Task 23.2 | Attn: | Peter Henriksen |
| Contact Name: | Jennifer Parker | Shipper: | Lab Pick-up |
| Sampled By: | Thai Do | Form filled out by: | Thai Do |
| Shipping Date: | 06.08.11 | Airbill Number: | N/A |
| Turnaround requested: | Standard | | |

| | Sample Collection Date (m/d/y) | Time | Sample Identification | Volume of Sample / # of Containers | Matrix | Test(s) Requested (check test(s) required): Archive | | | | | Comments / Instructions [Jar tag number(s)] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 12 | 06.08.11 | 848 | LPR6UU-EC056 | 1 | Tissue | X | | | | | |
| 13 | 06.08.11 | 848 | LPR6UU-EC061 | 1 | Tissue | X | | | | | |
| 14 | 06.08.11 | 848 | LPR6UU-EC062 | 1 | Tissue | X | | | | | |
| 15 | 06.08.11 | 848 | LPR6UU-EC063 | 1 | Tissue | X | | | | | |
| 16 | 06.08.11 | 848 | LPR6UU-EC064 | 1 | Tissue | X | | | | | |
| 17 | 06.08.11 | 848 | LPR6UU-EC065 | 1 | Tissue | X | | | | | |
| 18 | 06.08.11 | 848 | LPR6UU-EC066 | 1 | Tissue | X | | | | | |
| 19 | 06.08.11 | 848 | LPR6UU-EC067 | 1 | Tissue | X | | | | | |
| 20 | 06.08.11 | 848 | LPR6UU-EC068 | 1 | Tissue | X | | | | | |
| 21 | 06.08.11 | 848 | LPR6UU-EC069 | 1 | Tissue | X | | | | | |
| 22 | 06.08.11 | 848 | LPR6UU-EC070 | 1 | Tissue | X | | | | | |
| | | | **Total Number of Containers** | 11 | Purchase Order / Statement of Work # | | | | | | |

| 1) Released by: | 2) Released by: Lou Lugo | 3) Released by: | 4) Released by: | 5) Released by: |
|---|---|---|---|---|
| Company: Windward Environmental | Company: Alpha | Company: Alpha | Company: | Company: |
| Date/Time: 06.08.11/1530 | Date/Time: 6/8/11 17:30 | Date/Time: 6/8/11 12:57 | Date/Time: | Date/Time: |
| Rec'd by: Lou Lugo | Rec'd by: | Rec'd by: | Rec'd by: | Rec'd by: |
| Company: Alpha Analytical | Company: Alpha | Company: | Company: | Company: |
| Date/Time: 6/8/11 1530 | Date/Time: 6/8/11 18:00 | Date/Time: | Date/Time: | Date/Time: |

Windward environmental LLC
200 West Mercer Street
Suite 401
Seattle, WA 98119
Tel: (206) 378-1364
Fax: (206) 217-9343

**To be completed by Laboratory upon sample receipt:**

| | |
|---|---|
| Date of receipt: 6-9-11 | Laboratory W.O. #: L1108125 |
| Condition upon receipt: satisfactory | Time of receipt: 1am (01:00) |
| Cooler temperature: 2°C | Received by: |

L1108125

# CHAIN-OF-CUSTODY/TEST REQUEST FORM

| | | | | | |
|---|---|---|---|---|---|
| Project/Client Name: | **Passaic RI/FS Caged Bivalve Study** | Ship to: | **Alpha Analytical** | | # LPR-AA060811-3 |
| Project Number: | Task 23.2 | Attn: | Peter Henriksen | Shipping Date: | 06.08.11 |
| Contact Name: | Jennifer Parker | Shipper: | Lab Pick-up | Airbill Number: | N/A |
| Sampled By: | Thai Do | Form filled out by: | Thai Do | Turnaround requested: | Standard |

| | Sample Collection Date (m/d/y) | Time | Sample Identification | Volume of Sample / # of Containers | Matrix | Test(s) Requested (check test(s) required) Archive | | | | | Comments / Instructions [Jar tag number(s)] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 23 | 06.08.11 | 848 | LPR6UU-EC071 | 1 | Tissue | X | | | | | |
| 24 | 06.08.11 | 848 | LPR6UU-EC072 | 1 | Tissue | X | | | | | |
| 25 | 06.08.11 | 848 | LPR6UU-EC073 | 1 | Tissue | X | | | | | |
| 26 | 06.08.11 | 848 | LPR6UU-EC074 | 1 | Tissue | X | | | | | |
| 27 | 06.08.11 | 848 | LPR6UU-EC075 | 1 | Tissue | X | | | | | |
| 28 | 06.08.11 | 848 | LPR6UU-EC076 | 1 | Tissue | X | | | | | |
| 29 | 06.08.11 | 848 | LPR6UU-EC077 | 1 | Tissue | X | | | | | |
| 30 | 06.08.11 | 848 | LPR6UU-EC078 | 1 | Tissue | X | | | | | |
| 31 | 06.08.11 | 848 | LPR6UU-EC079 | 1 | Tissue | X | | | | | |
| 32 | 06.08.11 | 848 | LPR6UU-EC080 | 1 | Tissue | X | | | | | |
| 33 | 06.08.11 | 848 | LPR6UU-EC081 | 1 | Tissue | X | | | | | |
| | | | **Total Number of Containers** | 11 | Purchase Order / Statement of Work # | | | | | | |

| 1) Released by: | 2) Released by: | 3) Released by: | 4) Released by: | 5) Released by: |
|---|---|---|---|---|
| Company: **Windward Environmental** | Company: Alpha | Company: Alpha | Company: | Company: |
| Date/Time: 06.08.11/1530 | Date/Time: 6/8/11 17:30 | Date/Time: 6/8/11 12:57 | Date/Time: | Date/Time: |
| **Rec'd by:** Lou Lugo | **Rec'd by:** | **Rec'd by:** | **Rec'd by:** | **Rec'd by:** |
| Company: **Alpha Analytical** | Company: Alpha | Company: | Company: | Company: |
| Date/Time: 6/8/11 1530 | Date/Time: 6/8/11 18:00 | Date/Time: | Date/Time: | Date/Time: |

Windward environmental LLC
200 West Mercer Street
Suite 401
Seattle, WA 98119
Tel: (206) 378-1364
Fax: (206) 217-9343

**To be completed by Laboratory upon sample receipt:**

| | | | |
|---|---|---|---|
| Date of receipt: | 6-9-11 | Laboratory W.O. #: | L1108125 |
| Condition upon receipt: | satisfactory | Time of receipt: | 1am (01:00) |
| Cooler temperature: | 2°C | Received by: | [illegible] |

# CHAIN-OF-CUSTODY/TEST REQUEST FORM

L1108125

| | | | | | |
|---|---|---|---|---|---|
| Project/Client Name: | Passaic RI/FS Caged Bivalve Study | Ship to: | Alpha Analytical | | # LPR-AA060811-4 |
| Project Number: | Task 23.2 | Attn: | Peter Henriksen | Shipping Date: | 06.08.11 |
| Contact Name: | Jennifer Parker | Shipper: | Lab Pick-up | Airbill Number: | N/A |
| Sampled By: | Thai Do | Form filled out by: | Thai Do | Turnaround requested: | Standard |

| | Sample Collection Date (m/d/y) | Time | Sample Identification | Volume of Sample / # of Containers | Matrix | Test(s) Requested (check test(s) required): Archive | | | | | Comments / Instructions [Jar tag number(s)] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 34 | 06.08.11 | 848 | LPR6UU-EC082 | 1 | Tissue | X | | | | | |
| 35 | 06.08.11 | 848 | LPR6UU-EC083 | 1 | Tissue | X | | | | | |
| 36 | 06.08.11 | 848 | LPR6UU-EC084 | 1 | Tissue | X | | | | | |
| 37 | 06.08.11 | 848 | LPR6UU-EC085 | 1 | Tissue | X | | | | | |
| 38 | 06.08.11 | 848 | LPR6UU-EC086 | 1 | Tissue | X | | | | | |
| 39 | 06.08.11 | 848 | LPR6UU-EC087 | 1 | Tissue | X | | | | | |
| 40 | 06.08.11 | 848 | LPR6UU-EC088 | 1 | Tissue | X | | | | | |
| 41 | 06.08.11 | 848 | LPR6UU-EC089 | 1 | Tissue | X | | | | | |
| 42 | 06.08.11 | 848 | LPR6UU-EC090 | 1 | Tissue | X | | | | | |
| 43 | 06.08.11 | 848 | LPR6UU-EC091 | 1 | Tissue | X | | | | | |
| 44 | 06.08.11 | 848 | LPR6UU-EC092 | 1 | Tissue | X | | | | | |
| | | | **Total Number of Containers** | 11 | Purchase Order / Statement of Work # | | | | | | |

| 1) Released by: | 2) Released by: | 3) Released by: | 4) Released by: | 5) Released by: |
|---|---|---|---|---|
| Company: **Windward Environmental** | Company: Alpha | Company: Alpha | Company: | Company: |
| Date/Time: 06.08.11/ 1530 | Date/Time: 6/8/11 17:30 | Date/Time: 6/8/11 12:57 | Date/Time: | Date/Time: |
| **Rec'd by:** Lou Lugo | **Rec'd by:** | **Rec'd by:** | **Rec'd by:** | **Rec'd by:** |
| Company: **Alpha Analytical** | Company: Alpha | Company: | Company: | Company: |
| Date/Time: 6/8/11 1530 | Date/Time: 6/8/11 18:00 | Date/Time: | Date/Time: | Date/Time: |

Wind Ward environmental LLC
200 West Mercer Street
Suite 401
Seattle, WA 98119
Tel: (206) 378-1364
Fax: (206) 217-9343

**To be completed by Laboratory upon sample receipt:**

| | |
|---|---|
| Date of receipt: 6-9-11 | Laboratory W.O. #: L1108125 |
| Condition upon receipt: satisfactory | Time of receipt: 1am (01:00) |
| Cooler temperature: 2°c | Received by: ZZ |

# CHAIN-OF-CUSTODY/TEST REQUEST FORM

L1108125

| | | | |
|---|---|---|---|
| Project/Client Name: | Passaic RI/FS Caged Bivalve Study | Ship to: | Alpha Analytical # LPR-AA060811-5 |
| Project Number: | Task 23.2 | Attn: | Peter Henriksen |
| Contact Name: | Jennifer Parker | Shipper: | Lab Pick-up |
| Sampled By: | Thai Do | Form filled out by: | Thai Do |
| Shipping Date: | 06.08.11 | Airbill Number: | N/A |
| Turnaround requested: | Standard | | |

| | Sample Collection Date (m/d/y) | Time | Sample Identification | Volume of Sample / # of Containers | Matrix | Test(s) Requested (check test(s) required): Archive | | | | | Comments / Instructions [Jar tag number(s)] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 45 | 06.08.11 | 848 | LPR6UU-EC093 | 1 | Tissue | X | | | | | |
| 46 | 06.08.11 | 848 | LPR6UU-EC094 | 1 | Tissue | X | | | | | |
| 47 | 06.08.11 | 848 | LPR6UU-EC095 | 1 | Tissue | X | | | | | |
| 48 | 06.08.11 | 848 | LPR6UU-EC096 | 1 | Tissue | X | | | | | |
| 49 | 06.08.11 | 848 | LPR6UU-EC097 | 1 | Tissue | X | | | | | |
| 50 | 06.08.11 | 848 | LPR6UU-EC098 | 1 | Tissue | X | | | | | |
| 51 | 06.08.11 | 848 | LPR6UU-EC099 | 1 | Tissue | X | | | | | |
| 52 | 06.08.11 | 848 | LPR6UU-EC100 | 1 | Tissue | X | | | | | |
| 53 | 06.08.11 | 820 | LPR7ZZ-EC121 | 1 | Tissue | X | | | | | |
| 54 | 06.08.11 | 820 | LPR7ZZ-EC122 | 1 | Tissue | X | | | | | |
| 55 | 06.08.11 | 820 | LPR7ZZ-EC123 | 1 | Tissue | X | | | | | |
| | | | **Total Number of Containers** | 11 | Purchase Order / Statement of Work # | | | | | | |

| 1) Released by: | 2) Released by: | 3) Released by: | 4) Released by: | 5) Released by: |
|---|---|---|---|---|
| Company: Windward Environmental | Company: Alpha | Company: Alpha | Company: | Company: |
| Date/Time: 06.08.11/ 1530 | Date/Time: 6/8/11 17:30 | Date/Time: 6/8/11 12:57 | Date/Time: | Date/Time: |
| Rec'd by: Lou Lugo | Rec'd by: | Rec'd by: | Rec'd by: | Rec'd by: |
| Company: Alpha Analytical | Company: Alpha | Company: | Company: | Company: |
| Date/Time: 6/8/11 1530 | Date/Time: 6/8/11 18:00 | Date/Time: | Date/Time: | Date/Time: |

Windward environmental LLC
200 West Mercer Street
Suite 401
Seattle, WA 98119
Tel: (206) 378-1364
Fax: (206) 217-9343

**To be completed by Laboratory upon sample receipt:**

| | |
|---|---|
| Date of receipt: 6-9-11 | Laboratory W.O. #: L1108125 |
| Condition upon receipt: satisfactory | Time of receipt: 1am (01:00) |
| Cooler temperature: 2°C | Received by: [illegible] |

# CHAIN-OF-CUSTODY/TEST REQUEST FORM

L1108125

| | | | | | |
|---|---|---|---|---|---|
| Project/Client Name: | Passaic RI/FS Caged Bivalve Study | Ship to: | Alpha Analytical | | # LPR-AA060811-6 |
| Project Number: | Task 23.2 | Attn: | Peter Henriksen | Shipping Date: | 06.08.11 |
| Contact Name: | Jennifer Parker | Shipper: | Lab Pick-up | Airbill Number: | N/A |
| Sampled By: | Thai Do | Form filled out by: | Thai Do | Turnaround requested: | Standard |

| | Sample Collection Date (m/d/y) | Time | Sample Identification | Volume of Sample / # of Containers | Matrix | Test(s) Requested (check test(s) required) Archive | | | | | Comments / Instructions [Jar tag number(s)] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 56 | 06.08.11 | 820 | LPR7ZZ-EC124 | 1 | Tissue | X | | | | | |
| 57 | 06.08.11 | 820 | LPR7ZZ-EC125 | 1 | Tissue | X | | | | | |
| 58 | 06.08.11 | 820 | LPR7ZZ-EC126 | 1 | Tissue | X | | | | | |
| 59 | 06.08.11 | 820 | LPR7ZZ-EC127 | 1 | Tissue | X | | | | | |
| 60 | 06.08.11 | 820 | LPR7ZZ-EC128 | 1 | Tissue | X | | | | | |
| 61 | 06.08.11 | 820 | LPR7ZZ-EC129 | 1 | Tissue | X | | | | | |
| 62 | 06.08.11 | 820 | LPR7ZZ-EC131 | 1 | Tissue | X | | | | | |
| 63 | 06.08.11 | 820 | LPR7ZZ-EC132 | 1 | Tissue | X | | | | | |
| 64 | 06.08.11 | 820 | LPR7ZZ-EC133 | 1 | Tissue | X | | | | | |
| 65 | 06.08.11 | 820 | LPR7ZZ-EC141 | 1 | Tissue | X | | | | | |
| 66 | 06.08.11 | 820 | LPR7ZZ-EC142 | 1 | Tissue | X | | | | | |
| | | | **Total Number of Containers** | 11 | Purchase Order / Statement of Work # | | | | | | |

| 1) Released by: | 2) Released by: | 3) Released by: | 4) Released by: | 5) Released by: |
|---|---|---|---|---|
| Company: **Windward Environmental** | Company: Alpha | Company: Alpha | Company: | Company: |
| Date/Time: 06.08.11/ 1530 | Date/Time: 6/8/11 17:30 | Date/Time: 6/8/11 12:57 | Date/Time: | Date/Time: |
| Rec'd by: Lou Lugo | Rec'd by: | Rec'd by: | Rec'd by: | Rec'd by: |
| Company: **Alpha Analytical** | Company: Alpha | Company: | Company: | Company: |
| Date/Time: 6/8/11 1530 | Date/Time: 6/8/11 18:00 | Date/Time: | Date/Time: | Date/Time: |

Wind Ward environmental LLC
200 West Mercer Street
Suite 401
Seattle, WA 98119
Tel: (206) 378-1364
Fax: (206) 217-9343

**To be completed by Laboratory upon sample receipt:**

| | |
|---|---|
| Date of receipt: 6-9-11 | Laboratory W.O. #: L1108125 |
| Condition upon receipt: satisfactory | Time of receipt: 1am (01:00) |
| Cooler temperature: 2°C | Received by: |

# CHAIN-OF-CUSTODY/TEST REQUEST FORM

L1108125

| | | | | | |
|---|---|---|---|---|---|
| Project/Client Name: | Passaic RI/FS Caged Bivalve Study | Ship to: | Alpha Analytical | | # LPR-AA060811-7 |
| Project Number: | Task 23.2 | Attn: | Peter Henriksen | Shipping Date: | 06.08.11 |
| Contact Name: | Jennifer Parker | Shipper: | Lab Pick-up | Airbill Number: | N/A |
| Sampled By: | Thai Do | Form filled out by: | Thai Do | Turnaround requested: | Standard |

| | Sample Collection Date (m/d/y) | Time | Sample Identification | Volume of Sample / # of Containers | Matrix | Test(s) Requested (check test(s) required) Archive | | | | | Comments / Instructions [Jar tag number(s)] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 67 | 06.08.11 | 820 | LPR7ZZ-EC143 | 1 | Tissue | X | | | | | |
| 68 | 06.08.11 | 820 | LPR7ZZ-EC144 | 1 | Tissue | X | | | | | |
| 69 | 06.08.11 | 820 | LPR7ZZ-EC145 | 1 | Tissue | X | | | | | |
| 70 | 06.08.11 | 820 | LPR7ZZ-EC146 | 1 | Tissue | X | | | | | |
| 71 | 06.08.11 | 820 | LPR7ZZ-EC147 | 1 | Tissue | X | | | | | |
| 72 | 06.08.11 | 820 | LPR7ZZ-EC148 | 1 | Tissue | X | | | | | |
| 73 | 06.08.11 | 820 | LPR7ZZ-EC149 | 1 | Tissue | X | | | | | |
| 74 | 06.08.11 | 820 | LPR7ZZ-EC150 | 1 | Tissue | X | | | | | |
| 75 | 06.08.11 | 820 | LPR7ZZ-EC151 | 1 | Tissue | X | | | | | |
| 76 | 06.08.11 | 820 | LPR7ZZ-EC152 | 1 | Tissue | X | | | | | |
| 77 | 06.08.11 | 820 | LPR7ZZ-EC153 | 1 | Tissue | X | | | | | |
| | | | **Total Number of Containers** | 11 | Purchase Order / Statement of Work # | | | | | | |

| 1) Released by: | 2) Released by: | 3) Released by: | 4) Released by: | 5) Released by: |
|---|---|---|---|---|
| Company: **Windward Environmental** | Company: Alpha | Company: Alpha | Company: | Company: |
| Date/Time: 06.08.11/ 1530 | Date/Time: 6/8/11 17:30 | Date/Time: 6/8/11 12:57 | Date/Time: | Date/Time: |
| Rec'd by: Lou Lugo | Rec'd by: | Rec'd by: | Rec'd by: | Rec'd by: |
| Company: **Alpha Analytical** | Company: Alpha | Company: | Company: | Company: |
| Date/Time: 6/8/11 1530 | Date/Time: 6/8/11 18:00 | Date/Time: | Date/Time: | Date/Time: |

Windward environmental LLC
200 West Mercer Street
Suite 401
Seattle, WA 98119
Tel: (206) 378-1364
Fax: (206) 217-9343

**To be completed by Laboratory upon sample receipt:**

| | | | |
|---|---|---|---|
| Date of receipt: | 6.9.11 | Laboratory W.O. #: | L1108125 |
| Condition upon receipt: | satisfactory | Time of receipt: | 1am (01:00) |
| Cooler temperature: | 2°C | Received by: | ZZ |

# CHAIN-OF-CUSTODY/TEST REQUEST FORM

L1108125

| | | | | | |
|---|---|---|---|---|---|
| Project/Client Name: | Passaic RI/FS Caged Bivalve Study | Ship to: | Alpha Analytical | | # LPR-AA060811-8 |
| Project Number: | Task 23.2 | Attn: | Peter Henriksen | Shipping Date: | 06.08.11 |
| Contact Name: | Jennifer Parker | Shipper: | Lab Pick-up | Airbill Number: | N/A |
| Sampled By: | Thai Do | Form filled out by: | Thai Do | Turnaround requested: | Standard |

| | Sample Collection Date (m/d/y) | Time | Sample Identification | Volume of Sample / # of Containers | Matrix | Test(s) Requested (check test(s) required) Archive | | | | | Comments / Instructions [Jar tag number(s)] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 78 | 06.08.11 | 820 | LPR7ZZ-EC154 | 1 | Tissue | x | | | | | |
| 79 | 06.08.11 | 820 | LPR7ZZ-EC155 | 1 | Tissue | x | | | | | |
| 80 | 06.08.11 | 820 | LPR7ZZ-EC156 | 1 | Tissue | x | | | | | |
| 81 | 06.08.11 | 820 | LPR7ZZ-EC157 | 1 | Tissue | x | | | | | |
| 82 | 06.08.11 | 820 | LPR7ZZ-EC158 | 1 | Tissue | x | | | | | |
| 83 | 06.08.11 | 820 | LPR7ZZ-EC159 | 1 | Tissue | x | | | | | |
| 84 | 06.08.11 | 820 | LPR7ZZ-EC160 | 1 | Tissue | x | | | | | |
| 85 | 06.08.11 | 820 | LPR7ZZ-EC161 | 1 | Tissue | x | | | | | |
| 86 | 06.08.11 | 820 | LPR7ZZ-EC162 | 1 | Tissue | x | | | | | |
| 87 | 06.08.11 | 820 | LPR7ZZ-EC164 | 1 | Tissue | x | | | | | |
| 88 | 06.08.11 | 820 | LPR7ZZ-EC165 | 1 | Tissue | x | | | | | |
| | | | **Total Number of Containers** | 11 | Purchase Order / Statement of Work # | | | | | | |

| 1) Released by: | 2) Released by: | 3) Released by: | 4) Released by: | 5) Released by: |
|---|---|---|---|---|
| Company: **Windward Environmental** | Company: Alpha | Company: Alpha | Company: | Company: |
| Date/Time: 06.08.11/ 1530 | Date/Time: 6/8/11 17:30 | Date/Time: 6/8/11 12:57 | Date/Time: | Date/Time: |
| Rec'd by: Lou Lugo | Rec'd by: | Rec'd by: | Rec'd by: | Rec'd by: |
| Company: **Alpha Analytical** | Company: Alpha | Company: | Company: | Company: |
| Date/Time: 6/8/11 1530 | Date/Time: 6/8/11 18:00 | Date/Time: | Date/Time: | Date/Time: |

Windward environmental LLC
200 West Mercer Street
Suite 401
Seattle, WA 98119
Tel: (206) 378-1364
Fax: (206) 217-9343

**To be completed by Laboratory upon sample receipt:**

| | |
|---|---|
| Date of receipt:: 6-9-11 | Laboratory W.O. #: L1108125 |
| Condition upon receipt: satisfactory | Time of receipt: 1am (01:00) |
| Cooler temperature: 2°C | Received by: |

# CHAIN-OF-CUSTODY/TEST REQUEST FORM

L1108125

| | | | | | |
|---|---|---|---|---|---|
| Project/Client Name: | **Passaic RI/FS Caged Bivalve Study** | Ship to: | **Alpha Analytical** | | # LPR-AA060911-9 |
| Project Number: | Task 23.2 | Attn: | Peter Henriksen | Shipping Date: | 06.08.11 |
| Contact Name: | Jennifer Parker | Shipper: | Lab Pick-up | Airbill Number: | N/A |
| Sampled By: | Thai Do | Form filled out by: | Thai Do | Turnaround requested: | Standard |

| | Sample Collection Date (m/d/y) | Time | Sample Identification | Volume of Sample / # of Containers | Matrix | Test(s) Requested (check test(s) required) Archive | | | | | Comments / Instructions [Jar tag number(s)] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 89 | 06.08.11 | 820 | LPR7ZZ-EC166 | 1 | Tissue | x | | | | | |
| 90 | 06.08.11 | 820 | LPR7ZZ-EC167 | 1 | Tissue | x | | | | | |
| 91 | 06.08.11 | 820 | LPR7ZZ-EC168 | 1 | Tissue | x | | | | | |
| 92 | 06.08.11 | 820 | LPR7ZZ-EC169 | 1 | Tissue | x | | | | | |
| 93 | 06.08.11 | 820 | LPR7ZZ-EC170 | 1 | Tissue | x | | | | | |
| 94 | 06.08.11 | 820 | LPR7ZZ-EC171 | 1 | Tissue | x | | | | | |
| 95 | 06.08.11 | 820 | LPR7ZZ-EC172 | 1 | Tissue | x | | | | | |
| 96 | 06.08.11 | 820 | LPR7ZZ-EC173 | 1 | Tissue | x | | | | | |
| 97 | 06.08.11 | 820 | LPR7ZZ-EC174 | 1 | Tissue | x | | | | | |
| 98 | 06.08.11 | 820 | LPR7ZZ-EC175 | 1 | Tissue | x | | | | | |
| 99 | 06.08.11 | 820 | LPR7ZZ-EC176 | 1 | Tissue | x | | | | | |
| | | | **Total Number of Containers** | 11 | Purchase Order / Statement of Work # | | | | | | |

| 1) Released by: | 2) Released by: Lou Lugo | 3) Released by: | 4) Released by: | 5) Released by: |
|---|---|---|---|---|
| Company: **Windward Environmental** | Company: Alpha | Company: Alpha | Company: | Company: |
| Date/Time: 06.08.11/ 1530 | Date/Time: 6/8/11 17:30 | Date/Time: 6/8/11 12:57 | Date/Time: | Date/Time: |
| **Rec'd by:** Lou Lugo | **Rec'd by:** | **Rec'd by:** | **Rec'd by:** | **Rec'd by:** |
| Company: **Alpha Analytical** | Company: Alpha | Company: | Company: | Company: |
| Date/Time: 6/8/11 1530 | Date/Time: 6/8/11 18:00 | Date/Time: | Date/Time: | Date/Time: |

Windward environmental LLC
200 West Mercer Street
Suite 401
Seattle, WA 98119
Tel: (206) 378-1364
Fax: (206) 217-9343

**To be completed by Laboratory upon sample receipt:**

| | |
|---|---|
| Date of receipt:: 6-9-11 | Laboratory W.O. #: L1108125 |
| Condition upon receipt: satisfactory | Time of receipt: 1am (01:00) |
| Cooler temperature: 2°C | Received by: |

# CHAIN-OF-CUSTODY/TEST REQUEST FORM

L1108125

| | | | | | |
|---|---|---|---|---|---|
| Project/Client Name: | Passaic RI/FS Caged Bivalve Study | Ship to: | Alpha Analytical | | # LPR-AA060911-10 |
| Project Number: | Task 23.2 | Attn: | Peter Henriksen | Shipping Date: | 06.08.11 |
| Contact Name: | Jennifer Parker | Shipper: | Lab Pick-up | Airbill Number: | N/A |
| Sampled By: | Thai Do | Form filled out by: | Thai Do | Turnaround requested: | Standard |

| | Sample Collection Date (m/d/y) | Time | Sample Identification | Volume of Sample / # of Containers | Matrix | Test(s) Requested (check test(s) required) Archive | | | | | Comments / Instructions [Jar tag number(s)] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 100 | 06.08.11 | 820 | LPR7ZZ-EC177 | 1 | Tissue | x | | | | | |
| 101 | 06.08.11 | 820 | LPR7ZZ-EC178 | 1 | Tissue | x | | | | | |
| 102 | 06.08.11 | 820 | LPR7ZZ-EC179 | 1 | Tissue | x | | | | | |
| 103 | 06.08.11 | 820 | LPR7ZZ-EC180 | 1 | Tissue | x | | | | | |
| 104 | 06.08.11 | 820 | LPR7ZZ-EC181 | 1 | Tissue | x | | | | | |
| 105 | 06.08.11 | 820 | LPR7ZZ-EC182 | 1 | Tissue | x | | | | | |
| 106 | 06.08.11 | 820 | LPR7ZZ-EC183 | 1 | Tissue | x | | | | | |
| 107 | 06.08.11 | 820 | LPR7ZZ-EC184 | 1 | Tissue | x | | | | | |
| 108 | 06.08.11 | 820 | LPR7ZZ-EC185 | 1 | Tissue | x | | | | | |
| 109 | 06.08.11 | 820 | LPR7ZZ-EC186 | 1 | Tissue | x | | | | | |
| 110 | 06.08.11 | 820 | LPR7ZZ-EC187 | 1 | Tissue | x | | | | | |
| | | | **Total Number of Containers** | 11 | Purchase Order / Statement of Work # | | | | | | |

| 1) Released by: | 2) Released by: Lou Lugo | 3) Released by: | 4) Released by: | 5) Released by: |
|---|---|---|---|---|
| Company: **Windward Environmental** | Company: Alpha | Company: Alpha | Company: | Company: |
| Date/Time: 06.08.11/1530 | Date/Time: 6/8/11 17:30 | Date/Time: 6/8/11 12:57 | Date/Time: | Date/Time: |
| **Rec'd by:** Lou Lugo | **Rec'd by:** | **Rec'd by:** | **Rec'd by:** | **Rec'd by:** |
| Company: **Alpha Analytical** | Company: Alpha | Company: | Company: | Company: |
| Date/Time: 6/8/11 1530 | Date/Time: 6/8/11 18:00 | Date/Time: | Date/Time: | Date/Time: |

Windward environmental LLC
200 West Mercer Street
Suite 401
Seattle, WA 98119
Tel: (206) 378-1364
Fax: (206) 217-9343

**To be completed by Laboratory upon sample receipt:**

| | |
|---|---|
| Date of receipt:: 6-9-11 | Laboratory W.O. #: L1108125 |
| Condition upon receipt: satisfactory | Time of receipt: 1am (01:00) |
| Cooler temperature: 2 °C | Received by: [illegible] |

# CHAIN-OF-CUSTODY/TEST REQUEST FORM

L1108125

| | | | | | |
|---|---|---|---|---|---|
| Project/Client Name: | Passaic RI/FS Caged Bivalve Study | Ship to: | Alpha Analytical | | # LPR-AA060911-11 |
| Project Number: | Task 23.2 | Attn: | Peter Henriksen | Shipping Date: | 06.08.11 |
| Contact Name: | Jennifer Parker | Shipper: | Lab Pick-up | Airbill Number: | N/A |
| Sampled By: | Thai Do | Form filled out by: | Thai Do | Turnaround requested: | Standard |

| | Sample Collection Date (m/d/y) | Time | Sample Identification | Volume of Sample / # of Containers | Matrix | Test(s) Requested (check test(s) required) Archive | | | | | Comments / Instructions [Jar tag number(s)] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 111 | 06.08.11 | 820 | LPR7ZZ-EC188 | 1 | Tissue | x | | | | | |
| 112 | 06.08.11 | 820 | LPR7ZZ-EC189 | 1 | Tissue | x | | | | | |
| 113 | 06.08.11 | 820 | LPR7ZZ-EC190 | 1 | Tissue | x | | | | | |
| 114 | 06.08.11 | 820 | LPR7ZZ-EC201 | 1 | Tissue | x | | | | | |
| 115 | 06.08.11 | 820 | LPR7ZZ-EC202 | 1 | Tissue | x | | | | | |
| 116 | 06.08.11 | 820 | LPR7ZZ-EC203 | 1 | Tissue | x | | | | | |
| 117 | 06.08.11 | 820 | LPR7ZZ-EC204 | 1 | Tissue | x | | | | | |
| 118 | 06.08.11 | 820 | LPR7ZZ-EC205 | 1 | Tissue | x | | | | | |
| 119 | 06.08.11 | 820 | LPR7ZZ-EC206 | 1 | Tissue | x | | | | | |
| 120 | 06.08.11 | 820 | LPR7ZZ-EC207 | 1 | Tissue | x | | | | | |
| 121 | 06.08.11 | 820 | LPR7ZZ-EC208 | 1 | Tissue | x | | | | | |
| | | | **Total Number of Containers** | 11 | Purchase Order / Statement of Work # | | | | | | |

| 1) Released by: | 2) Released by: | 3) Released by: | 4) Released by: | 5) Released by: |
|---|---|---|---|---|
| Company: **Windward Environmental** | Company: Alpha | Company: Alpha | Company: | Company: |
| Date/Time: 06.08.11/ 1530 | Date/Time: 6/8/11 17:30 | Date/Time: 6/8/11 12:57 | Date/Time: | Date/Time: |
| Rec'd by: Lou Lugo | Rec'd by: | Rec'd by: | Rec'd by: | Rec'd by: |
| Company: **Alpha Analytical** | Company: Alpha | Company: | Company: | Company: |
| Date/Time: 6/8/11 1530 | Date/Time: 6/8/11 18:20 | Date/Time: | Date/Time: | Date/Time: |

Windward environmental LLC
200 West Mercer Street
Suite 401
Seattle, WA 98119
Tel: (206) 378-1364
Fax: (206) 217-9343

**To be completed by Laboratory upon sample receipt:**

| | | | |
|---|---|---|---|
| Date of receipt: | 6-9-11 | Laboratory W.O. #: | L1108125 |
| Condition upon receipt: | satisfactory | Time of receipt: | 1am (01:00) |
| Cooler temperature: | 2°c | Received by: | |

# CHAIN-OF-CUSTODY/TEST REQUEST FORM

L1108125

| | | | |
|---|---|---|---|
| Project/Client Name: | Passaic RI/FS Caged Bivalve Study | Ship to: | Alpha Analytical # LPR-AA060911-12 |
| Project Number: | Task 23.2 | Attn: | Peter Henriksen |
| Contact Name: | Jennifer Parker | Shipper: | Lab Pick-up |
| Sampled By: | Thai Do | Form filled out by: | Thai Do |
| Shipping Date: | 06.08.11 | Airbill Number: | N/A |
| Turnaround requested: | Standard | | |

| | Sample Collection Date (m/d/y) | Time | Sample Identification | Volume of Sample / # of Containers | Matrix | Test(s) Requested (check test(s) required): Archive | | | | | Comments / Instructions [Jar tag number(s)] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 122 | 06.08.11 | 820 | LPR7ZZ-EC209 | 1 | Tissue | x | | | | | |
| 123 | 06.08.11 | 820 | LPR7ZZ-EC210 | 1 | Tissue | x | | | | | |
| 124 | 06.08.11 | 820 | LPR7ZZ-EC211 | 1 | Tissue | x | | | | | |
| 125 | 06.08.11 | 820 | LPR7ZZ-EC212 | 1 | Tissue | x | | | | | |
| 126 | 06.08.11 | 820 | LPR7ZZ-EC214 | 1 | Tissue | x | | | | | |
| 127 | 06.08.11 | 820 | LPR7ZZ-EC215 | 1 | Tissue | x | | | | | |
| 128 | 06.08.11 | 820 | LPR7ZZ-EC216 | 1 | Tissue | x | | | | | |
| 129 | 06.08.11 | 820 | LPR7ZZ-EC217 | 1 | Tissue | x | | | | | |
| 130 | 06.08.11 | 820 | LPR7ZZ-EC218 | 1 | Tissue | x | | | | | |
| 131 | 06.08.11 | 820 | LPR7ZZ-EC219 | 1 | Tissue | x | | | | | |
| 132 | 06.08.11 | 820 | LPR7ZZ-EC220 | 1 | Tissue | x | | | | | |
| | | | **Total Number of Containers** | 11 | Purchase Order / Statement of Work # | | | | | | |

| 1) Released by: | 2) Released by: | 3) Released by: | 4) Released by: | 5) Released by: |
|---|---|---|---|---|
| Company: Windward Environmental | Company: Alpha | Company: Alpha | Company: | Company: |
| Date/Time: 06.08.11/1530 | Date/Time: 6/8/11 17:30 | Date/Time: 6/8/11 12:57 | Date/Time: | Date/Time: |
| Rec'd by: Lou Lugo | Rec'd by: | Rec'd by: | Rec'd by: | Rec'd by: |
| Company: Alpha Analytical | Company: Alpha | Company: | Company: | Company: |
| Date/Time: 6/8/11 1530 | Date/Time: 6/8/11 18:00 | Date/Time: | Date/Time: | Date/Time: |

Windward environmental LLC
200 West Mercer Street
Suite 401
Seattle, WA 98119
Tel: (206) 378-1364
Fax: (206) 217-9343

**To be completed by Laboratory upon sample receipt:**

| | |
|---|---|
| Date of receipt: 6-9-11 | Laboratory W.O. #: L1108125 |
| Condition upon receipt: satisfactory | Time of receipt: 1am (01:00) |
| Cooler temperature: 2°C | Received by: |

# CHAIN-OF-CUSTODY/TEST REQUEST FORM

L1108125

| | | | | | |
|---|---|---|---|---|---|
| Project/Client Name: | Passaic RI/FS Caged Bivalve Study | Ship to: | Alpha Analytical | | # LPR-AA060911-13 |
| Project Number: | Task 23.2 | Attn: | Peter Henriksen | Shipping Date: | 06.08.11 |
| Contact Name: | Jennifer Parker | Shipper: | Lab Pick-up | Airbill Number: | N/A |
| Sampled By: | Thai Do | Form filled out by: | Thai Do | Turnaround requested: | Standard |

| | Sample Collection Date (m/d/y) | Time | Sample Identification | Volume of Sample / # of Containers | Matrix | Test(s) Requested (check test(s) required) Archive | | | | | Comments / Instructions [Jar tag number(s)] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 133 | 06.08.11 | 755 | LPR7AB-EC221 | 1 | Tissue | x | | | | | |
| 134 | 06.08.11 | 755 | LPR7AB-EC222 | 1 | Tissue | x | | | | | |
| 135 | 06.08.11 | 755 | LPR7AB-EC223 | 1 | Tissue | x | | | | | |
| 136 | 06.08.11 | 755 | LPR7AB-EC224 | 1 | Tissue | x | | | | | |
| 137 | 06.08.11 | 755 | LPR7AB-EC225 | 1 | Tissue | x | | | | | |
| 138 | 06.08.11 | 755 | LPR7AB-EC226 | 1 | Tissue | x | | | | | |
| 139 | 06.08.11 | 755 | LPR7AB-EC231 | 1 | Tissue | x | | | | | |
| 140 | 06.08.11 | 755 | LPR7AB-EC232 | 1 | Tissue | x | | | | | |
| 141 | 06.08.11 | 755 | LPR7AB-EC233 | 1 | Tissue | x | | | | | |
| 142 | 06.08.11 | 755 | LPR7AB-EC234 | 1 | Tissue | x | | | | | |
| 143 | 06.08.11 | 755 | LPR7AB-EC235 | 1 | Tissue | x | | | | | |
| | | | **Total Number of Containers** | 11 | Purchase Order / Statement of Work # | | | | | | |

| 1) Released by: | 2) Released by: | 3) Released by: | 4) Released by: | 5) Released by: |
|---|---|---|---|---|
| Company: **Windward Environmental** | Company: Alpha | Company: Alpha | Company: | Company: |
| Date/Time: 06.08.11/ 1530 | Date/Time: 6/8/11 17:30 | Date/Time: 6/8/11 12:57 | Date/Time: | Date/Time: |
| Rec'd by: Lou Lugo | Rec'd by: | Rec'd by: | Rec'd by: | Rec'd by: |
| Company: **Alpha Analytical** | Company: Alpha | Company: | Company: | Company: |
| Date/Time: 6/8/11 1530 | Date/Time: 6/8/11 18:00 | Date/Time: | Date/Time: | Date/Time: |

Windward environmental LLC
200 West Mercer Street
Suite 401
Seattle, WA 98119
Tel: (206) 378-1364
Fax: (206) 217-9343

**To be completed by Laboratory upon sample receipt:**

| | |
|---|---|
| Date of receipt:: 6-9-11 | Laboratory W.O. #: L1108125 |
| Condition upon receipt: satisfactory | Time of receipt: 1-m (01:00) |
| Cooler temperature: 2°C | Received by: |

# CHAIN-OF-CUSTODY/TEST REQUEST FORM

L1108125

| | | | | | |
|---|---|---|---|---|---|
| Project/Client Name: | Passaic RI/FS Caged Bivalve Study | Ship to: | Alpha Analytical | | # LPR-AA060911-14 |
| Project Number: | Task 23.2 | Attn: | Peter Henriksen | Shipping Date: | 06.08.11 |
| Contact Name: | Jennifer Parker | Shipper: | Lab Pick-up | Airbill Number: | N/A |
| Sampled By: | Thai Do | Form filled out by: | Thai Do | Turnaround requested: | Standard |

| | Sample Collection Date (m/d/y) | Time | Sample Identification | Volume of Sample / # of Containers | Matrix | Test(s) Requested (check test(s) required) Archive | | | | | Comments / Instructions [Jar tag number(s)] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 144 | 06.08.11 | 755 | LPR7AB-EC236 | 1 | Tissue | x | | | | | |
| 145 | 06.08.11 | 755 | LPR7AB-EC241 | 1 | Tissue | x | | | | | |
| 146 | 06.08.11 | 755 | LPR7AB-EC242 | 1 | Tissue | x | | | | | |
| 147 | 06.08.11 | 755 | LPR7AB-EC243 | 1 | Tissue | x | | | | | |
| 148 | 06.08.11 | 755 | LPR7AB-EC244 | 1 | Tissue | x | | | | | |
| 149 | 06.08.11 | 755 | LPR7AB-EC245 | 1 | Tissue | x | | | | | |
| 150 | 06.08.11 | 755 | LPR7AB-EC246 | 1 | Tissue | x | | | | | |
| 151 | 06.08.11 | 755 | LPR7AB-EC247 | 1 | Tissue | x | | | | | |
| 152 | 06.08.11 | 755 | LPR7AB-EC248 | 1 | Tissue | x | | | | | |
| 153 | 06.08.11 | 755 | LPR7AB-EC249 | 1 | Tissue | x | | | | | |
| 154 | 06.08.11 | 755 | LPR7AB-EC250 | 1 | Tissue | x | | | | | |
| | | | **Total Number of Containers** | 11 | Purchase Order / Statement of Work # | | | | | | |

| 1) Released by: | 2) Released by: | 3) Released by: | 4) Released by: | 5) Released by: |
|---|---|---|---|---|
| Company: **Windward Environmental** | Company: Alpha | Company: Alpha | Company: | Company: |
| Date/Time: 06.08.11/1530 | Date/Time: 6/8/11 17:30 | Date/Time: 6/8/11 12:57 | Date/Time: | Date/Time: |
| Rec'd by: Lou Lugo | Rec'd by: | Rec'd by: | Rec'd by: | Rec'd by: |
| Company: **Alpha Analytical** | Company: Alpha | Company: | Company: | Company: |
| Date/Time: 6/8/11 1530 | Date/Time: 6/8/11 | Date/Time: | Date/Time: | Date/Time: |

Wind Ward environmental LLC
200 West Mercer Street
Suite 401
Seattle, WA 98119
Tel: (206) 378-1364
Fax: (206) 217-9343

**To be completed by Laboratory upon sample receipt:**

| | |
|---|---|
| Date of receipt: 6-9-11 | Laboratory W.O. #: L1108125 |
| Condition upon receipt: satisfactory | Time of receipt: 1am (01:00) |
| Cooler temperature: 2°C | Received by: |

# CHAIN-OF-CUSTODY/TEST REQUEST FORM

L1108125

| | | | | | |
|---|---|---|---|---|---|
| Project/Client Name: | Passaic RI/FS Caged Bivalve Study | Ship to: | Alpha Analytical | | # LPR-AA060911-15 |
| Project Number: | Task 23.2 | Attn: | Peter Henriksen | Shipping Date: | 06.08.11 |
| Contact Name: | Jennifer Parker | Shipper: | Lab Pick-up | Airbill Number: | N/A |
| Sampled By: | Thai Do | Form filled out by: | Thai Do | Turnaround requested: | Standard |

| | Sample Collection Date (m/d/y) | Time | Sample Identification | Volume of Sample / # of Containers | Matrix | Test(s) Requested (check test(s) required) Archive | | | | | Comments / Instructions [Jar tag number(s)] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 155 | 06.08.11 | 755 | LPR7AB-EC251 | 1 | Tissue | x | | | | | |
| 156 | 06.08.11 | 755 | LPR7AB-EC252 | 1 | Tissue | x | | | | | |
| 157 | 06.08.11 | 755 | LPR7AB-EC253 | 1 | Tissue | x | | | | | |
| 158 | 06.08.11 | 755 | LPR7AB-EC254 | 1 | Tissue | x | | | | | |
| 159 | 06.08.11 | 755 | LPR7AB-EC255 | 1 | Tissue | x | | | | | |
| 160 | 06.08.11 | 755 | LPR7AB-EC256 | 1 | Tissue | x | | | | | |
| 161 | 06.08.11 | 755 | LPR7AB-EC257 | 1 | Tissue | x | | | | | |
| 162 | 06.08.11 | 755 | LPR7AB-EC258 | 1 | Tissue | x | | | | | |
| 163 | 06.08.11 | 755 | LPR7AB-EC259 | 1 | Tissue | x | | | | | |
| 164 | 06.08.11 | 755 | LPR7AB-EC260 | 1 | Tissue | x | | | | | |
| 165 | 06.08.11 | 755 | LPR7AB-EC261 | 1 | Tissue | x | | | | | |
| | | | **Total Number of Containers** | 11 | Purchase Order / Statement of Work # | | | | | | |

| 1) Released by: | 2) Released by: | 3) Released by: | 4) Released by: | 5) Released by: |
|---|---|---|---|---|
| Company: **Windward Environmental** | Company: Alpha | Company: Alpha | Company: | Company: |
| Date/Time: 06.08.11/ 1530 | Date/Time: 6/8/11 17:30 | Date/Time: 6/8/11 12:57 | Date/Time: | Date/Time: |
| Rec'd by: Lou Lugo | Rec'd by: | Rec'd by: | Rec'd by: | Rec'd by: |
| Company: **Alpha Analytical** | Company: Alpha | Company: | Company: | Company: |
| Date/Time: 6/8/11 1530 | Date/Time: 6/8/11 18:00 | Date/Time: | Date/Time: | Date/Time: |

Windward environmental LLC
200 West Mercer Street
Suite 401
Seattle, WA 98119
Tel: (206) 378-1364
Fax: (206) 217-9343

**To be completed by Laboratory upon sample receipt:**

| | |
|---|---|
| Date of receipt:: 6-9-11 | Laboratory W.O. #: L1108125 |
| Condition upon receipt: satisfactory | Time of receipt: 1am (01:00) |
| Cooler temperature: 2°C | Received by: |

# CHAIN-OF-CUSTODY/TEST REQUEST FORM

L1108125

| | | | | | |
|---|---|---|---|---|---|
| Project/Client Name: | **Passaic RI/FS Caged Bivalve Study** | Ship to: | **Alpha Analytical** | | # LPR-AA060911-16 |
| Project Number: | Task 23.2 | Attn: | Peter Henriksen | Shipping Date: | 06.08.11 |
| Contact Name: | Jennifer Parker | Shipper: | Lab Pick-up | Airbill Number: | N/A |
| Sampled By: | Thai Do | Form filled out by: | Thai Do | Turnaround requested: | Standard |

| | Sample Collection Date (m/d/y) | Time | Sample Identification | Volume of Sample / # of Containers | Matrix | Test(s) Requested (check test(s) required) Archive | | | | | Comments / Instructions [Jar tag number(s)] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 166 | 06.08.11 | 755 | LPR7AB-EC262 | 1 | Tissue | x | | | | | |
| 167 | 06.08.11 | 755 | LPR7AB-EC263 | 1 | Tissue | x | | | | | |
| 168 | 06.08.11 | 755 | LPR7AB-EC264 | 1 | Tissue | x | | | | | |
| 169 | 06.08.11 | 755 | LPR7AB-EC265 | 1 | Tissue | x | | | | | |
| 170 | 06.08.11 | 755 | LPR7AB-EC266 | 1 | Tissue | x | | | | | |
| 171 | 06.08.11 | 755 | LPR7AB-EC267 | 1 | Tissue | x | | | | | |
| 172 | 06.08.11 | 755 | LPR7AB-EC268 | 1 | Tissue | x | | | | | |
| 173 | 06.08.11 | 755 | LPR7AB-EC269 | 1 | Tissue | x | | | | | |
| 174 | 06.08.11 | 755 | LPR7AB-EC271 | 1 | Tissue | x | | | | | |
| 175 | 06.08.11 | 755 | LPR7AB-EC272 | 1 | Tissue | x | | | | | |
| 176 | 06.08.11 | 755 | LPR7AB-EC273 | 1 | Tissue | x | | | | | |
| | | | **Total Number of Containers** | 11 | Purchase Order / Statement of Work # | | | | | | |

| 1) Released by: | 2) Released by: | 3) Released by: | 4) Released by: | 5) Released by: |
|---|---|---|---|---|
| Company: **Windward Environmental** | Company: Alpha | Company: Alpha | Company: | Company: |
| Date/Time: 06.08.11/ 1530 | Date/Time: 6/8/11 17:30 | Date/Time: 6/8/11 12:57 | Date/Time: | Date/Time: |
| Rec'd by: Lou Lugo | Rec'd by: | Rec'd by: | Rec'd by: | Rec'd by: |
| Company: **Alpha Analytical** | Company: Alpha | Company: | Company: | Company: |
| Date/Time: 6/8/11 1530 | Date/Time: 6/8/11 1800 | Date/Time: | Date/Time: | Date/Time: |

Windward environmental LLC
200 West Mercer Street
Suite 401
Seattle, WA 98119
Tel: (206) 378-1364
Fax: (206) 217-9343

**To be completed by Laboratory upon sample receipt:**

| | |
|---|---|
| Date of receipt:: 6-9-11 | Laboratory W.O. #: L1108125 |
| Condition upon receipt: satisfactory | Time of receipt: 1am (01:00) |
| Cooler temperature: 2°C | Received by: |

# CHAIN-OF-CUSTODY/TEST REQUEST FORM

L1108125

| | | | |
|---|---|---|---|
| Project/Client Name: | Passaic RI/FS Caged Bivalve Study | Ship to: | Alpha Analytical # LPR-AA060911-17 |
| Project Number: | Task 23.2 | Attn: | Peter Henriksen |
| Contact Name: | Jennifer Parker | Shipper: | Lab Pick-up |
| Sampled By: | Thai Do | Form filled out by: | Thai Do |
| | | Shipping Date: | 06.08.11 |
| | | Airbill Number: | N/A |
| | | Turnaround requested: | Standard |

| | Sample Collection Date (m/d/y) | Time | Sample Identification | Volume of Sample / # of Containers | Matrix | Test(s) Requested (check test(s) required) Archive | | | | | Comments / Instructions [Jar tag number(s)] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 177 | 06.08.11 | 755 | LPR7AB-EC274 | 1 | Tissue | x | | | | | |
| 178 | 06.08.11 | 755 | LPR7AB-EC275 | 1 | Tissue | x | | | | | |
| 179 | 06.08.11 | 755 | LPR7AB-EC276 | 1 | Tissue | x | | | | | |
| 180 | 06.08.11 | 755 | LPR7AB-EC277 | 1 | Tissue | x | | | | | |
| 181 | 06.08.11 | 755 | LPR7AB-EC278 | 1 | Tissue | x | | | | | |
| 182 | 06.08.11 | 755 | LPR7AB-EC279 | 1 | Tissue | x | | | | | |
| 183 | 06.08.11 | 755 | LPR7AB-EC280 | 1 | Tissue | x | | | | | |
| 184 | 06.08.11 | 740 | LPR8AC-EC285 | 1 | Tissue | x | | | | | |
| 185 | 06.08.11 | 740 | LPR8AC-EC286 | 1 | Tissue | x | | | | | |
| 186 | 06.08.11 | 740 | LPR8AC-EC305 | 1 | Tissue | x | | | | | |
| 187 | 06.08.11 | 740 | LPR8AC-EC307 | 1 | Tissue | x | | | | | |
| | | | **Total Number of Containers** | 11 | Purchase Order / Statement of Work # | | | | | | |

| 1) Released by: | 2) Released by: | 3) Released by: | 4) Released by: | 5) Released by: |
|---|---|---|---|---|
| Company: **Windward Environmental** | Company: Alpha | Company: Alpha | Company: | Company: |
| Date/Time: 06.08.11/1530 | Date/Time: 6/8/11 17:30 | Date/Time: 6/8/11 12:57 | Date/Time: | Date/Time: |
| Rec'd by: Lou Lugo | Rec'd by: | Rec'd by: | Rec'd by: | Rec'd by: |
| Company: **Alpha Analytical** | Company: Alpha | Company: | Company: | Company: |
| Date/Time: 6/8/11 1530 | Date/Time: 6/8/11 18:00 | Date/Time: | Date/Time: | Date/Time: |

Windward environmental LLC
200 West Mercer Street
Suite 401
Seattle, WA 98119
Tel: (206) 378-1364
Fax: (206) 217-9343

**To be completed by Laboratory upon sample receipt:**

| | |
|---|---|
| Date of receipt:: 6-9-11 | Laboratory W.O. #: L1108125 |
| Condition upon receipt: satisfactory | Time of receipt: 1am (01:00) |
| Cooler temperature: 2°C | Received by: |

# CHAIN-OF-CUSTODY/TEST REQUEST FORM

L1108125

| | | | | | |
|---|---|---|---|---|---|
| Project/Client Name: | Passaic RI/FS Caged Bivalve Study | Ship to: | Alpha Analytical | | # LPR-AA060911-18 |
| Project Number: | Task 23.2 | Attn: | Peter Henriksen | Shipping Date: | 06.08.11 |
| Contact Name: | Jennifer Parker | Shipper: | Lab Pick-up | Airbill Number: | N/A |
| Sampled By: | Thai Do | Form filled out by: | Thai Do | Turnaround requested: | Standard |

| | Sample Collection Date (m/d/y) | Time | Sample Identification | Volume of Sample / # of Containers | Matrix | Test(s) Requested (check test(s) required) Archive | | | | | Comments / Instructions [Jar tag number(s)] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 188 | 06.08.11 | 903 | LPR6VV-EC341 | 1 | Tissue | x | | | | | |
| 189 | 06.08.11 | 903 | LPR6VV-EC342 | 1 | Tissue | x | | | | | |
| 190 | 06.08.11 | 903 | LPR6VV-EC343 | 1 | Tissue | x | | | | | |
| 191 | 06.08.11 | 903 | LPR6VV-EC344 | 1 | Tissue | x | | | | | |
| 192 | 06.08.11 | 903 | LPR6VV-EC345 | 1 | Tissue | x | | | | | |
| 193 | 06.08.11 | 903 | LPR6VV-EC346 | 1 | Tissue | x | | | | | |
| 194 | 06.08.11 | 903 | LPR6VV-EC351 | 1 | Tissue | x | | | | | |
| 195 | 06.08.11 | 903 | LPR6VV-EC352 | 1 | Tissue | x | | | | | |
| 196 | 06.08.11 | 903 | LPR6VV-EC353 | 1 | Tissue | x | | | | | |
| 197 | 06.08.11 | 903 | LPR6VV-EC354 | 1 | Tissue | x | | | | | |
| 198 | 06.08.11 | 903 | LPR6VV-EC355 | 1 | Tissue | x | | | | | |
| | | | **Total Number of Containers** | 11 | Purchase Order / Statement of Work # | | | | | | |

| 1) Released by: | 2) Released by: | 3) Released by: | 4) Released by: | 5) Released by: |
|---|---|---|---|---|
| Company: **Windward Environmental** | Company: Alpha | Company: Alpha | Company: | Company: |
| Date/Time: 06.08.11/1530 | Date/Time: 6/8/11 17:30 | Date/Time: 6/8/11 12:57 | Date/Time: | Date/Time: |
| Rec'd by: Lou Lugo | Rec'd by: | Rec'd by: | Rec'd by: | Rec'd by: |
| Company: **Alpha Analytical** | Company: Alpha | Company: | Company: | Company: |
| Date/Time: 6/8/11 1530 | Date/Time: 6/8/11 18:03 | Date/Time: | Date/Time: | Date/Time: |

Windward environmental LLC
200 West Mercer Street
Suite 401
Seattle, WA 98119
Tel: (206) 378-1364
Fax: (206) 217-9343

**To be completed by Laboratory upon sample receipt:**

| | |
|---|---|
| Date of receipt:: 6-9-11 | Laboratory W.O. #: L1108125 |
| Condition upon receipt: satisfactory | Time of receipt: 1am (01:00) |
| Cooler temperature: 2°c | Received by: |

# CHAIN-OF-CUSTODY/TEST REQUEST FORM

L1108125

| | | | | | |
|---|---|---|---|---|---|
| Project/Client Name: | Passaic RI/FS Caged Bivalve Study | Ship to: | Alpha Analytical | # LPR-AA060911-19 | |
| Project Number: | Task 23.2 | Attn: | Peter Henriksen | Shipping Date: | 06.08.11 |
| Contact Name: | Jennifer Parker | Shipper: | Lab Pick-up | Airbill Number: | N/A |
| Sampled By: | Thai Do | Form filled out by: | Thai Do | Turnaround requested: | Standard |

| | Sample Collection Date (m/d/y) | Time | Sample Identification | Volume of Sample / # of Containers | Matrix | Test(s) Requested (check test(s) required) Archive | | | | | Comments / Instructions [Jar tag number(s)] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 199 | 06.08.11 | 903 | LPR6VV-EC356 | 1 | Tissue | x | | | | | |
| 200 | 06.08.11 | 903 | LPR6VV-EC361 | 1 | Tissue | x | | | | | |
| 201 | 06.08.11 | 903 | LPR6VV-EC362 | 1 | Tissue | x | | | | | |
| 202 | 06.08.11 | 903 | LPR6VV-EC363 | 1 | Tissue | x | | | | | |
| 203 | 06.08.11 | 903 | LPR6VV-EC364 | 1 | Tissue | x | | | | | |
| 204 | 06.08.11 | 903 | LPR6VV-EC365 | 1 | Tissue | x | | | | | |
| 205 | 06.08.11 | 903 | LPR6VV-EC366 | 1 | Tissue | x | | | | | |
| 206 | 06.08.11 | 903 | LPR6VV-EC367 | 1 | Tissue | x | | | | | |
| 207 | 06.08.11 | 903 | LPR6VV-EC368 | 1 | Tissue | x | | | | | |
| 208 | 06.08.11 | 903 | LPR6VV-EC369 | 1 | Tissue | x | | | | | |
| 209 | 06.08.11 | 903 | LPR6VV-EC370 | 1 | Tissue | x | | | | | |
| | | | **Total Number of Containers** | 11 | Purchase Order / Statement of Work # | | | | | | |

| 1) Released by: | 2) Released by: | 3) Released by: | 4) Released by: | 5) Released by: |
|---|---|---|---|---|
| Company: **Windward Environmental** | Company: Alpha | Company: Alpha | Company: | Company: |
| Date/Time: 06.08.11/ 1530 | Date/Time: 6/8/11 17:30 | Date/Time: 6/8/11 12:57 | Date/Time: | Date/Time: |
| Rec'd by: Lou Lugo | Rec'd by: | Rec'd by: | Rec'd by: | Rec'd by: |
| Company: **Alpha Analytical** | Company: Alpha 6/8/11 18:00 | Company: | Company: | Company: |
| Date/Time: 6/8/11 1530 | Date/Time: | Date/Time: | Date/Time: | Date/Time: |

Windward environmental LLC
200 West Mercer Street
Suite 401
Seattle, WA 98119
Tel: (206) 378-1364
Fax: (206) 217-9343

**To be completed by Laboratory upon sample receipt:**

| | | | |
|---|---|---|---|
| Date of receipt:: | 6-9-11 | Laboratory W.O. #: | L1108125 |
| Condition upon receipt: | satisfactory | Time of receipt: | 1am (01:00) |
| Cooler temperature: | 2°c | Received by: | |

# CHAIN-OF-CUSTODY/TEST REQUEST FORM

L1108125

| | | | | | |
|---|---|---|---|---|---|
| Project/Client Name: | Passaic RI/FS Caged Bivalve Study | Ship to: | Alpha Analytical | # LPR-AA060911-20 | |
| Project Number: | Task 23.2 | Attn: | Peter Henriksen | Shipping Date: | 06.08.11 |
| Contact Name: | Jennifer Parker | Shipper: | Lab Pick-up | Airbill Number: | N/A |
| Sampled By: | Thai Do | Form filled out by: | Thai Do | Turnaround requested: | Standard |

| | Sample Collection Date (m/d/y) | Time | Sample Identification | Volume of Sample / # of Containers | Matrix | Test(s) Requested (check test(s) required) Archive | | | | | Comments / Instructions [Jar tag number(s)] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 210 | 06.08.11 | 903 | LPR6VV-EC371 | 1 | Tissue | x | | | | | |
| 211 | 06.08.11 | 903 | LPR6VV-EC372 | 1 | Tissue | x | | | | | |
| 212 | 06.08.11 | 903 | LPR6VV-EC373 | 1 | Tissue | x | | | | | |
| 213 | 06.08.11 | 903 | LPR6VV-EC374 | 1 | Tissue | x | | | | | |
| 214 | 06.08.11 | 903 | LPR6VV-EC375 | 1 | Tissue | x | | | | | |
| 215 | 06.08.11 | 903 | LPR6VV-EC376 | 1 | Tissue | x | | | | | |
| 216 | 06.08.11 | 903 | LPR6VV-EC377 | 1 | Tissue | x | | | | | |
| 217 | 06.08.11 | 903 | LPR6VV-EC378 | 1 | Tissue | x | | | | | |
| 218 | 06.08.11 | 903 | LPR6VV-EC379 | 1 | Tissue | x | | | | | |
| 219 | 06.08.11 | 903 | LPR6VV-EC380 | 1 | Tissue | x | | | | | |
| 220 | 06.08.11 | 903 | LPR6VV-EC381 | 1 | Tissue | x | | | | | |
| | | | **Total Number of Containers** | 11 | Purchase Order / Statement of Work # | | | | | | |

| 1) Released by: | 2) Released by: | 3) Released by: | 4) Released by: | 5) Released by: |
|---|---|---|---|---|
| Company: **Windward Environmental** | Company: Alpha | Company: Alpha | Company: | Company: |
| Date/Time: 06.08.11/ 1530 | Date/Time: 6/8/11 17:30 | Date/Time: 6/8/11 12:57 | Date/Time: | Date/Time: |
| Rec'd by: Lou Lugo | Rec'd by: | Rec'd by: | Rec'd by: | Rec'd by: |
| Company: **Alpha Analytical** | Company: Alpha | Company: | Company: | Company: |
| Date/Time: 6/8/11 1530 | Date/Time: 6/8/11 18:00 | Date/Time: | Date/Time: | Date/Time: |

Windward environmental LLC
200 West Mercer Street
Suite 401
Seattle, WA 98119
Tel: (206) 378-1364
Fax: (206) 217-9343

**To be completed by Laboratory upon sample receipt:**

| | |
|---|---|
| Date of receipt:: 6/9/11 | Laboratory W.O. #: L1108125 |
| Condition upon receipt: satisfactory | Time of receipt: 1am (01:00) |
| Cooler temperature: 2°C | Received by: |

# CHAIN-OF-CUSTODY/TEST REQUEST FORM

L1108125

| | | | | | |
|---|---|---|---|---|---|
| Project/Client Name: | **Passaic RI/FS Caged Bivalve Study** | Ship to: | **Alpha Analytical** | | # LPR-AA060911-21 |
| Project Number: | Task 23.2 | Attn: | Peter Henriksen | Shipping Date: | 06.08.11 |
| Contact Name: | Jennifer Parker | Shipper: | Lab Pick-up | Airbill Number: | N/A |
| Sampled By: | Thai Do | Form filled out by: | Thai Do | Turnaround requested: | Standard |

| | Sample Collection Date (m/d/y) | Time | Sample Identification | Volume of Sample / # of Containers | Matrix | Test(s) Requested (check test(s) required) Archive | | | | | Comments / Instructions [Jar tag number(s)] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 221 | 06.08.11 | 903 | LPR6VV-EC382 | 1 | Tissue | x | | | | | |
| 222 | 06.08.11 | 903 | LPR6VV-EC383 | 1 | Tissue | x | | | | | |
| 223 | 06.08.11 | 903 | LPR6VV-EC384 | 1 | Tissue | x | | | | | |
| 224 | 06.08.11 | 903 | LPR6VV-EC385 | 1 | Tissue | x | | | | | |
| 225 | 06.08.11 | 903 | LPR6VV-EC386 | 1 | Tissue | x | | | | | |
| 226 | 06.08.11 | 903 | LPR6VV-EC387 | 1 | Tissue | x | | | | | |
| 227 | 06.08.11 | 903 | LPR6VV-EC388 | 1 | Tissue | x | | | | | |
| 228 | 06.08.11 | 903 | LPR6VV-EC389 | 1 | Tissue | x | | | | | |
| 229 | 06.08.11 | 903 | LPR6VV-EC391 | 1 | Tissue | x | | | | | |
| 230 | 06.08.11 | 903 | LPR6VV-EC392 | 1 | Tissue | x | | | | | |
| 231 | 06.08.11 | 903 | LPR6VV-EC393 | 1 | Tissue | x | | | | | |
| | | | **Total Number of Containers** | 11 | Purchase Order / Statement of Work # | | | | | | |

| 1) Released by: | 2) Released by: | 3) Released by: | 4) Released by: | 5) Released by: |
|---|---|---|---|---|
| Company: **Windward Environmental** | Company: Alpha | Company: Alpha | Company: | Company: |
| Date/Time: 06.08.11/1530 | Date/Time: 6/8/11 17:30 | Date/Time: 6/8/11 12:57 | Date/Time: | Date/Time: |
| Rec'd by: Lou Lugo | Rec'd by: | Rec'd by: | Rec'd by: | Rec'd by: |
| Company: **Alpha Analytical** | Company: Alpha | Company: | Company: | Company: |
| Date/Time: 6/8/11 1530 | Date/Time: 6/8/11 18:00 | Date/Time: | Date/Time: | Date/Time: |

Wind Ward environmental LLC
200 West Mercer Street
Suite 401
Seattle, WA 98119
Tel: (206) 378-1364
Fax: (206) 217-9343

**To be completed by Laboratory upon sample receipt:**

| | |
|---|---|
| Date of receipt: 6-9-11 | Laboratory W.O. #: L1108125 |
| Condition upon receipt: satisfactory | Time of receipt: 1am (01:00) |
| Cooler temperature: 2°c | Received by: |

# CHAIN-OF-CUSTODY/TEST REQUEST FORM

L1108125

| | | | | | |
|---|---|---|---|---|---|
| Project/Client Name: | Passaic RI/FS Caged Bivalve Study | Ship to: | Alpha Analytical | # LPR-AA060911-22 | |
| Project Number: | Task 23.2 | Attn: | Peter Henriksen | Shipping Date: | 06.08.11 |
| Contact Name: | Jennifer Parker | Shipper: | Lab Pick-up | Airbill Number: | N/A |
| Sampled By: | Thai Do | Form filled out by: | Thai Do | Turnaround requested: | Standard |

| | Sample Collection Date (m/d/y) | Time | Sample Identification | Volume of Sample / # of Containers | Matrix | Test(s) Requested (check test(s) required) Archive | | | | | Comments / Instructions [Jar tag number(s)] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 232 | 06.08.11 | 903 | LPR6VV-EC394 | 1 | Tissue | x | | | | | |
| 233 | 06.08.11 | 903 | LPR6VV-EC395 | 1 | Tissue | x | | | | | |
| 234 | 06.08.11 | 903 | LPR6VV-EC396 | 1 | Tissue | x | | | | | |
| 235 | 06.08.11 | 903 | LPR6VV-EC397 | 1 | Tissue | x | | | | | |
| 236 | 06.08.11 | 903 | LPR6VV-EC398 | 1 | Tissue | x | | | | | |
| 237 | 06.08.11 | 903 | LPR6VV-EC399 | 1 | Tissue | x | | | | | |
| 238 | 06.08.11 | 903 | LPR6VV-EC400 | 1 | Tissue | x | | | | | |
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| | | | **Total Number of Containers** | 7 | Purchase Order / Statement of Work # | | | | | | |

| 1) Released by: | 2) Released by: | 3) Released by: | 4) Released by: | 5) Released by: |
|---|---|---|---|---|
| Company: Windward Environmental | Company: Alpha | Company: Alpha 6/8/11 12:57 | Company: | Company: |
| Date/Time: 06.08.11/ 1530 | Date/Time: 6/8/11 17:30 | Date/Time: | Date/Time: | Date/Time: |
| Rec'd by: | Rec'd by: | Rec'd by: | Rec'd by: | Rec'd by: |
| Company: Alpha Analytical | Company: Alpha 6/8/11 18:00 | Company: | Company: | Company: |
| Date/Time: 6/8/11 1530 | Date/Time: | Date/Time: | Date/Time: | Date/Time: |

Windward environmental LLC
200 West Mercer Street
Suite 401
Seattle, WA 98119
Tel: (206) 378-1364
Fax: (206) 217-9343

**To be completed by Laboratory upon sample receipt:**

| | |
|---|---|
| Date of receipt:: 6-9-11 | Laboratory W.O. #: L1108125 |
| Condition upon receipt: satisfactory | Time of receipt: 1am (01:00) |
| Cooler temperature: 2°C | Received by: |

# Composites to Analytical Labs

# CHAIN-OF-CUSTODY/TEST REQUEST FORM

| | | | | | |
|---|---|---|---|---|---|
| Project/Client Name: | **Passaic RI/FS Caged Bivalve Study** | To: | **Alpha Analytical** | COC reference | # LPR-AA-CBS |
| Project Number: | Task 23.2.1 | Attn: | Ellen Collins | Shipping Date: | NA |
| Contact Name: | Jennifer Parker | Shipper: | NA | Airbill Number: | NA |
| Sampled By: | Windward Environmental LLC | Form filled out by: | Jennifer Parker/Dianne Janak | Turnaround requested: | Standard |

| Sample Collection Date (m/d/y) | Time | Sample Identification | # of Containers | Matrix | Test(s) Requested (check test(s) required) | | | | | Comments / Instructions [Jar tag number(s)] |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | SVOCs (8270C) | PCB Aroclors (8082) | PAHs and Alkylated PAHs (8270C) | Percent Moisture (SM2540G Mod) | | |
| 6/8/2011 | 8:48 | LPR6-ECST-Comp01 | 1 | Tissue | X | X | X | X | | |
| 3/9/2011 | 15:00 | LPRBG-EC5T-Comp01 | 1 | Tissue | X | X | X | X | | |
| 6/8/2011 | 9:03 | LPR6-ECST-Comp02 | 1 | Tissue | X | X | X | X | | |
| 6/8/2011 | 8:20 | LPR7-ECST-Comp03 | 1 | Tissue | X | X | X | X | | |
| 6/8/2011 | 7:55 | LPR7-ECST-Comp04 | 1 | Tissue | X | X | X | X | | |
| 6/8/2011 | 7:40 | LPR8-ECST-Comp05 | 1 | Tissue | X | X | X | X | | |
| 5/9/2011 | 10:20 | LPR1-GDST-Comp01 | 1 | Tissue | X | X | X | X | | |
| 3/8/2011 | 18:30 | LPRBG-GDST-Comp01 | 1 | Tissue | X | X | X | X | | |
| 5/9/2011 | 10:45 | LPR2-GDST-Comp02 | 1 | Tissue | X | X | X | X | | |
| 5/9/2011 | 11:20 | LPR3-GDST-Comp03 | 1 | Tissue | X | X | X | X | | |
| | | **Total Number of Containers** | 10 | **Purchase Order / Statement of Work #** 2011-015 | | | | | | |

| 1) **Released by:** | 2) **Released by:** | 3) **Released by:** | **NOTES** Individual specimens were collected by Windward Environmental. The collection date and time corresponds to the earliest collected individual specimen within the composite. Specimens were grouped together into composites by Windward onsite at Alpha Analytical. Alpha Analytical processed and homogenized the composites; therefore, samples are released by Alpha |
|---|---|---|---|
| Company: ALPHA<br>Date/Time: 7/26/11 1305<br>**Rec'd by:**<br>Company: ALPHA<br>Date/Time: 7/26/11 1305 | Company:<br>Date/Time:<br>**Rec'd by:**<br>Company:<br>Date/Time: | Company:<br>Date/Time:<br>**Rec'd by:**<br>Company:<br>Date/Time: | |

Wind Ward environmental LLC
200 West Mercer Street
Suite 401
Seattle, WA 98119
Tel: (206) 378-1364
Fax: (206) 217-9343

**To be completed by Laboratory upon sample receipt:**

| | |
|---|---|
| Date of receipt:: 7.26.2011 | Laboratory W.O. #: L1110328 |
| Condition upon receipt: satisfactory | Time of receipt: 13:05 |
| Cooler temperature: NA | Received by: |

# CHAIN-OF-CUSTODY/TEST REQUEST FORM

| | | | | | |
|---|---|---|---|---|---|
| Project/Client Name: | **Passaic RI/FS Caged Bivalve Study** | To: | **Alpha Analytical** | COC reference | # LPR-AA-RB1 |
| Project Number: | Task 23.2.1 | Attn: | Ellen Collins | Shipping Date: | NA |
| Contact Name: | Jennifer Parker | Shipper: | NA | Airbill Number: | NA |
| Sampled By: | Windward Environmental LLC | Form filled out by: | Jennifer Parker/Ellen Collins | Turnaround requested: | Standard |

| Sample Collection Date (m/d/y) | Time | Sample Identification | # of Containers | Matrix | Test(s) Requested (check test(s) required) | | | | | Comments / Instructions [Jar tag number(s)] |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | SVOCs (8270C) | PCB Aroclors (8082) | PAHs and Alkylated PAHs (8270C) | | | |
| 7/18/2011 | 17:00 | LPR-071811RB | 6 | Water | X | X | X | | | |
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| **Total Number of Containers** | | | 6 | **Purchase Order / Statement of Work #** 2011-015 | | | | | | |

| 1) **Released by:** | 2) **Released by:** | 3) **Released by:** | **NOTES** |
|---|---|---|---|
| Company: ALPHA | Company: | Company: | |
| Date/Time: 7/18/11 1720 | Date/Time: | Date/Time: | |
| **Rec'd by:** | **Rec'd by:** | **Rec'd by:** | |
| Company: ALPHA | Company: | Company: | |
| Date/Time: 7/18/11 1720 | Date/Time: | Date/Time: | |

Wind Ward environmental LLC

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Suite 401
Seattle, WA 98119
Tel: (206) 378-1364
Fax: (206) 217-9343

**To be completed by Laboratory upon sample receipt:**

| | |
|---|---|
| Date of receipt:: 7.18.2011 | Laboratory W.O. #: L1110328 |
| Condition upon receipt: satisfactory | Time of receipt: ~~10~~ 17:20 |
| Cooler temperature: NA | Received by: |

# CHAIN-OF-CUSTODY/TEST REQUEST FORM

| | | | | | |
|---|---|---|---|---|---|
| Project/Client Name: | Passaic RI/FS Caged Bivalve Study | To: | Analytical Perspectives | COC reference | # LPR-AP-RB1 |
| Project Number: | Task 23.2.1 | Attn: | Kim Mace | Shipping Date: | 07/19/2011 |
| Contact Name: | Jennifer Parker | Shipper: | UPS | Airbill Number: | 1Z19E78E 01 4755 5129 |
| Sampled By: | Windward Environmental LLC | Form filled out by: | Jennifer Parker/Ellen Collins | Turnaround requested: | Standard |

| Sample Collection Date (m/d/y) | Time | Sample Identification | # of Containers | Matrix | Test(s) Requested (check test(s) required): PCB Congeners (1668A) | PCDDs/PCDFs (1613B) | | | | Comments / Instructions [Jar tag number(s)] |
|---|---|---|---|---|---|---|---|---|---|---|
| 7/18/2011 | 17:00 | LPR-071811-RB | 2 | Water | X | X | | | | |
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| Total Number of Containers | | | 2 | Purchase Order / Statement of Work # 2011-016 | | | | | | |

| 1) Released by: | 2) Released by: | 3) Released by: | NOTES |
|---|---|---|---|
| Company: 404A<br>Date/Time: 7/19/11 1145<br>Rec'd by: UPS<br>Company:<br>Date/Time: | Company:<br>Date/Time:<br>Rec'd by:<br>Company:<br>Date/Time: | Company:<br>Date/Time:<br>Rec'd by:<br>Company:<br>Date/Time: | |

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Seattle, WA 98119
Tel: (206) 378-1364
Fax: (206) 217-9343

**To be completed by Laboratory upon sample receipt:**

| | | | |
|---|---|---|---|
| Date of receipt:: | 21 Jul 11 | Laboratory W.O. #: | A3380 |
| Condition upon receipt: | good | Time of receipt: | 9:44 |
| Cooler temperature: | 2°C | Received by: | Nancy Musselwhite |

see next page → information transferred to this form since JPEG did not scan correctly — 25 Jul 11

A3406

FedEx Air Bill # 7950 3062 9177

1 of 1

# CHAIN-OF-CUSTODY/TEST REQUEST FORM

| | | | | | |
|---|---|---|---|---|---|
| Project/Client Name: | Passaic RI/FS Caged Bivalve Study | To: | Analytical Perspectives | COC reference | # LPR-AP-CBS |
| Project Number: | Task 23.2.1 | Attn: | Kim Mace | Shipping Date: | 07/26/2011 8/1/11 |
| Contact Name: | Jennifer Parker | Shipper: | UPS | Airbill Number: | ~~1Z19E18E 014956 2242~~ |
| Sampled By: | Windward Environmental LLC | Form filled out by: | Jennifer Parker/Dianne Janak | Turnaround requested: | Standard |

| Sample Collection Date (m/d/y) | Time | Sample Identification | # of Containers | Matrix | Test(s) Requested (check test(s) required): PCB Congeners (1668A) | PCDDs/PCDFs (1613B) | | | | Comments / Instructions [Jar tag number(s)] |
|---|---|---|---|---|---|---|---|---|---|---|
| 6/8/2011 | 8:48 | LPR6-ECST-Comp01 | 1 | Tissue | X | X | | | | |
| 3/9/2011 | 15:00 | LPRBG-ECST-Comp01 | 1 | Tissue | X | X | | | | |
| 6/8/2011 | 9:03 | LPR6-ECST-Comp02 | 1 | Tissue | X | X | | | | |
| 6/8/2011 | 8:20 | LPR7-ECST-Comp03 | 1 | Tissue | X | X | | | | |
| 6/8/2011 | 7:55 | LPR7-ECST-Comp04 | 1 | Tissue | X | X | | | | |
| 6/8/2011 | 7:40 | LPR8-ECST-Comp05 | 1 | Tissue | X | X | | | | |
| 5/9/2011 | 10:20 | LPR1-GDST-Comp01 | 1 | Tissue | X | X | | | | |
| 3/8/2011 | 18:30 | LPRBG-GDST-Comp01 | 1 | Tissue | X | X | | | | |
| 5/9/2011 | 10:45 | LPR2-GDST-Comp02 | 1 | Tissue | X | X | | | | |
| 5/9/2011 | 11:20 | LPR3-GDST-Comp03 | 1 | Tissue | X | X | | | | |
| | | **Total Number of Containers** | 10 | **Purchase Order / Statement of Work #** 2011-016 | | | | | | |

| 1) Released by: | 2) Released by: | 3) Released by: |
|---|---|---|
| Company: ALPHA | UPS | Company: ALPHA |
| Date/Time: 7/26/11 1207 | Date/Time: | Date/Time: 8/1/11 0805 |
| Rec'd by: UPS | Rec'd by: | Rec'd by: FedEx |
| Company: | Company: ALPHA | Company: |
| Date/Time: | Date/Time: 7/27/11 1815 | Date/Time: |

**NOTES** Individual specimens were collected by Windward Environmental. The collection date and time corresponds to the earliest collected individual specimen within the composite. Specimens were grouped together into composites by Windward onsite at Alpha Analytical. Alpha Analytical processed and homogenized the composites; therefore, samples are released by Alpha

**To be completed by Laboratory upon sample receipt:**

| | |
|---|---|
| Date of receipt: 02 Aug 11 | Laboratory W.O. #: |
| Condition upon receipt: good | Time of receipt: 9:45 |
| Cooler temperature: -30° | Received by: A Musselwhite |

Windward environmental LLC
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Seattle, WA 98119
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Fax: (206) 217-9343

Kij 9/3/11 ~~H30025~~ 1132006



# CHAIN-OF-CUSTODY/TEST REQUEST FORM

BRL Report 1132006, Rev.4

| | | | | | |
|---|---|---|---|---|---|
| Project/Client Name: | **Passaic RI/FS Caged Bivalve Study** | To: | **Brooks Rand Labs** | COC reference | # LPR-BRL-RB1 |
| Project Number: | Task 23.2.1 | Attn: | Jen Hartman | Shipping Date: | 07/19/2011 |
| Contact Name: | Jennifer Parker | Shipper: | UPS | Airbill Number: | 1Z 19E 18E 01 4701 1493 |
| Sampled By: | Windward Environmental LLC | Form filled out by: | Jennifer Parker/Ellen Collins | Turnaround requested: | Standard |

| Sample Collection Date (m/d/y) | Time | Sample Identification | # of Containers | Matrix | Test(s) Requested (check test(s) required): Methylmercury (1630) | Total Mercury (1631) | | | | Comments / Instructions [Jar tag number(s)] |
|---|---|---|---|---|---|---|---|---|---|---|
| 7/18/2011 | 17:00 | LPR-071811-RB | 2 | Water | X | X | | | | |
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| **Total Number of Containers** | | | 2 | **Purchase Order / Statement of Work** # 2011-0013 | | | | | | |

| 1) **Released by:** | 2) **Released by:** | 3) **Released by:** | **NOTES** |
|---|---|---|---|
| Company: UPS<br>Date/Time: 7/19/11 1110 | Company:<br>Date/Time: | Company:<br>Date/Time: | |
| **Rec'd by:** UPS | **Rec'd by:** | **Rec'd by:** | |
| Company:<br>Date/Time: | Company:<br>Date/Time: | Company:<br>Date/Time: | |

**To be completed by Laboratory upon sample receipt:**

| | |
|---|---|
| Date of receipt:: 7/21/11 | Laboratory W.O. #: |
| Condition upon receipt: | Time of receipt: 9:00 |
| Cooler temperature: 2.0 | Received by: |

Wind Ward environmental LLC
200 West Mercer Street
Suite 401
Seattle, WA 98119
Tel: (206) 378-1364
Fax: (206) 217-9343

1132006 FedEx AIRBILL # 7950 3961 7644



1 of 1

# CHAIN-OF-CUSTODY/TEST REQUEST FORM

| | | | | | |
|---|---|---|---|---|---|
| Project/Client Name: | Passaic RI/FS Caged Bivalve Study | To: | Brooks Rand Labs | COC reference | # LPR-BRL-CBS |
| Project Number: | Task 23.2.1 | Attn: | Jen Hartman | Shipping Date: | 07/26/2011 |
| Contact Name: | Jennifer Parker | Shipper: | UPS | Airbill Number: | ~~1Z19E18E01 4922 3822~~ |
| Sampled By: | Windward Environmental LLC | Form filled out by: | Jennifer Parker/Dianne Janak | Turnaround requested: | Standard |

| Sample Collection Date (m/d/y) | Time | Sample Identification | # of Containers | Matrix | Test(s) Requested (check test(s) required): Methylmercury (1630) | Total Mercury (1631) | | | | Comments / Instructions [Jar tag number(s)] |
|---|---|---|---|---|---|---|---|---|---|---|
| 6/8/2011 | 8:48 | LPR6-ECST-Comp01 | 1 | Tissue | X | X | | | | |
| 3/9/2011 | 15:00 | LPRBG-ECST-Comp01 | 1 | Tissue | X | X | | | | |
| 6/8/2011 | 9:03 | LPR6-ECST-Comp02 | 1 | Tissue | X | X | | | | |
| 6/8/2011 | 8:20 | LPR7-ECST-Comp03 | 1 | Tissue | X | X | | | | |
| 6/8/2011 | 7:55 | LPR7-ECST-Comp04 | 1 | Tissue | X | X | | | | |
| 6/8/2011 | 7:40 | LPR8-ECST-Comp05 | 1 | Tissue | X | X | | | | |
| 5/9/2011 | 10:20 | LPR1-GDST-Comp01 | 1 | Tissue | X | X | | | | |
| 3/8/2011 | 18:30 | LPRBG-GDST-Comp01 | 1 | Tissue | X | X | | | | |
| 5/9/2011 | 10:45 | LPR2-GDST-Comp02 | 1 | Tissue | X | X | | | | |
| 5/9/2011 | 11:20 | LPR3-GDST-Comp03 | 1 | Tissue | X | X | | | | |
| **Total Number of Containers** | | | 10 | **Purchase Order / Statement of Work** # 2011-0013 | | | | | | |

1) **Released by:** [signature]
Company: ALPHA
Date/Time: 7/26/11 1123
**Rec'd by:** UPS
Company:
Date/Time:

2) **Released by:** UPS
Company:
Date/Time:
**Rec'd by:** [signature]
Company: ALPHA
Date/Time: 7/27/11 1815

3) **Released by:** [signature]
Company: ALPHA
Date/Time: 8/1/11 0750
**Rec'd by:** ~~UPS~~ FedEx 8/1/11
Company:
Date/Time:

**NOTES** Individual specimens were collected by Windward Environmental. The collection date and time corresponds to the earliest collected individual specimen within the composite. Specimens were grouped together into composites by Windward onsite at Alpha Analytical. Alpha Analytical processed and homogenized the composites; therefore, samples are released by Alpha

**To be completed by Laboratory upon sample receipt:**

| | | | |
|---|---|---|---|
| Date of receipt: | 8/2/2011 | Laboratory W.O. #: | |
| Condition upon receipt: | Good | Time of receipt: | 0845 |
| Cooler temperature: | -28°C | Received by: | [signature] 8/2/2011 |

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Fax: (206) 217-9343

# CHAIN-OF-CUSTODY/TEST REQUEST FORM

| | | | | | |
|---|---|---|---|---|---|
| Project/Client Name: | **Passaic RI/FS Caged Bivalve Study** | To: | **Columbia Analytical** | COC reference | # LPR-CAS-RB1 |
| Project Number: | Task 23.2.1 | Attn: | Lynda Huckestein | Shipping Date: | 07/19/2011 |
| Contact Name: | Jennifer Parker | Shipper: | UPS | Airbill Number: | 1Z19E 18E 01 4773 9903 |
| Sampled By: | Windward Environmental LLC | Form filled out by: | Jennifer Parker/Ellen Collins | Turnaround requested: | Standard |

| Sample Collection Date (m/d/y) | Time | Sample Identification | # of Containers | Matrix | Test(s) Requested (check test(s) required) | | | | | Comments / Instructions [Jar tag number(s)] |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Butyltins (Krone) | Metals (ICP,6010B) | Metals (ICP/MS, 6020) | Metals (Se, 7742) | | |
| 7/18/2011 | 17:00 | LPR-071811-RB | 2 | Water | X | X | X | X | | |
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| | | | | | | | | | | |
| **Total Number of Containers** | | | 2 | **Purchase Order / Statement of Work** # 2011-016 | | | | | | |

| 1) **Released by:** | 2) **Released by:** | 3) **Released by:** | **NOTES** |
|---|---|---|---|
| Company: ALPHA | Company: | Company: | |
| Date/Time: 7/19/11 1120 | Date/Time: | Date/Time: | |
| **Rec'd by:** UPS | **Rec'd by:** | **Rec'd by:** | |
| Company: | Company: CAS | Company: | |
| Date/Time: | Date/Time: 7/21/11 1030 | Date/Time: | |

**To be completed by Laboratory upon sample receipt:**

| | |
|---|---|
| Date of receipt:: 7/21/11 | Laboratory W.O. #: |
| Condition upon receipt: | Time of receipt: |
| Cooler temperature: | Received by: |

Windward environmental LLC
200 West Mercer Street
Suite 401
Seattle, WA 98119
Tel: (206) 378-1364
Fax: (206) 217-9343

1C11072026 FedEx Airbill # 7950 3064 6342



# CHAIN-OF-CUSTODY/TEST REQUEST FORM

| | | | | | |
|---|---|---|---|---|---|
| Project/Client Name: | Passaic RI/FS Caged Bivalve Study | To: | Columbia Analytical | COC reference | # LPR-CAS-CBS |
| Project Number: | Task 23.2.1 | Attn: | Lynda Huckestein | Shipping Date: | 07/26/2011 |
| Contact Name: | Jennifer Parker | Shipper: | UPS | Airbill Number: | ~~1Z19C8E 01 4905 4630~~ |
| Sampled By: | Windward Environmental LLC | Form filled out by: | Jennifer Parker/Dianne Janak | Turnaround requested: | Standard |

| Sample Collection Date (m/d/y) | Time | Sample Identification | # of Containers | Matrix | Test(s) Requested (check test(s) required) | | | | | Comments / Instructions [Jar tag number(s)] |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Butyltins (Krone) | Metals (ICP,6010B) | Metals (ICP/MS, 6020) | Metals (Se, 7742) | Lipids (Bligh-Dyer) | |
| 6/8/2011 | 8:48 | LPR6-ECST-Comp01 | 1 | Tissue | X | X | X | X | X | |
| 3/9/2011 | 15:00 | LPRBG-ECST-Comp01 | 1 | Tissue | X | X | X | X | X | |
| 6/8/2011 | 9:03 | LPR6-ECST-Comp02 | 1 | Tissue | X | X | X | X | X | |
| 6/8/2011 | 8:20 | LPR7-ECST-Comp03 | 1 | Tissue | X | X | X | X | X | |
| 6/8/2011 | 7:55 | LPR7-ECST-Comp04 | 1 | Tissue | X | X | X | X | X | |
| 6/8/2011 | 7:40 | LPR8-ECST-Comp05 | 1 | Tissue | X | X | X | X | X | |
| 5/9/2011 | 10:20 | LPR1-GDST-Comp01 | 1 | Tissue | X | X | X | X | X | |
| 3/8/2011 | 18:30 | LPRBG-GDST-Comp01 | 1 | Tissue | X | X | X | X | X | |
| 5/9/2011 | 10:45 | LPR2-GDST-Comp02 | 1 | Tissue | X | X | X | X | X | |
| 5/9/2011 | 11:20 | LPR3-GDST-Comp03 | 1 | Tissue | X | X | X | X | X | |
| | | **Total Number of Containers** | 10 | **Purchase Order / Statement of Work** # 2011-016 | | | | | | |

| 1) **Released by:** | 2) **Released by:** | 3) **Released by:** | |
|---|---|---|---|
| Company: ALPHA | UPS | Company: ALPHA | **NOTES** Individual specimens were collected by Windward Environmental. The collection date and time corresponds to the earliest collected individual specimen within the composite. Specimens were grouped together into composites by Windward onsite at Alpha Analytical. Alpha Analytical processed and homogenized the composites; therefore, samples are released by Alpha |
| Date/Time: 7/26/11 1130 | Company: | Date/Time: 8/1/11 0815 | |
| **Rec'd by:** UPS | Date/Time: | **Rec'd by:** FED EX | |
| Company: | **Rec'd by:** | Company: | |
| Date/Time: | Company: ALPHA | Date/Time: | |
| | Date/Time: 7/27/11 1815 | | |

**To be completed by Laboratory upon sample receipt:**

| | | | |
|---|---|---|---|
| Date of receipt:: | 8/2/11 | Laboratory W.O. #: | |
| Condition upon receipt: | Good | Time of receipt: | 10:00 am |
| Cooler temperature: | -19.9 | Received by: | CAS |

Wind Ward environmental LLC
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Tel: (206) 378-1364
Fax: (206) 217-9343

IMMEDIATE TEST

1 of 1

# CHAIN-OF-CUSTODY/TEST REQUEST FORM

| | | | | | |
|---|---|---|---|---|---|
| Project/Client Name: | Passaic RI/FS Caged Bivalve Study | To: | Maxxam Analytics | COC reference | # LPR-MA-RB1 |
| Project Number: | Task 23.2.1 | Attn: | Mike Challis | Shipping Date: | 07/19/2011 |
| Contact Name: | Jennifer Parker | Shipper: | UPS | Airbill Number: | 1Z19E8E 66 4847 3111 |
| Sampled By: | Windward Environmental LLC | Form filled out by: | Jennifer Parker/Ellen Collins | Turnaround requested: | Standard |

| Sample Collection Date (m/d/y) | Time | Sample Identification | # of Containers | Matrix | Test(s) Requested (check test(s) required): OC Pesticides (1699 Mod – NYSDEC HRMS-2) | | | | | Comments / Instructions [Jar tag number(s)] |
|---|---|---|---|---|---|---|---|---|---|---|
| 7/18/2011 | 17:00 | LPR-071811-RB | 1 | Water | X | | | | | 21-Jul-11 10:03 MIKE CHALLIS B1A8699 MHO ENV-963 |
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| | | | | | | | | | | |
| | | Total Number of Containers | 1 | Purchase Order / Statement of Work # 2011-017 | | | | | | |

| 1) Released by: | 2) Released by: | 3) Released by: | NOTES |
|---|---|---|---|
| Company: ZENTA<br>Date/Time: 7/19/11 1130<br>Rec'd by: UPS<br>Company:<br>Date/Time: | Company:<br>Date/Time:<br>Rec'd by:<br>Company:<br>Date/Time: | Company:<br>Date/Time:<br>Rec'd by: ZZentA ZOFIA ZENTA<br>Company: 2011/07/21 10:03<br>Date/Time: | temp: 22 2011/07/21 ~~6/5/6~~° C custody seal intact |

**To be completed by Laboratory upon sample receipt:**

| | |
|---|---|
| Date of receipt:: | Laboratory W.O. #: |
| Condition upon receipt: | Time of receipt: |
| Cooler temperature: | Received by: |

4.1/4.0/4.2° C

Windward environmental LLC
200 West Mercer Street
Suite 401
Seattle, WA 98119
Tel: (206) 378-1364
Fax: (206) 217-9343

IMMEDIATE TEST

1 of 1

# CHAIN-OF-CUSTODY/TEST REQUEST FORM

| | | | | | |
|---|---|---|---|---|---|
| Project/Client Name: | Passaic RI/FS Caged Bivalve Study | To: | Maxxam Analytics | COC reference | # LPR-MA-CBS |
| Project Number: | Task 23.2.1 | Attn: | Mike Challis | Shipping Date: | 07/26/2011 |
| Contact Name: | Jennifer Parker | Shipper: | Maxxam courier | Airbill Number: | ~~NA~~ 7950 1192 4693 |
| Sampled By: | Windward Environmental LLC | Form filled out by: | Jennifer Parker/Dianne Janak | Turnaround requested: | Standard |

28-Jul-11 12:30
MIKE CHALLIS
B1B3152
J_L FZ-13

| Sample Collection Date (m/d/y) | Time | Sample Identification | # of Containers | Matrix | Test(s) Requested (check test(s) required): OC Pesticides (1699 Mod – NYSDEC HRMS-2) | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 6/8/2011 | 8:48 | LPR6-ECST-Comp01 | 1 | Tissue | X | | | | |
| 3/9/2011 | 15:00 | LPRBG-ECST-Comp01 | 1 | Tissue | X | | | | |
| 6/8/2011 | 9:03 | LPR6-ECST-Comp02 | 1 | Tissue | X | | | | |
| 6/8/2011 | 8:20 | LPR7-ECST-Comp03 | 1 | Tissue | X | | | | |
| 6/8/2011 | 7:55 | LPR7-ECST-Comp04 | 1 | Tissue | X | | | | |
| 6/8/2011 | 7:40 | LPR8-ECST-Comp05 | 1 | Tissue | X | | | | |
| 5/9/2011 | 10:20 | LPR1-GDST-Comp01 | 1 | Tissue | X | | | | |
| 3/8/2011 | 18:30 | LPRBG-GDST-Comp01 | 1 | Tissue | X | | | | |
| 5/9/2011 | 10:45 | LPR2-GDST-Comp02 | 1 | Tissue | X | | | | |
| 5/9/2011 | 11:20 | LPR3-GDST-Comp03 | 1 | Tissue | X | | | | |
| | | **Total Number of Containers** | 10 | **Purchase Order / Statement of Work** # 2011-017 | | | | | |

**International Solid Sample**
**Heat Treat Required**
High Risk material
Controlled Storage and Disposal

| 1) Released by: | 2) Released by: | 3) Released by: | NOTES |
|---|---|---|---|
| Company: ALPHA<br>Date/Time: 7/26/11 1250 ~~1250~~ 7/28/11<br>Rec'd by: FED EX<br>Company:<br>Date/Time: | Company:<br>Date/Time:<br>Rec'd by:<br>Company:<br>Date/Time: | Company:<br>Date/Time:<br>Rec'd by:<br>Company:<br>Date/Time: | **NOTES** Individual specimens were collected by Windward Environmental. The collection date and time corresponds to the earliest collected individual specimen within the composite. Specimens were grouped together into composites by Windward onsite at Alpha Analytical. Alpha Analytical processed and homogenized the composites; therefore, samples are released by Alpha |


Windward environmental LLC
200 West Mercer Street
Suite 401
Seattle, WA 98119
Tel: (206) 378-1364
Fax: (206) 217-9343


**To be completed by Laboratory upon sample receipt:**

| | |
|---|---|
| Date of receipt:: | Laboratory W.O. #: |
| Condition upon receipt: -14.8/-10.6/-9.4°C | Time of receipt: 2011/07/28 12:30 |
| Cooler temperature: | Received by: FANG WANG |

# APPENDIX I. CAGED BIVALVE ANALYSIS PLAN

**Table 1. Summary of proposed mussel samples**

| Reach | RM range | Tissue Location | Collection Day | Sample ID (tissue type 1) | Field Estimated Whole body mass (g)[a] | n | Analytes[b] |
|---|---|---|---|---|---|---|---|
| $T_0$ | na | $T_0$ | Day 0 | LPRBG-GDST-Comp01 | 180 | 40 | All |
| $T_0$ | na | $T_0$ | Day 0 | LPRBG-ECST-Comp01 | 400 | 40 | All |
| 1 | RM 0 - RM 2 | LPR1XX | Day 61 | LPR1-GDST-Comp01 | 149 | 33 | All |
| 2 | RM 2 - RM 4 | LPR2AD | Day 61 | LPR2-GDST-Comp02 | 144 | 32 | All |
| 3 | RM 4 - RM 6 | LPR3SS | Day 61 | LPR3-GDST-Comp03 | 45[c] | 10 | Lipids, % Moisture, PCDD/PCDF, PCB congeners, Hg |
| 4 | RM 6 - RM 8 | LPR4ZZ | Day 61 | no sample | 4.5[d] | 1 | No Sample |
| 6 | RM 10 - RM 12 | LPR6UU | Day 90 | LPR6-ECST-Comp01 | 520 | 52 | All |
| 6 | RM 10 - RM 12 | LPR6VV | Day 90 | LPR6-ECST-Comp02 | 510 | 51 | All |
| 7 | RM12 - RM 14 | LPR7ZZ | Day 90 | LPR7-ECST-Comp03 | 800 | 80 | All |
| 7 | RM12 - RM 14 | LPR7AB | Day 90 | LPR7-ECST-Comp04 | 510 | 51 | All |
| 8 | RM 14- RM 17.4 | LPR8AC | Day 90 | LPR8-ECST-Comp05 | 40[c] | 4 | Lipids, % Moisture, PCDD/PCDF, PCB congeners, Hg |

[a] Estimated tissue mass is based on average weights obtained from a subset of mussels at Day 0. If the post-homogenization mass is less than 95 g, the analyte priority list presented in Table 2 will be followed, which is consisent with the priority list presented in the Caged Bivalve Study Benthic QAPP Addendum (Windward 2011).

[b] Proposed analytes based on estimated mass. Actual mass will be determined by Alpha Analytical during processing of the tissue.

[c] Mortality exceeded 60% at LPR3SS (87.5%) and LPR8AC (93.3%). In accordance with the Caged Bivalve Study Benthic QAPP Addendum (Windward 2011), CPG and USEPA will discuss analysis of tissue samples from locations with greater than 60% mortality. Table 2 presents the reduced analyte priority list that will be followed if the samples are analyzed.

[d] No samples from LPR4ZZ is proposed because available tissue mass is too small.

BG - Time zero ($T_0$) tissue sample collected at time of deployment (Day 0) from batch of mussels used in cages. $T_0$ tissue samples are proposed for analysis in order to establish tissue concentrations in mussels at the start of the 90-day caged bivalve study.
ECST - *Elliptio complanata* (freshwater mussel) Soft tissue
GDST - *Guekensia demissa* (estuarine ribbed mussel) Soft tissue

Green shaded cells indicate the samples targeted for QC analysis
Blue shadded cell indicates the samples targeted for USEPA split sample analysis.

Windward. 2011. Lower Passaic River Restoration Project. Lower Passaic River Study Area RI/FS. Caged Bivalve Study Addendum to the Quality Assurance Project Plan: Surface sediment chemical analyses and benthic invertebrate toxicity and bioaccumulation testing. Final. Prepared for Cooperating Parties Group, Newark, New Jersey. Windward Environmental LLC, Seattle, WA.

**Table 2. Priority list of analytes for caged bivalve tissue and minimum post-homogenization mass requirements[a]**

| Proposed Revised Priority List | | |
|---|---|---|
| Analyte | Minimum Mass (g) | Cummulative Mass (g) |
| Lipids | 5 | 5 |
| Percent Moisture | 5 | 10 |
| PCDD/PCDF | 10 | 20 |
| PCB congeners | 10 | 30 |
| Total and methyl mercury | 10 | 40 |
| Organochlorine pesticides | 10 | 50 |
| Metals (including butyltins) | 15 | 65 |
| PAHs (including alkylated PAHs) | 10 | 75 |
| SVOCs | 10 | 85 |
| PCB Aroclors | 10 | 95 |
| **Total minimum mass** | **95** | |
| | | |
| | | |

[a] Priority list as presented in USEPA-approved Caged Bivalve Study Benthic QAPP Addendum (Windward 2011).

Windward. 2011. Lower Passaic River Restoration Project. Lower Passaic River Study Area RI/FS. Caged Bivalve Study Addendum to the Quality Assurance Project Plan: Surface sediment chemical analyses and benthic invertebrate toxicity and bioaccumulation testing. Final. Prepared for Cooperating Parties Group, Newark, New Jersey. Windward Environmental LLC, Seattle, WA.

# APPENDIX J. SAMPLES AND ANALYSES BY ANALYTICAL LABORATORY AND SAMPLE DELIVERY GROUP

## 2011 Caged Bivalve Study Data for the LPRSA
## Appendix J
### Table J-1. SDGs, sample IDs, and analyses - Alpha Analytical

| Bivalve Type | Species | Sample ID | SDG | Lab ID | SVOCs (8270C) | Percent Moisture (SM2540G Mod) | PCB Aroclors (8082) | PAHs and Alkylated PAHs (8270C-SIM) |
|---|---|---|---|---|---|---|---|---|
| Eastern elliptio mussel | *Elliptio complanata* | LPR6-ECST-Comp01 | L1110328 | L1110328-01 | x | x | x | x |
| Eastern elliptio mussel | *Elliptio complanata* | LPRBG-ECST-Comp01 | L1110328 | L1110328-02 | x | x | x | x |
| Eastern elliptio mussel | *Elliptio complanata* | LPR6-ECST-Comp02 | L1110328 | L1110328-03 | x | x | x | x |
| Eastern elliptio mussel | *Elliptio complanata* | LPR7-ECST-Comp03 | L1110328 | L1110328-04 | x | x | x | x |
| Eastern elliptio mussel | *Elliptio complanata* | LPR7-ECST-Comp04 | L1110328 | L1110328-05 | x | x | x | x |
| Eastern elliptio mussel | *Elliptio complanata* | LPR8-ECST-Comp05 | L1110328 | L1110328-06 | x | x | x | x |
| Ribbed mussel | *Geukensia demissa* | LPR1-GDST-Comp01 | L1110328 | L1110328-07 | x | x | x | x |
| Ribbed mussel | *Geukensia demissa* | LPRBG-GDST-Comp01 | L1110328 | L1110328-08 | x | x | x | x |
| Ribbed mussel | *Geukensia demissa* | LPR2-GDST-Comp02 | L1110328 | L1110328-09 | x | x | x | x |
| Ribbed mussel | *Geukensia demissa* | LPR3-GDST-Comp03 | L1110328 | L1110328-10 | x | x | x | x |
| Rinsate blank | | LPR-071811-RB | L1110328 | L1110328-11 | x | | x | x |

## 2011 Caged Bivalve Study Data for the LPRSA
## Appendix J
### Table J-2. SDGs, sample IDs, and analyses - Analytical Perspectives

| Bivalve Type | Species | Sample ID | SDG | Lab ID | PCDD/PCDF (1613B) | PCB Congeners (1668B) |
|---|---|---|---|---|---|---|
| Eastern elliptio musse | *Elliptio complanata* | LPR6-ECST-Comp01 | A3406 | A3406_001 | x | x |
| Eastern elliptio musse | *Elliptio complanata* | LPRBG-ECST-Comp01 | A3406 | A3406_002 | x | x |
| Eastern elliptio musse | *Elliptio complanata* | LPR6-ECST-Comp02 | A3406 | A3406_003 | x | x |
| Eastern elliptio musse | *Elliptio complanata* | LPR7-ECST-Comp03 | A3406 | A3406_004 | x | x |
| Eastern elliptio musse | *Elliptio complanata* | LPR7-ECST-Comp04 | A3406 | A3406_005 | x | x |
| Eastern elliptio musse | *Elliptio complanata* | LPR8-ECST-Comp05 | A3406 | A3406_006 | x | x |
| Ribbed mussel | *Geukensia demissa* | LPR1-GDST-Comp01 | A3406 | A3406_007 | x | x |
| Ribbed mussel | *Geukensia demissa* | LPRBG-GDST-Comp01 | A3406 | A3406_008 | x | x |
| Ribbed mussel | *Geukensia demissa* | LPR2-GDST-Comp02 | A3406 | A3406_009 | x | x |
| Ribbed mussel | *Geukensia demissa* | LPR3-GDST-Comp03 | A3406 | A3406_010 | x | x |
| Rinsate blank | | LPR-071811-RB | A3380 | A3380_001 | x | x |

## 2011 Caged Bivalve Study Data for the LPRSA
## Appendix J
### Table J-3. SDGs, sample IDs, and analyses - Brooks Rand Labs

| Bivalve Type | Species | Sample ID | SDG | Lab ID | Methyl mercury (1630) | Total Mercury (1631) |
|---|---|---|---|---|---|---|
| Eastern elliptio musse | *Elliptio complanata* | LPR6-ECST-Comp01 | 1132006 | 1132006-01 | x | x |
| Eastern elliptio musse | *Elliptio complanata* | LPRBG-ECST-Comp01 | 1132006 | 1132006-02 | x | x |
| Eastern elliptio musse | *Elliptio complanata* | LPR6-ECST-Comp02 | 1132006 | 1132006-03 | x | x |
| Eastern elliptio musse | *Elliptio complanata* | LPR7-ECST-Comp03 | 1132006 | 1132006-04 | x | x |
| Eastern elliptio musse | *Elliptio complanata* | LPR7-ECST-Comp04 | 1132006 | 1132006-05 | x | x |
| Eastern elliptio musse | *Elliptio complanata* | LPR8-ECST-Comp05 | 1132006 | 1132006-06 | x | x |
| Ribbed mussel | *Geukensia demissa* | LPR1-GDST-Comp01 | 1132006 | 1132006-07 | x | x |
| Ribbed mussel | *Geukensia demissa* | LPRBG-GDST-Comp01 | 1132006 | 1132006-08 | x | x |
| Ribbed mussel | *Geukensia demissa* | LPR2-GDST-Comp02 | 1132006 | 1132006-09 | x | x |
| Ribbed mussel | *Geukensia demissa* | LPR3-GDST-Comp03 | 1132006 | 1132006-10 | x | x |
| Rinsate blank | | LPR-071811-RB | 1132006 | 1132006-11 | x | x |

## 2011 Caged Bivalve Study Data for the LPRSA
## Appendix J
### Table J-4. SDGs, sample IDs, and analyses - CAS, Kelso

| Bivalve Type | Species | Sample ID | SDG | Lab ID | Lipids (Bligh-Dyer) | Butyltins (Krone) | Metals (ICP,6010B) | Metals (ICP/MS, 6020) | Metals (Se, 7742) |
|---|---|---|---|---|---|---|---|---|---|
| Eastern elliptio mussel | *Elliptio complanata* | LPR6-ECST-Comp01 | K1107026 | K1107026-001 | x | x | x | x | x |
| Eastern elliptio mussel | *Elliptio complanata* | LPRBG-ECST-Comp01 | K1107026 | K1107026-002 | x | x | x | x | x |
| Eastern elliptio mussel | *Elliptio complanata* | LPR6-ECST-Comp02 | K1107026 | K1107026-003 | x | x | x | x | x |
| Eastern elliptio mussel | *Elliptio complanata* | LPR7-ECST-Comp03 | K1107026 | K1107026-004 | x | x | x | x | x |
| Eastern elliptio mussel | *Elliptio complanata* | LPR7-ECST-Comp04 | K1107026 | K1107026-005 | x | x | x | x | x |
| Eastern elliptio mussel | *Elliptio complanata* | LPR8-ECST-Comp05 | K1107026 | K1107026-006 | x | x | x | x | x |
| Ribbed mussel | *Geukensia demissa* | LPR1-GDST-Comp01 | K1107026 | K1107026-007 | x | x | x | x | x |
| Ribbed mussel | *Geukensia demissa* | LPRBG-GDST-Comp01 | K1107026 | K1107026-008 | x | x | x | x | x |
| Ribbed mussel | *Geukensia demissa* | LPR2-GDST-Comp02 | K1107026 | K1107026-009 | x | x | x | x | x |
| Ribbed mussel | *Geukensia demissa* | LPR3-GDST-Comp03 | K1107026 | K1107026-010 | x | x | x | x | x |
| Rinsate blank | | LPR-071811-RB | K1106643 | K1106643-001 | | x | x | x | x |

## 2011 Caged Bivalve Study Data for the LPRSA
## Appendix J
### Table J-5. SDGs, sample IDs, and analyses - Maxxam Analytics

| Bivalve Type | Species | Sample ID | SDG | Lab ID | Pesticides (EPA 1699 Mod) |
|---|---|---|---|---|---|
| Eastern elliptio mussel | *Elliptio complanata* | LPR6-ECST-Comp01 | B1A8699 | KJ5480 | x |
| Eastern elliptio mussel | *Elliptio complanata* | LPRBG-ECST-Comp01 | B1A8699 | KJ5483 | x |
| Eastern elliptio mussel | *Elliptio complanata* | LPR6-ECST-Comp02 | B1A8699 | KJ5484 | x |
| Eastern elliptio mussel | *Elliptio complanata* | LPR7-ECST-Comp03 | B1A8699 | KJ5485 | x |
| Eastern elliptio mussel | *Elliptio complanata* | LPR7-ECST-Comp04 | B1A8699 | KJ5486 | x |
| Eastern elliptio mussel | *Elliptio complanata* | LPR8-ECST-Comp05 | B1A8699 | KJ5487 | x |
| Ribbed mussel | *Geukensia demissa* | LPR1-GDST-Comp01 | B1A8699 | KJ5488 | x |
| Ribbed mussel | *Geukensia demissa* | LPRBG-GDST-Comp01 | B1A8699 | KJ5489 | x |
| Ribbed mussel | *Geukensia demissa* | LPR2-GDST-Comp02 | B1A8699 | KJ5490 | x |
| Ribbed mussel | *Geukensia demissa* | LPR3-GDST-Comp03 | B1A8699 | KJ5491 | x |
| Rinsate blank | | LPR-071811-RB | B1A8699 | KG3768 | x |

# APPENDIX K. DATA MANAGEMENT

# 1 Introduction

General data rules for the tissue and sediment chemistry data collected in 2009 and 2010 are established in the *Fish/Decapod Crustacean Tissue and Benthic Sediment Data Management Plan* (ddms Draft), and risk assessment-specific data rules are presented in the *Data Usability and Data Evaluation Plan for the Lower Passaic River Study Area Risk Assessments* (Windward and AECOM 2015).

Limited data reduction was performed on the data presented in this report. Reduction of the data presented in this report included the following:

- Totals were calculated for various parameters.
- A single result was selected in cases wherein multiple analytical methods were conducted.

The calculation of sums and the selection of single results is consistent with the rules presented in the *Fish/Decapod Crustacean Tissue and Benthic Sediment Data Management Plan* (ddms Draft).

# 2 Calculated Totals

Calculated totals based on varying treatments of non-detected concentrations are presented in this data report. Non-detected values were treated in the following ways for calculating totals:

- Non-detected values were represented as zero.[1]
- Non-detected values were represented as one-half the reporting limit (RL).
- Non-detected values were represented as the full RL.

Calculated totals based on each of these rules are presented in the data report summary tables in the main document. Totals with non-detected values of zero (i.e., detected-only values) are presented in maps and graphs. The methods for calculating the totals to be used in the risk assessments are presented in the *Revised Data Usability and Data Evaluation Plan for the Lower Passaic River Study Area Risk Assessments* Windward and AECOM (2015). Table 1 of this appendix presents the constituents that comprise the chemical sums reported in this data report. The constituents included in chemical sums are consistent with the summations described in the *Fish/Decapod Crustacean Tissue and Benthic Sediment Data Management Plan* (ddms Draft).

[1] If all components of the sum were non-detected, the calculated total concentration was represented by the highest RL.

## Table 1. Constituents for LPRSA data chemical sums

| Chemical Sums[a] | Constituent Parameters |
|---|---|
| **PCBs** | |
| Total PCB congeners | 209 PCB congeners[b] |
| Total PCB Aroclors | Aroclor 1016, Aroclor 1221, Aroclor 1232, Aroclor 1242, Aroclor 1248, Aroclor 1254, Aroclor 1260, Aroclor 1262, and Aroclor 1268 |
| **PAHs** | |
| Total HPAHs | benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(j/k)fluoranthene, chrysene, dibenzo(a,c+a,h)anthracene, fluoranthene, indeno(1,2,3-c,d)pyrene, and pyrene |
| Total LPAHs | acenaphthene, acenaphthylene, anthracene, fluorene, naphthalene, and phenanthrene |
| Total PAHs | acenaphthene, acenaphthylene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(j/k)fluoranthene, chrysene, dibenzo(a,c+a,h)anthracene, fluoranthene, fluorene, indeno(1,2,3-c,d)pyrene, naphthalene, phenanthrene, and pyrene |
| **Pesticides** | |
| Total chlordanes | alpha-chlordane, gamma-chlordane, oxychlordane, cis-nonachlor, and trans-nonachlor |
| Total endosulfan | endosulfan I, endosulfan II, and endosulfan sulfate |
| Total 4,4′-DDT | 4,4′-DDD; 4,4′-DDE; 4,4′-DDT |
| Total 2,4′- and 4,4′-DDD | 2,4′-DDD; 4,4′-DDD |
| Total 2,4′- and 4,4′-DDE | 2,4′-DDE; 4,4′-DDE |
| Total 2,4′- and 4,4′-DDT | 2,4′-DDT; 4,4′-DDT |
| Total DDx | 2,4′-DDD; 2,4′-DDE; 2,4′-DDT; 4,4′-DDD; 4,4′-DDE; 4,4′-DDT |

[a] Partial sums were calculated in instances when a constituent parameter was missing (e.g., a compound rejected by validation). A "T(#)" data qualifier was applied to all partial sums. The "#" in the qualifier represents the number of constituent parameters missing from the sum value.

[b] When calculating a PCB congener sum, only a single concentration associated with co-eluting congeners was included in the sum.

[c] The 12 dioxin-like congeners are: PCB 77, PCB 81, PCB 105, PCB 114, PCB 118, PCB 123, PCB 126, PCB 156, PCB 157, PCB 167, PCB 169, and PCB 189.

DDD – dichlorodiphenyldichloroethane
DDE – dichlorodiphenyldichloroethylene
DDT – dichlorodiphenyltrichloroethane
HPAH – high-molecular-weight polycyclic aromatic hydrocarbon
LPAH – low-molecular-weight polycyclic aromatic hydrocarbon
LPRSA – Lower Passaic River Study Area
PAH – polycyclic aromatic hydrocarbon
PCB – polychlorinated biphenyl
RL – reporting limit
SEM – simultaneously extracted metals
total DDx – sum of all six DDT isomers (2,4′-DDD, 4,4′-DDD, 2,4′-DDE, 4,4′-DDE, 2,4′-DDT and 4,4′-DDT)

# 2 Reduction of Multiple Analytical Results for a Single Sample

Multiple validated results for a given sample were reported for several analytes. When multiple results were reported for a single parameter, the most appropriate result is reported in this data report, consistent with the best result selection rules for the

Lower Passaic River Study Area 2009 and 2010 data described in the *Fish/Decapod Crustacean Tissue and Benthic Sediment Data Management Plan* (ddms Draft):

- Analyte overlap occurred between the semivolatile organic compound (SVOC) and polycyclic aromatic hydrocarbon (PAH) analyses. The results of the PAH analysis using gas chromatography/mass spectrometry-selective ion monitoring (GC/MS-SIM) was given precedence over the GC/MS SVOC analysis. Specifically, the PAH GC/MS-SIM method results were reported for 2-methylnaphthalene, acenaphthene, acenaphthylene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(j,k)fluoranthene, dibenzo(a,c+a,h)anthracene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, naphthalene, phenanthrene, and pyrene.
- Analyte overlap occurred between the SVOCs and organochlorine (OC) pesticides (i.e., hexachlorobenzene). The high-resolution gas chromatography/high-resolution mass spectrometry (HRGC/HRMS) OC results were given precedence over the SVOC results.
- In cases wherein two different results were reported by the same laboratory for a given sample, the data validator selected the best result and documented that selection in the data validation reports.

# 3 Significant Figures and Rounding

For the purpose of providing data summaries, the reported (or assessed) precision of each result was explicitly stored in the database by recording the number of significant figures. The tracking of significant figures is important when calculating averages and performing other data summaries. Significant figures were first applied following the validation criteria outlined in Attachment 1, and then as the last step in the calculation of sums and averages.[2] The number of significant figures reported reflects the least precise value in the calculation (i.e., the lowest number of significant figures).

[2] Significant figures were adjusted during the validation of Lower Passaic River Study Area (LPRSA) fish and crab Windward (2018) and sediment Windward (2015) data as described in Attachment 1. Significant figures of LPRSA caged bivalve data were adjusted similarly for consistency.

# 5 References

ddms. Draft. Fish/decapod crustacean tissue and benthic sediment data management plan, Lower Passaic River Restoration Project. Prepared by de maximis Data Management Solutions, Inc., for the Cooperating Parties Group. de maximis Data Management Solutions, Inc., St. Paul, MN.

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# APPENDIX L. SAMPLE RESULTS TABLES

## 2011 Caged Bivalve Study Data for the LPRSA
## Appendix L
### Table L-1. Sample results - metals

| | | | | Aluminum | | | Antimony | | | Arsenic | | | Barium | | | Beryllium | | | Cadmium | | | Calcium | | | Chromium | | | Cobalt | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | mg/kg | | | mg/kg | | | mg/kg | | | mg/kg | | | mg/kg | | | mg/kg | | | mg/kg | | | mg/kg | | | mg/kg | | |
| Bivalve Type | Tissue Type | Reach | SampleID | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect |
| Eastern elliptio musse | Soft tissue | na | LPRBG-ECST-Comp01 | 11.1 | | Yes | 0.002 | U | No | 0.38 | | Yes | 359 | | Yes | 0.0064 | | Yes | 0.059 | J | Yes | 3670 | | Yes | 0.33 | J | Yes | 0.08 | J | Yes |
| Eastern elliptio musse | Soft tissue | 6 | LPR6-ECST-Comp01 | 13.9 | | Yes | 0.016 | J | Yes | 0.28 | | Yes | 296 | | Yes | 0.0063 | | Yes | 0.057 | J | Yes | 2980 | | Yes | 0.35 | J | Yes | 0.077 | J | Yes |
| Eastern elliptio musse | Soft tissue | 6 | LPR6-ECST-Comp02 | 27.4 | | Yes | 0.005 | UJ | No | 0.34 | | Yes | 300 | | Yes | 0.0059 | | Yes | 0.066 | J | Yes | 3130 | | Yes | 0.9 | J | Yes | 0.076 | J | Yes |
| Eastern elliptio musse | Soft tissue | 7 | LPR7-ECST-Comp03 | 18.7 | | Yes | 0.005 | UJ | No | 0.36 | | Yes | 355 | | Yes | 0.0066 | | Yes | 0.068 | J | Yes | 3510 | | Yes | 0.57 | J | Yes | 0.086 | J | Yes |
| Eastern elliptio musse | Soft tissue | 7 | LPR7-ECST-Comp04 | 17.5 | | Yes | 0.005 | UJ | No | 0.37 | | Yes | 309 | | Yes | 0.0063 | | Yes | 0.067 | J | Yes | 3240 | | Yes | 0.4 | J | Yes | 0.08 | J | Yes |
| Eastern elliptio musse | Soft tissue | 8 | LPR8-ECST-Comp05 | 11 | | Yes | 0.004 | UJ | No | 0.34 | | Yes | 283 | | Yes | 0.0054 | | Yes | 0.066 | J | Yes | 3040 | | Yes | 10.8 | | Yes | 0.16 | J | Yes |
| Ribbed mussel | Soft tissue | na | LPRBG-GDST-Comp01 | 5.9 | | Yes | 0.001 | U | No | 1.5 | | Yes | 2.2 | | Yes | 0.0007 | J | Yes | 0.026 | J | Yes | 400 | | Yes | 0.2 | J | Yes | 0.021 | J | Yes |
| Ribbed mussel | Soft tissue | 1 | LPR1-GDST-Comp01 | 16.9 | | Yes | 0.003 | J | Yes | 1.1 | | Yes | 1.1 | | Yes | 0.001 | J | Yes | 0.021 | J | Yes | 175 | | Yes | 0.16 | J | Yes | 0.022 | J | Yes |
| Ribbed mussel | Soft tissue | 2 | LPR2-GDST-Comp02 | 16.6 | | Yes | 0.002 | UJ | No | 0.88 | | Yes | 0.86 | | Yes | 0.0009 | J | Yes | 0.021 | J | Yes | 157 | | Yes | 0.2 | J | Yes | 0.024 | J | Yes |
| Ribbed mussel | Soft tissue | 3 | LPR3-GDST-Comp03 | 31.8 | | Yes | 0.003 | UJ | No | 0.82 | | Yes | 3 | | Yes | 0.0012 | | Yes | 0.025 | J | Yes | 271 | | Yes | 15.9 | | Yes | 0.097 | J | Yes |

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### Table L-1. Sample results - metals

| | | | | Copper | | | Iron | | | Lead | | | Magnesium | | | Manganese | | | Mercury | | | Methyl mercury | | | Nickel | | | Potassium | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | mg/kg | | | mg/kg | | | mg/kg | | | mg/kg | | | mg/kg | | | µg/kg | | | µg/kg | | | mg/kg | | | mg/kg | | |
| Bivalve Type | Tissue Type | Reach | SampleID | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect |
| Eastern elliptio musse | Soft tissue | na | LPRBG-ECST-Comp01 | 0.84 | J | Yes | 1270 | | Yes | 0.13 | J | Yes | 89 | | Yes | 1510 | | Yes | 28 | | Yes | 18 | | Yes | 0.2 | J | Yes | 209 | | Yes |
| Eastern elliptio musse | Soft tissue | 6 | LPR6-ECST-Comp01 | 0.5 | J | Yes | 1080 | | Yes | 0.19 | J | Yes | 88 | | Yes | 1210 | | Yes | 28 | | Yes | 12 | | Yes | 0.15 | J | Yes | 143 | | Yes |
| Eastern elliptio musse | Soft tissue | 6 | LPR6-ECST-Comp02 | 1.2 | J | Yes | 1140 | | Yes | 0.28 | J | Yes | 114 | | Yes | 1250 | | Yes | 24 | | Yes | 17 | | Yes | 0.4 | J | Yes | 190 | | Yes |
| Eastern elliptio musse | Soft tissue | 7 | LPR7-ECST-Comp03 | 0.63 | J | Yes | 1310 | | Yes | 0.25 | J | Yes | 113 | | Yes | 1410 | | Yes | 33 | | Yes | 15 | | Yes | 0.24 | J | Yes | 177 | | Yes |
| Eastern elliptio musse | Soft tissue | 7 | LPR7-ECST-Comp04 | 0.72 | J | Yes | 1150 | | Yes | 0.23 | J | Yes | 115 | | Yes | 1260 | | Yes | 27 | | Yes | 25 | | Yes | 0.45 | J | Yes | 193 | | Yes |
| Eastern elliptio musse | Soft tissue | 8 | LPR8-ECST-Comp05 | 0.92 | J | Yes | 1070 | | Yes | 0.14 | J | Yes | 91 | | Yes | 1170 | | Yes | 35 | | Yes | 21 | | Yes | 7.8 | J | Yes | 147 | | Yes |
| Ribbed mussel | Soft tissue | na | LPRBG-GDST-Comp01 | 0.62 | J | Yes | 15.1 | | Yes | 0.041 | J | Yes | 554 | | Yes | 0.89 | | Yes | 11 | | Yes | 3.5 | | Yes | 0.17 | J | Yes | 622 | | Yes |
| Ribbed mussel | Soft tissue | 1 | LPR1-GDST-Comp01 | 0.68 | J | Yes | 32.4 | | Yes | 0.17 | J | Yes | 251 | | Yes | 2.1 | | Yes | 11 | | Yes | 4.7 | | Yes | 0.11 | J | Yes | 534 | | Yes |
| Ribbed mussel | Soft tissue | 2 | LPR2-GDST-Comp02 | 0.63 | J | Yes | 26.7 | | Yes | 0.12 | J | Yes | 197 | | Yes | 0.98 | | Yes | 8.7 | | Yes | 3.3 | | Yes | 0.13 | J | Yes | 427 | | Yes |
| Ribbed mussel | Soft tissue | 3 | LPR3-GDST-Comp03 | 0.98 | J | Yes | 132 | | Yes | 0.15 | J | Yes | 220 | | Yes | 4 | | Yes | 19 | | Yes | 4.5 | | Yes | 6.1 | J | Yes | 613 | | Yes |

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**Appendix L**
**Table L-1. Sample results - metals**

| | | | | Selenium | | | Silver | | | Sodium | | | Thallium | | | Titanium | | | Vanadium | | | Zinc | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | mg/kg | | | mg/kg | | | mg/kg | | | mg/kg | | | mg/kg | | | mg/kg | | | mg/kg | | |
| Bivalve Type | Tissue Type | Reach | SampleID | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect |
| Eastern elliptio musse | Soft tissue | na | LPRBG-ECST-Comp01 | 0.13 | | Yes | 0.004 | J | Yes | 211 | | Yes | 0.0021 | U | No | 0.31 | | Yes | 6.3 | | Yes | 16.7 | | Yes |
| Eastern elliptio musse | Soft tissue | 6 | LPR6-ECST-Comp01 | 0.15 | | Yes | 0.005 | J | Yes | 210 | | Yes | 0.006 | | Yes | 0.42 | | Yes | 5.1 | | Yes | 14.1 | | Yes |
| Eastern elliptio musse | Soft tissue | 6 | LPR6-ECST-Comp02 | 0.22 | | Yes | 0.006 | J | Yes | 277 | | Yes | 0.0018 | U | No | 0.85 | | Yes | 5.2 | | Yes | 16.1 | | Yes |
| Eastern elliptio musse | Soft tissue | 7 | LPR7-ECST-Comp03 | 0.15 | | Yes | 0.005 | J | Yes | 260 | | Yes | 0.0019 | U | No | 0.57 | | Yes | 5.8 | | Yes | 17.3 | | Yes |
| Eastern elliptio musse | Soft tissue | 7 | LPR7-ECST-Comp04 | 0.19 | | Yes | 0.006 | J | Yes | 260 | | Yes | 0.002 | U | No | 0.51 | | Yes | 5.4 | | Yes | 17.1 | | Yes |
| Eastern elliptio musse | Soft tissue | 8 | LPR8-ECST-Comp05 | 0.12 | | Yes | 0.005 | J | Yes | 241 | | Yes | 0.0017 | U | No | 0.33 | | Yes | 4.9 | | Yes | 13.5 | | Yes |
| Ribbed mussel | Soft tissue | na | LPRBG-GDST-Comp01 | 0.16 | | Yes | 0.025 | J | Yes | 3860 | | Yes | 0.0015 | U | No | 0.17 | | Yes | 0.12 | | Yes | 4.2 | | Yes |
| Ribbed mussel | Soft tissue | 1 | LPR1-GDST-Comp01 | 0.19 | | Yes | 0.025 | J | Yes | 1710 | | Yes | 0.001 | U | No | 0.45 | | Yes | 0.08 | | Yes | 3.4 | | Yes |
| Ribbed mussel | Soft tissue | 2 | LPR2-GDST-Comp02 | 0.19 | | Yes | 0.022 | J | Yes | 1230 | | Yes | 0.001 | U | No | 0.47 | | Yes | 0.1 | | Yes | 3.7 | | Yes |
| Ribbed mussel | Soft tissue | 3 | LPR3-GDST-Comp03 | 0.14 | | Yes | 0.024 | J | Yes | 1380 | | Yes | 0.0011 | U | No | 1.2 | | Yes | 0.25 | | Yes | 6.4 | | Yes |

## 2011 Caged Bivalve Study Data for the LPRSA
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### Table L-2. Sample results - butyltins

| | | | | Monobutyltin | | | Dibutyltin | | | Tributyltin | | | Tetrabutyltin | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | |
| Bivalve Type | Tissue Type | Reach | SampleID | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect |
| Eastern elliptio musse | Soft tissue | na | LPRBG-ECST-Comp01 | 1.4 | | Yes | 1 | UJ | No | 1 | U | No | 1 | U | No |
| Eastern elliptio musse | Soft tissue | 6 | LPR6-ECST-Comp01 | 2 | | Yes | 0.37 | J | Yes | 0.3 | J | Yes | 1 | U | No |
| Eastern elliptio musse | Soft tissue | 6 | LPR6-ECST-Comp02 | 1 | U | No | 0.74 | J | Yes | 0.45 | J | Yes | 1 | U | No |
| Eastern elliptio musse | Soft tissue | 7 | LPR7-ECST-Comp03 | 1.6 | | Yes | 0.16 | J | Yes | 0.25 | J | Yes | 1 | U | No |
| Eastern elliptio musse | Soft tissue | 7 | LPR7-ECST-Comp04 | 1.6 | | Yes | 1 | UJ | No | 1 | U | No | 1 | U | No |
| Eastern elliptio musse | Soft tissue | 8 | LPR8-ECST-Comp05 | 1 | UJ | No | 0.23 | J | Yes | 0.16 | J | Yes | 1 | U | No |
| Ribbed mussel | Soft tissue | na | LPRBG-GDST-Comp01 | 4 | | Yes | 0.15 | J | Yes | 0.58 | J | Yes | 1 | U | No |
| Ribbed mussel | Soft tissue | 1 | LPR1-GDST-Comp01 | 3.6 | | Yes | 0.37 | J | Yes | 0.9 | J | Yes | 1 | U | No |
| Ribbed mussel | Soft tissue | 2 | LPR2-GDST-Comp02 | 2.1 | | Yes | 0.13 | J | Yes | 0.5 | J | Yes | 1 | U | No |
| Ribbed mussel | Soft tissue | 3 | LPR3-GDST-Comp03 | 1 | U | No | 0.17 | J | Yes | 0.59 | J | Yes | 1 | U | No |

**2011 Caged Bivalve Study Data for the LPRSA**
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**Table L-3. Sample results - PAHs**

| | | | | PAHs | | | PAHs | | | PAHs | | | PAHs | | | PAHs | | | PAHs | | | PAHs | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 1-Methylnaphthalene | | | 1-Methylphenanthrene | | | 2,3,5-Trimethylnaphthalene | | | 2,6-Dimethylnaphthalene | | | 2-Methylnaphthalene | | | Acenaphthene | | | Acenaphthylene | | |
| | | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | |
| Bivalve Type | Tissue Type | Reach | SampleID | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect |
| Eastern elliptio musse | Soft tissue | na | LPRBG-ECST-Comp01 | 0.9 | U | No | 0.9 | U | No | 0.9 | U | No | 0.9 | U | No | 0.9 | U | No | 0.9 | U | No | 0.9 | U | No |
| Eastern elliptio musse | Soft tissue | 6 | LPR6-ECST-Comp01 | 0.9 | U | No | 4 | | Yes | 0.5 | J | Yes | 0.6 | J | Yes | 0.9 | U | No | 1 | | Yes | 0.5 | J | Yes |
| Eastern elliptio musse | Soft tissue | 6 | LPR6-ECST-Comp02 | 0.9 | U | No | 4 | | Yes | 0.9 | U | No | 0.6 | J | Yes | 0.6 | J | Yes | 1 | | Yes | 0.9 | U | No |
| Eastern elliptio musse | Soft tissue | 7 | LPR7-ECST-Comp03 | 0.5 | J | Yes | 5 | | Yes | 0.9 | U | No | 0.5 | J | Yes | 0.5 | J | Yes | 1 | | Yes | 0.9 | U | No |
| Eastern elliptio musse | Soft tissue | 7 | LPR7-ECST-Comp04 | 0.6 | J | Yes | 5 | | Yes | 0.5 | J | Yes | 0.6 | J | Yes | 0.5 | J | Yes | 1 | | Yes | 0.9 | U | No |
| Eastern elliptio musse | Soft tissue | 8 | LPR8-ECST-Comp05 | 1 | | Yes | 7 | | Yes | 0.6 | J | Yes | 0.9 | J | Yes | 0.9 | J | Yes | 2 | | Yes | 0.9 | U | No |
| Ribbed mussel | Soft tissue | na | LPRBG-GDST-Comp01 | 8 | | Yes | 0.8 | J | Yes | 0.9 | U | No | 0.6 | J | Yes | 6 | | Yes | 3 | | Yes | 0.9 | J | Yes |
| Ribbed mussel | Soft tissue | 1 | LPR1-GDST-Comp01 | 21 | | Yes | 6 | | Yes | 1 | J | Yes | 2 | | Yes | 15 | | Yes | 28 | | Yes | 2 | | Yes |
| Ribbed mussel | Soft tissue | 2 | LPR2-GDST-Comp02 | 13 | | Yes | 3 | | Yes | 1 | J | Yes | 2 | | Yes | 10 | | Yes | 14 | | Yes | 1 | | Yes |
| Ribbed mussel | Soft tissue | 3 | LPR3-GDST-Comp03 | 9 | | Yes | 1 | | Yes | 1 | U | No | 1 | | Yes | 8 | | Yes | 6 | | Yes | 1 | | Yes |

**2011 Caged Bivalve Study Data for the LPRSA**
**Appendix L**
**Table L-3. Sample results - PAHs**

| | | | | PAHs | | | PAHs | | | PAHs | | | PAHs | | | PAHs | | | PAHs | | | PAHs | | | PAHs | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Anthracene | | | Benzo(a)anthracene | | | Benzo(a)pyrene | | | Benzo(b)fluoranthene | | | Benzo(e)pyrene | | | Benzo(g,h,i)perylene | | | Benzo(j,k)fluoranthene | | | Chrysene | | |
| | | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | |
| Bivalve Type | Tissue Type | Reach | SampleID | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect |
| Eastern elliptio musse | Soft tissue | na | LPRBG-ECST-Comp01 | 0.9 | U | No | 0.9 | U | No | 0.9 | U | No | 0.9 | U | No | 0.9 | U | No | 0.9 | U | No | 0.9 | U | No | 0.9 | U | No |
| Eastern elliptio musse | Soft tissue | 6 | LPR6-ECST-Comp01 | 2 | | Yes | 9 | | Yes | 5 | | Yes | 14 | | Yes | 24 | | Yes | 8 | | Yes | 7 | | Yes | 44 | | Yes |
| Eastern elliptio musse | Soft tissue | 6 | LPR6-ECST-Comp02 | 1 | | Yes | 10 | | Yes | 8 | | Yes | 18 | | Yes | 24 | | Yes | 8 | | Yes | 8 | | Yes | 47 | | Yes |
| Eastern elliptio musse | Soft tissue | 7 | LPR7-ECST-Comp03 | 2 | | Yes | 9 | | Yes | 7 | | Yes | 17 | | Yes | 22 | | Yes | 6 | | Yes | 8 | | Yes | 44 | | Yes |
| Eastern elliptio musse | Soft tissue | 7 | LPR7-ECST-Comp04 | 2 | | Yes | 11 | | Yes | 8 | | Yes | 18 | | Yes | 24 | | Yes | 7 | | Yes | 8 | | Yes | 49 | | Yes |
| Eastern elliptio musse | Soft tissue | 8 | LPR8-ECST-Comp05 | 2 | | Yes | 9 | | Yes | 7 | | Yes | 18 | | Yes | 22 | | Yes | 6 | | Yes | 7 | | Yes | 47 | | Yes |
| Ribbed mussel | Soft tissue | na | LPRBG-GDST-Comp01 | 0.5 | J | Yes | 0.9 | U | No | 0.9 | U | No | 0.9 | U | No | 0.9 | U | No | 0.9 | U | No | 0.9 | U | No | 0.6 | J | Yes |
| Ribbed mussel | Soft tissue | 1 | LPR1-GDST-Comp01 | 3 | | Yes | 19 | | Yes | 9 | | Yes | 21 | | Yes | 15 | | Yes | 5 | | Yes | 9 | | Yes | 31 | | Yes |
| Ribbed mussel | Soft tissue | 2 | LPR2-GDST-Comp02 | 2 | | Yes | 8 | | Yes | 3 | | Yes | 4 | | Yes | 5 | | Yes | 1 | | Yes | 5 | | Yes | 15 | | Yes |
| Ribbed mussel | Soft tissue | 3 | LPR3-GDST-Comp03 | 1 | | Yes | 2 | | Yes | 1 | | Yes | 1 | | Yes | 1 | | Yes | 0.5 | J | Yes | 1 | | Yes | 3 | | Yes |

**2011 Caged Bivalve Study Data for the LPRSA**
**Appendix L**
**Table L-3. Sample results - PAHs**

| | | | | PAHs | | | PAHs | | | PAHs | | | PAHs | | | PAHs | | | PAHs | | | PAHs | | | PAHs | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Dibenz(a,c+a,h)anthracene | | | Dibenzothiophene | | | Fluoranthene | | | Fluorene | | | Indeno(1,2,3-cd)pyrene | | | Naphthalene | | | Perylene | | | Phenanthrene | | |
| | | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | |
| Bivalve Type | Tissue Type | Reach | SampleID | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect |
| Eastern elliptio musse | Soft tissue | na | LPRBG-ECST-Comp01 | 0.9 | U | No | 0.9 | U | No | 0.8 | J | Yes | 0.9 | U | No | 0.9 | U | No | 0.6 | J | Yes | 0.7 | J | Yes | 0.5 | J | Yes |
| Eastern elliptio musse | Soft tissue | 6 | LPR6-ECST-Comp01 | 1 | | Yes | 0.9 | | Yes | 41 | | Yes | 1 | | Yes | 2 | | Yes | 0.5 | J | Yes | 2 | | Yes | 8 | | Yes |
| Eastern elliptio musse | Soft tissue | 6 | LPR6-ECST-Comp02 | 1 | | Yes | 0.7 | J | Yes | 43 | | Yes | 0.9 | J | Yes | 2 | | Yes | 0.9 | J | Yes | 2 | | Yes | 8 | | Yes |
| Eastern elliptio musse | Soft tissue | 7 | LPR7-ECST-Comp03 | 0.9 | J | Yes | 0.5 | J | Yes | 35 | | Yes | 0.8 | J | Yes | 2 | | Yes | 0.9 | | Yes | 2 | | Yes | 7 | | Yes |
| Eastern elliptio musse | Soft tissue | 7 | LPR7-ECST-Comp04 | 0.8 | J | Yes | 0.6 | J | Yes | 39 | | Yes | 0.9 | J | Yes | 2 | | Yes | 1 | | Yes | 2 | | Yes | 8 | | Yes |
| Eastern elliptio musse | Soft tissue | 8 | LPR8-ECST-Comp05 | 0.9 | J | Yes | 0.7 | J | Yes | 40 | | Yes | 1 | | Yes | 2 | | Yes | 2 | | Yes | 2 | | Yes | 10 | | Yes |
| Ribbed mussel | Soft tissue | na | LPRBG-GDST-Comp01 | 0.9 | U | No | 0.8 | J | Yes | 4 | | Yes | 3 | | Yes | 0.9 | U | No | 16 | | Yes | 0.9 | U | No | 11 | | Yes |
| Ribbed mussel | Soft tissue | 1 | LPR1-GDST-Comp01 | 0.9 | J | Yes | 3 | | Yes | 54 | | Yes | 10 | | Yes | 3 | | Yes | 60 | | Yes | 3 | | Yes | 36 | | Yes |
| Ribbed mussel | Soft tissue | 2 | LPR2-GDST-Comp02 | 0.8 | U | No | 2 | | Yes | 28 | | Yes | 6 | | Yes | 0.9 | | Yes | 33 | | Yes | 0.6 | J | Yes | 22 | | Yes |
| Ribbed mussel | Soft tissue | 3 | LPR3-GDST-Comp03 | 1 | U | No | 1 | | Yes | 8 | | Yes | 3 | | Yes | 1 | U | No | 20 | | Yes | 1 | U | No | 13 | | Yes |

**2011 Caged Bivalve Study Data for the LPRSA**
**Appendix L**
**Table L-3. Sample results - PAHs**

| | | | | PAHs | | | PAHs | | | PAHs | | | PAHs | | | PAHs | | | PAHs | | | PAHs | | | PAHs | | | PAHs | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Pyrene | | | Total HPAHs | | | Total HPAHs (ND=0.5RL) | | | Total HPAHs (ND=RL) | | | Total LPAHs (ND=0) | | | Total LPAHs (ND=0.5RL) | | | Total LPAHs (ND=RL) | | | Total PAHs | | | Total PAHs (ND=0.5RL) | | |
| | | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | |
| Bivalve Type | Tissue Type | Reach | SampleID | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect |
| Eastern elliptio musse | Soft tissue | na | LPRBG-ECST-Comp01 | 0.9 | | Yes | 1.7 | J | Yes | 5.3 | J | Yes | 8.9 | J | Yes | 1.1 | J | Yes | 2.9 | J | Yes | 4.7 | J | Yes | 2.8 | J | Yes | 8.2 | J | Yes |
| Eastern elliptio musse | Soft tissue | 6 | LPR6-ECST-Comp01 | 64 | | Yes | 200 | | Yes | 200 | | Yes | 200 | | Yes | 13 | J | Yes | 13 | J | Yes | 13 | J | Yes | 210 | J | Yes | 210 | J | Yes |
| Eastern elliptio musse | Soft tissue | 6 | LPR6-ECST-Comp02 | 70 | | Yes | 220 | | Yes | 220 | | Yes | 220 | | Yes | 12 | J | Yes | 12 | J | Yes | 13 | J | Yes | 230 | J | Yes | 230 | J | Yes |
| Eastern elliptio musse | Soft tissue | 7 | LPR7-ECST-Comp03 | 63 | | Yes | 190 | J | Yes | 190 | J | Yes | 190 | J | Yes | 12 | J | Yes | 12 | J | Yes | 13 | J | Yes | 200 | J | Yes | 200 | J | Yes |
| Eastern elliptio musse | Soft tissue | 7 | LPR7-ECST-Comp04 | 69 | | Yes | 210 | J | Yes | 210 | J | Yes | 210 | J | Yes | 13 | J | Yes | 13 | J | Yes | 14 | J | Yes | 220 | J | Yes | 230 | J | Yes |
| Eastern elliptio musse | Soft tissue | 8 | LPR8-ECST-Comp05 | 69 | | Yes | 210 | J | Yes | 210 | J | Yes | 210 | J | Yes | 17 | | Yes | 17 | | Yes | 18 | | Yes | 220 | J | Yes | 220 | J | Yes |
| Ribbed mussel | Soft tissue | na | LPRBG-GDST-Comp01 | 5 | | Yes | 9.6 | J | Yes | 13 | J | Yes | 16 | J | Yes | 34 | J | Yes | 34 | J | Yes | 34 | J | Yes | 44 | J | Yes | 47 | J | Yes |
| Ribbed mussel | Soft tissue | 1 | LPR1-GDST-Comp01 | 82 | | Yes | 230 | J | Yes | 230 | J | Yes | 230 | J | Yes | 140 | | Yes | 140 | | Yes | 140 | | Yes | 370 | J | Yes | 370 | J | Yes |
| Ribbed mussel | Soft tissue | 2 | LPR2-GDST-Comp02 | 42 | | Yes | 110 | | Yes | 110 | | Yes | 110 | | Yes | 78 | | Yes | 78 | | Yes | 78 | | Yes | 180 | | Yes | 190 | | Yes |
| Ribbed mussel | Soft tissue | 3 | LPR3-GDST-Comp03 | 11 | | Yes | 28 | J | Yes | 29 | J | Yes | 30 | J | Yes | 44 | | Yes | 44 | | Yes | 44 | | Yes | 72 | J | Yes | 73 | J | Yes |

**2011 Caged Bivalve Study Data for the LPRSA**
**Appendix L**
**Table L-3. Sample results - PAHs**

| | | | | PAHs | | | Alk PAHs | | | Alk PAHs | | | Alk PAHs | | | Alk PAHs | | | Alk PAHs | | | Alk PAHs | | | Alk PAHs | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Total PAHs (ND=RL) | | | C1-Benzanthracene/chrysenes | | | C1-Dibenzothiophenes | | | C1-Fluorenes | | | C1-Phenanthrene/anthracenes | | | C1-Pyrene/fluoranthenes | | | C2-Benzanthracene/chrysenes | | | C2-Dibenzothiophenes | | |
| | | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | |
| Bivalve Type | Tissue Type | Reach | SampleID | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect |
| Eastern elliptio musse | Soft tissue | na | LPRBG-ECST-Comp01 | 14 | J | Yes | 0.9 | U | No | 0.9 | U | No | 0.9 | U | No | 0.9 | U | No | 0.9 | U | No | 0.9 | U | No | 0.9 | U | No |
| Eastern elliptio musse | Soft tissue | 6 | LPR6-ECST-Comp01 | 210 | J | Yes | 14 | | Yes | 3 | | Yes | 3 | | Yes | 16 | | Yes | 49 | | Yes | 6 | | Yes | 10 | | Yes |
| Eastern elliptio musse | Soft tissue | 6 | LPR6-ECST-Comp02 | 230 | J | Yes | 15 | | Yes | 2 | | Yes | 2 | | Yes | 16 | | Yes | 54 | | Yes | 6 | | Yes | 9 | | Yes |
| Eastern elliptio musse | Soft tissue | 7 | LPR7-ECST-Comp03 | 200 | J | Yes | 15 | | Yes | 2 | | Yes | 3 | | Yes | 16 | | Yes | 52 | | Yes | 6 | | Yes | 10 | | Yes |
| Eastern elliptio musse | Soft tissue | 7 | LPR7-ECST-Comp04 | 230 | J | Yes | 18 | | Yes | 3 | | Yes | 3 | | Yes | 20 | | Yes | 60 | | Yes | 7 | | Yes | 11 | | Yes |
| Eastern elliptio musse | Soft tissue | 8 | LPR8-ECST-Comp05 | 220 | J | Yes | 18 | | Yes | 3 | | Yes | 3 | | Yes | 22 | | Yes | 60 | | Yes | 7 | | Yes | 11 | | Yes |
| Ribbed mussel | Soft tissue | na | LPRBG-GDST-Comp01 | 50 | J | Yes | 0.9 | U | No | 0.9 | U | No | 0.6 | J | Yes | 2 | | Yes | 1 | | Yes | 0.9 | U | No | 0.9 | U | No |
| Ribbed mussel | Soft tissue | 1 | LPR1-GDST-Comp01 | 370 | J | Yes | 16 | | Yes | 3 | | Yes | 4 | | Yes | 22 | | Yes | 47 | | Yes | 8 | | Yes | 11 | | Yes |
| Ribbed mussel | Soft tissue | 2 | LPR2-GDST-Comp02 | 190 | | Yes | 5 | | Yes | 2 | | Yes | 3 | | Yes | 12 | | Yes | 18 | | Yes | 2 | | Yes | 5 | | Yes |
| Ribbed mussel | Soft tissue | 3 | LPR3-GDST-Comp03 | 74 | J | Yes | 0.9 | J | Yes | 0.7 | J | Yes | 1 | | Yes | 4 | | Yes | 4 | | Yes | 1 | U | No | 1 | | Yes |

**2011 Caged Bivalve Study Data for the LPRSA**
**Appendix L**
**Table L-3. Sample results - PAHs**

| | | | | Alk PAHs | | | Alk PAHs | | | Alk PAHs | | | Alk PAHs | | | Alk PAHs | | | Alk PAHs | | | Alk PAHs | | | Alk PAHs | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | C2-Fluorenes | | | C2-Naphthalenes | | | C2-Phenanthrene/anthracenes | | | C3-Benzanthracene/chrysenes | | | C3-Dibenzothiophenes | | | C3-Fluorenes | | | C3-Naphthalenes | | | C3-Phenanthrene/anthracenes | | |
| | | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | |
| Bivalve Type | Tissue Type | Reach | SampleID | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect |
| Eastern elliptio musse | Soft tissue | na | LPRBG-ECST-Comp01 | 0.9 | U | No | 0.5 | J | Yes | 0.9 | U | No | 0.9 | U | No | 0.9 | U | No | 0.9 | U | No | 0.5 | J | Yes | 0.9 | U | No |
| Eastern elliptio musse | Soft tissue | 6 | LPR6-ECST-Comp01 | 7 | | Yes | 2 | | Yes | 26 | | Yes | 8 | | Yes | 10 | | Yes | 11 | | Yes | 4 | | Yes | 16 | | Yes |
| Eastern elliptio musse | Soft tissue | 6 | LPR6-ECST-Comp02 | 6 | | Yes | 2 | | Yes | 25 | | Yes | 6 | | Yes | 10 | | Yes | 10 | | Yes | 4 | | Yes | 18 | | Yes |
| Eastern elliptio musse | Soft tissue | 7 | LPR7-ECST-Comp03 | 7 | | Yes | 2 | | Yes | 28 | | Yes | 0.9 | U | No | 11 | | Yes | 11 | | Yes | 5 | | Yes | 19 | | Yes |
| Eastern elliptio musse | Soft tissue | 7 | LPR7-ECST-Comp04 | 7 | | Yes | 3 | | Yes | 30 | | Yes | 6 | | Yes | 12 | | Yes | 10 | | Yes | 5 | | Yes | 20 | | Yes |
| Eastern elliptio musse | Soft tissue | 8 | LPR8-ECST-Comp05 | 8 | | Yes | 3 | | Yes | 30 | | Yes | 6 | | Yes | 12 | | Yes | 12 | | Yes | 6 | | Yes | 19 | | Yes |
| Ribbed mussel | Soft tissue | na | LPRBG-GDST-Comp01 | 0.9 | J | Yes | 5 | | Yes | 2 | | Yes | 0.9 | U | No | 0.9 | U | No | 0.9 | U | No | 4 | | Yes | 0.9 | J | Yes |
| Ribbed mussel | Soft tissue | 1 | LPR1-GDST-Comp01 | 9 | | Yes | 17 | | Yes | 27 | | Yes | 6 | | Yes | 13 | | Yes | 13 | | Yes | 15 | | Yes | 23 | | Yes |
| Ribbed mussel | Soft tissue | 2 | LPR2-GDST-Comp02 | 5 | | Yes | 11 | | Yes | 13 | | Yes | 0.8 | U | No | 4 | | Yes | 6 | | Yes | 9 | | Yes | 7 | | Yes |
| Ribbed mussel | Soft tissue | 3 | LPR3-GDST-Comp03 | 2 | | Yes | 6 | | Yes | 3 | | Yes | 1 | U | No | 1 | | Yes | 1 | U | No | 4 | | Yes | 1 | | Yes |

## 2011 Caged Bivalve Study Data for the LPRSA
## Appendix L
### Table L-3. Sample results - PAHs

| | | | | Alk PAHs | | | Alk PAHs | | | Alk PAHs | | | Alk PAHs | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | C4-Benzanthracene/chrysenes | | | C4-Dibenzothiophenes | | | C4-Naphthalenes | | | C4-Phenanthrene/anthracenes | | |
| | | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | |
| Bivalve Type | Tissue Type | Reach | SampleID | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect |
| Eastern elliptio musse | Soft tissue | na | LPRBG-ECST-Comp01 | 0.9 | U | No | 0.9 | U | No | 0.9 | U | No | 0.9 | U | No |
| Eastern elliptio musse | Soft tissue | 6 | LPR6-ECST-Comp01 | 0.9 | U | No | 6 | | Yes | 7 | | Yes | 7 | | Yes |
| Eastern elliptio musse | Soft tissue | 6 | LPR6-ECST-Comp02 | 0.9 | U | No | 6 | | Yes | 7 | | Yes | 8 | | Yes |
| Eastern elliptio musse | Soft tissue | 7 | LPR7-ECST-Comp03 | 0.9 | U | No | 5 | | Yes | 7 | | Yes | 9 | | Yes |
| Eastern elliptio musse | Soft tissue | 7 | LPR7-ECST-Comp04 | 0.9 | U | No | 6 | | Yes | 7 | | Yes | 8 | | Yes |
| Eastern elliptio musse | Soft tissue | 8 | LPR8-ECST-Comp05 | 0.9 | U | No | 5 | | Yes | 7 | | Yes | 8 | | Yes |
| Ribbed mussel | Soft tissue | na | LPRBG-GDST-Comp01 | 0.9 | U | No | 0.9 | U | No | 2 | | Yes | 0.9 | U | No |
| Ribbed mussel | Soft tissue | 1 | LPR1-GDST-Comp01 | 0.9 | U | No | 9 | | Yes | 12 | | Yes | 11 | | Yes |
| Ribbed mussel | Soft tissue | 2 | LPR2-GDST-Comp02 | 0.8 | U | No | 2 | | Yes | 6 | | Yes | 3 | | Yes |
| Ribbed mussel | Soft tissue | 3 | LPR3-GDST-Comp03 | 1 | U | No | 1 | U | No | 2 | | Yes | 1 | U | No |

## 2011 Caged Bivalve Study Data for the LPRSA
## Appendix L
### Table L-4. Sample results - SVOCs

| | | | | 1,1'-Biphenyl | | | 2,2'-Oxybis(1-chloropropane) | | | 2,4,5-Trichlorophenol | | | 2,4,6-Trichlorophenol | | | 2,4-Dichlorophenol | | | 2,4-Dimethylphenol | | | 2,4-Dinitrophenol | | | 2,4-Dinitrotoluene | | | 2,6-Dinitrotoluene | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | |
| Bivalve Type | Tissue Type | Reach | SampleID | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect |
| Eastern elliptio musse | Soft tissue | na | LPRBG-ECST-Comp01 | 920 | U | No | 920 | U | No | 920 | U | No | 920 | U | No | 920 | U | No | 920 | U | No | 3700 | UJ | No | 920 | U | No | 920 | U | No |
| Eastern elliptio musse | Soft tissue | 6 | LPR6-ECST-Comp01 | 930 | U | No | 930 | U | No | 930 | U | No | 930 | U | No | 930 | U | No | 930 | U | No | 3700 | UJ | No | 930 | U | No | 930 | U | No |
| Eastern elliptio musse | Soft tissue | 6 | LPR6-ECST-Comp02 | 950 | U | No | 950 | U | No | 950 | U | No | 950 | U | No | 950 | U | No | 950 | U | No | 3800 | UJ | No | 950 | U | No | 950 | U | No |
| Eastern elliptio musse | Soft tissue | 7 | LPR7-ECST-Comp03 | 930 | U | No | 930 | U | No | 930 | U | No | 930 | U | No | 930 | U | No | 930 | U | No | 3700 | UJ | No | 930 | U | No | 930 | U | No |
| Eastern elliptio musse | Soft tissue | 7 | LPR7-ECST-Comp04 | 920 | U | No | 920 | U | No | 920 | U | No | 920 | U | No | 920 | U | No | 920 | U | No | 3700 | UJ | No | 920 | U | No | 920 | U | No |
| Eastern elliptio musse | Soft tissue | 8 | LPR8-ECST-Comp05 | 950 | U | No | 950 | U | No | 950 | U | No | 950 | U | No | 950 | U | No | 950 | U | No | 3800 | UJ | No | 950 | U | No | 950 | U | No |
| Ribbed mussel | Soft tissue | na | LPRBG-GDST-Comp01 | 930 | U | No | 930 | U | No | 930 | U | No | 930 | U | No | 930 | U | No | 930 | U | No | 3700 | UJ | No | 930 | U | No | 930 | U | No |
| Ribbed mussel | Soft tissue | 1 | LPR1-GDST-Comp01 | 900 | U | No | 900 | U | No | 900 | U | No | 900 | U | No | 900 | U | No | 900 | U | No | 3600 | UJ | No | 900 | U | No | 900 | U | No |
| Ribbed mussel | Soft tissue | 2 | LPR2-GDST-Comp02 | 940 | U | No | 940 | U | No | 940 | U | No | 940 | U | No | 940 | U | No | 940 | U | No | 3800 | UJ | No | 940 | U | No | 940 | U | No |
| Ribbed mussel | Soft tissue | 3 | LPR3-GDST-Comp03 | 930 | U | No | 930 | U | No | 930 | U | No | 930 | U | No | 930 | U | No | 930 | U | No | 3700 | UJ | No | 930 | U | No | 930 | U | No |

## 2011 Caged Bivalve Study Data for the LPRSA
## Appendix L
### Table L-4. Sample results - SVOCs

| | | | | 2-Chloronaphthalene | | | 2-Chlorophenol | | | 2-Methylphenol | | | 2-Nitroaniline | | | 2-Nitrophenol | | | 3,3'-Dichlorobenzidine | | | 3-Nitroaniline | | | 4,6-Dinitro-2-methylphenol | | | 4-Bromophenyl-phenylether | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | |
| Bivalve Type | Tissue Type | Reach | SampleID | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect |
| Eastern elliptio musse | Soft tissue | na | LPRBG-ECST-Comp01 | 920 | U | No | 920 | U | No | 920 | U | No | 920 | U | No | 920 | U | No | 920 | U | No | 920 | U | No | 3700 | U | No | 920 | U | No |
| Eastern elliptio musse | Soft tissue | 6 | LPR6-ECST-Comp01 | 930 | U | No | 930 | U | No | 930 | U | No | 930 | U | No | 930 | U | No | 930 | U | No | 930 | U | No | 3700 | U | No | 930 | U | No |
| Eastern elliptio musse | Soft tissue | 6 | LPR6-ECST-Comp02 | 950 | U | No | 950 | U | No | 950 | U | No | 950 | U | No | 950 | U | No | 950 | U | No | 950 | U | No | 3800 | U | No | 950 | U | No |
| Eastern elliptio musse | Soft tissue | 7 | LPR7-ECST-Comp03 | 930 | U | No | 930 | U | No | 930 | U | No | 930 | U | No | 930 | U | No | 930 | U | No | 930 | U | No | 3700 | U | No | 930 | U | No |
| Eastern elliptio musse | Soft tissue | 7 | LPR7-ECST-Comp04 | 920 | U | No | 920 | U | No | 920 | U | No | 920 | U | No | 920 | U | No | 920 | U | No | 920 | U | No | 3700 | U | No | 920 | U | No |
| Eastern elliptio musse | Soft tissue | 8 | LPR8-ECST-Comp05 | 950 | U | No | 950 | U | No | 950 | U | No | 950 | U | No | 950 | U | No | 950 | U | No | 950 | U | No | 3800 | U | No | 950 | U | No |
| Ribbed mussel | Soft tissue | na | LPRBG-GDST-Comp01 | 930 | U | No | 930 | U | No | 930 | U | No | 930 | U | No | 930 | U | No | 930 | U | No | 930 | U | No | 3700 | U | No | 930 | U | No |
| Ribbed mussel | Soft tissue | 1 | LPR1-GDST-Comp01 | 900 | U | No | 900 | U | No | 900 | U | No | 900 | U | No | 900 | U | No | 900 | U | No | 900 | U | No | 3600 | U | No | 900 | U | No |
| Ribbed mussel | Soft tissue | 2 | LPR2-GDST-Comp02 | 940 | U | No | 940 | U | No | 940 | U | No | 940 | U | No | 940 | U | No | 940 | U | No | 940 | U | No | 3800 | U | No | 940 | U | No |
| Ribbed mussel | Soft tissue | 3 | LPR3-GDST-Comp03 | 930 | U | No | 930 | U | No | 930 | U | No | 930 | U | No | 930 | U | No | 930 | U | No | 930 | U | No | 3700 | U | No | 930 | U | No |

**2011 Caged Bivalve Study Data for the LPRSA**
**Appendix L**
**Table L-4. Sample results - SVOCs**

| | | | | 4-Chloro-3-methylphenol | | | 4-Chloroaniline | | | 4-Chlorophenyl-phenylether | | | 4-Methylphenol | | | 4-Nitroaniline | | | 4-Nitrophenol | | | Acetophenone | | | Atrazine | | | Benzaldehyde | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | |
| Bivalve Type | Tissue Type | Reach | SampleID | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect |
| Eastern elliptio musse | Soft tissue | na | LPRBG-ECST-Comp01 | 920 | U | No | 920 | U | No | 920 | U | No | 920 | U | No | 920 | U | No | 1800 | U | No | 920 | U | No | 920 | U | No | 14000 | | Yes |
| Eastern elliptio musse | Soft tissue | 6 | LPR6-ECST-Comp01 | 930 | U | No | 930 | U | No | 930 | U | No | 930 | U | No | 930 | U | No | 1900 | U | No | 930 | U | No | 930 | U | No | 11000 | | Yes |
| Eastern elliptio musse | Soft tissue | 6 | LPR6-ECST-Comp02 | 950 | U | No | 950 | U | No | 950 | U | No | 950 | U | No | 950 | U | No | 1900 | U | No | 950 | U | No | 950 | U | No | 12000 | | Yes |
| Eastern elliptio musse | Soft tissue | 7 | LPR7-ECST-Comp03 | 930 | U | No | 930 | U | No | 930 | U | No | 930 | U | No | 930 | U | No | 1900 | U | No | 930 | U | No | 930 | U | No | 16000 | | Yes |
| Eastern elliptio musse | Soft tissue | 7 | LPR7-ECST-Comp04 | 920 | U | No | 920 | U | No | 920 | U | No | 920 | U | No | 920 | U | No | 1800 | U | No | 920 | U | No | 920 | U | No | 15000 | | Yes |
| Eastern elliptio musse | Soft tissue | 8 | LPR8-ECST-Comp05 | 950 | U | No | 950 | U | No | 950 | U | No | 950 | U | No | 950 | U | No | 1900 | U | No | 950 | U | No | 950 | U | No | 9000 | | Yes |
| Ribbed mussel | Soft tissue | na | LPRBG-GDST-Comp01 | 930 | U | No | 930 | U | No | 930 | U | No | 930 | U | No | 930 | U | No | 1900 | U | No | 930 | U | No | 930 | U | No | 1900 | U | No |
| Ribbed mussel | Soft tissue | 1 | LPR1-GDST-Comp01 | 900 | U | No | 900 | U | No | 900 | U | No | 900 | U | No | 900 | U | No | 1800 | U | No | 900 | U | No | 900 | U | No | 1800 | U | No |
| Ribbed mussel | Soft tissue | 2 | LPR2-GDST-Comp02 | 940 | U | No | 940 | U | No | 940 | U | No | 940 | U | No | 940 | U | No | 1900 | U | No | 940 | U | No | 940 | U | No | 1900 | U | No |
| Ribbed mussel | Soft tissue | 3 | LPR3-GDST-Comp03 | 930 | U | No | 930 | U | No | 930 | U | No | 930 | U | No | 930 | U | No | 1900 | U | No | 930 | U | No | 930 | U | No | 1900 | U | No |

## 2011 Caged Bivalve Study Data for the LPRSA
## Appendix L
### Table L-4. Sample results - SVOCs

| | | | | Bis-(2-chloroethoxy)methane | | | Bis-(2-chloroethyl)ether | | | Bis-(2-ethylhexyl)phthalate | | | Butylbenzylphthalate | | | Caprolactam | | | Carbazole | | | Dibenzofuran | | | Diethylphthalate | | | Dimethylphthalate | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | |
| Bivalve Type | Tissue Type | Reach | SampleID | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect |
| Eastern elliptio musse | Soft tissue | na | LPRBG-ECST-Comp01 | 920 | U | No | 920 | U | No | 920 | U | No | 920 | U | No | 920 | U | No | 920 | U | No | 920 | U | No | 920 | U | No | 920 | U | No |
| Eastern elliptio musse | Soft tissue | 6 | LPR6-ECST-Comp01 | 930 | U | No | 930 | U | No | 1600 | | Yes | 930 | U | No | 930 | U | No | 930 | U | No | 930 | U | No | 930 | U | No | 930 | U | No |
| Eastern elliptio musse | Soft tissue | 6 | LPR6-ECST-Comp02 | 950 | U | No | 950 | U | No | 950 | U | No | 950 | U | No | 950 | U | No | 950 | U | No | 950 | U | No | 950 | U | No | 950 | U | No |
| Eastern elliptio musse | Soft tissue | 7 | LPR7-ECST-Comp03 | 930 | U | No | 930 | U | No | 930 | U | No | 930 | U | No | 930 | U | No | 930 | U | No | 930 | U | No | 930 | U | No | 930 | U | No |
| Eastern elliptio musse | Soft tissue | 7 | LPR7-ECST-Comp04 | 920 | U | No | 920 | U | No | 920 | U | No | 920 | U | No | 920 | U | No | 920 | U | No | 920 | U | No | 920 | U | No | 920 | U | No |
| Eastern elliptio musse | Soft tissue | 8 | LPR8-ECST-Comp05 | 950 | U | No | 950 | U | No | 950 | U | No | 950 | U | No | 950 | U | No | 950 | U | No | 950 | U | No | 950 | U | No | 950 | U | No |
| Ribbed mussel | Soft tissue | na | LPRBG-GDST-Comp01 | 930 | U | No | 930 | U | No | 930 | U | No | 930 | U | No | 930 | U | No | 930 | U | No | 930 | U | No | 930 | U | No | 930 | U | No |
| Ribbed mussel | Soft tissue | 1 | LPR1-GDST-Comp01 | 900 | U | No | 900 | U | No | 900 | U | No | 900 | U | No | 900 | U | No | 900 | U | No | 900 | U | No | 900 | U | No | 900 | U | No |
| Ribbed mussel | Soft tissue | 2 | LPR2-GDST-Comp02 | 940 | U | No | 940 | U | No | 940 | U | No | 940 | U | No | 940 | U | No | 940 | U | No | 940 | U | No | 940 | U | No | 940 | U | No |
| Ribbed mussel | Soft tissue | 3 | LPR3-GDST-Comp03 | 930 | U | No | 930 | U | No | 930 | U | No | 930 | U | No | 930 | U | No | 930 | U | No | 930 | U | No | 930 | U | No | 930 | U | No |

## 2011 Caged Bivalve Study Data for the LPRSA
## Appendix L
### Table L-4. Sample results - SVOCs

| | | | | Di-n-butylphthalate | | | Di-n-octylphthalate | | | Hexachlorobutadiene | | | Hexachlorocyclopentadiene | | | Hexachloroethane | | | Isophorone | | | Nitrobenzene | | | n-Nitroso-di-n-propylamine | | | n-Nitrosodiphenylamine | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | |
| Bivalve Type | Tissue Type | Reach | SampleID | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect |
| Eastern elliptio musse | Soft tissue | na | LPRBG-ECST-Comp01 | 920 | U | No | 920 | UJ | No | 920 | U | No | 920 | U | No | 920 | U | No | 920 | U | No | 920 | U | No | 920 | U | No | 920 | U | No |
| Eastern elliptio musse | Soft tissue | 6 | LPR6-ECST-Comp01 | 930 | U | No | 930 | UJ | No | 930 | U | No | 930 | U | No | 930 | U | No | 930 | U | No | 930 | U | No | 930 | U | No | 930 | U | No |
| Eastern elliptio musse | Soft tissue | 6 | LPR6-ECST-Comp02 | 950 | U | No | 950 | UJ | No | 950 | U | No | 950 | U | No | 950 | U | No | 950 | U | No | 950 | U | No | 950 | U | No | 950 | U | No |
| Eastern elliptio musse | Soft tissue | 7 | LPR7-ECST-Comp03 | 930 | U | No | 930 | UJ | No | 930 | U | No | 930 | U | No | 930 | U | No | 930 | U | No | 930 | U | No | 930 | U | No | 930 | U | No |
| Eastern elliptio musse | Soft tissue | 7 | LPR7-ECST-Comp04 | 920 | U | No | 920 | UJ | No | 920 | U | No | 920 | U | No | 920 | U | No | 920 | U | No | 920 | U | No | 920 | U | No | 920 | U | No |
| Eastern elliptio musse | Soft tissue | 8 | LPR8-ECST-Comp05 | 950 | U | No | 950 | UJ | No | 950 | U | No | 950 | U | No | 950 | U | No | 950 | U | No | 950 | U | No | 950 | U | No | 950 | U | No |
| Ribbed mussel | Soft tissue | na | LPRBG-GDST-Comp01 | 930 | U | No | 930 | UJ | No | 930 | U | No | 930 | U | No | 930 | U | No | 930 | U | No | 930 | U | No | 930 | U | No | 930 | U | No |
| Ribbed mussel | Soft tissue | 1 | LPR1-GDST-Comp01 | 900 | U | No | 900 | UJ | No | 900 | U | No | 900 | U | No | 900 | U | No | 900 | U | No | 900 | U | No | 900 | U | No | 900 | U | No |
| Ribbed mussel | Soft tissue | 2 | LPR2-GDST-Comp02 | 940 | U | No | 940 | UJ | No | 940 | U | No | 940 | U | No | 940 | U | No | 940 | U | No | 940 | U | No | 940 | U | No | 940 | U | No |
| Ribbed mussel | Soft tissue | 3 | LPR3-GDST-Comp03 | 930 | U | No | 930 | UJ | No | 930 | U | No | 930 | U | No | 930 | U | No | 930 | U | No | 930 | U | No | 930 | U | No | 930 | U | No |

## 2011 Caged Bivalve Study Data for the LPRSA
## Appendix L
### Table L-4. Sample results - SVOCs

| | | | | Pentachlorophenol | | | Phenol | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | µg/kg | | | µg/kg | | |
| Bivalve Type | Tissue Type | Reach | SampleID | Value | Qual | Detect | Value | Qual | Detect |
| Eastern elliptio musse | Soft tissue | na | LPRBG-ECST-Comp01 | 3700 | U | No | 920 | U | No |
| Eastern elliptio musse | Soft tissue | 6 | LPR6-ECST-Comp01 | 3700 | U | No | 930 | U | No |
| Eastern elliptio musse | Soft tissue | 6 | LPR6-ECST-Comp02 | 3800 | U | No | 950 | U | No |
| Eastern elliptio musse | Soft tissue | 7 | LPR7-ECST-Comp03 | 3700 | U | No | 930 | U | No |
| Eastern elliptio musse | Soft tissue | 7 | LPR7-ECST-Comp04 | 3700 | U | No | 920 | U | No |
| Eastern elliptio musse | Soft tissue | 8 | LPR8-ECST-Comp05 | 3800 | U | No | 950 | U | No |
| Ribbed mussel | Soft tissue | na | LPRBG-GDST-Comp01 | 3700 | U | No | 930 | U | No |
| Ribbed mussel | Soft tissue | 1 | LPR1-GDST-Comp01 | 3600 | U | No | 900 | U | No |
| Ribbed mussel | Soft tissue | 2 | LPR2-GDST-Comp02 | 3800 | U | No | 940 | U | No |
| Ribbed mussel | Soft tissue | 3 | LPR3-GDST-Comp03 | 3700 | U | No | 930 | U | No |

## 2011 Caged Bivalve Study Data for the LPRSA
## Appendix L
### Table L-5. Sample results - PCBs[a]

| | | | | PCB Aroclors | | | PCB Aroclors | | | PCB Aroclors | | | PCB Aroclors | | | PCB Aroclors | | | PCB Aroclors | | | PCB Aroclors | | | PCB Aroclors | | | PCB Aroclors | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Aroclor-1016 | | | Aroclor-1221 | | | Aroclor-1232 | | | Aroclor-1242 | | | Aroclor-1248 | | | Aroclor-1254 | | | Aroclor-1260 | | | Aroclor-1262 | | | Aroclor-1268 | | |
| | | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | |
| Bivalve Type | Tissue Type | Reach | SampleID | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect |
| Eastern elliptio musse | Soft tissue | na | LPRBG-ECST-Comp01 | 7.5 | U | No | 7.5 | U | No | 7.5 | U | No | 7.5 | U | No | 7.5 | U | No | 7.5 | U | No | 7.5 | U | No | 7.5 | U | No | 7.5 | U | No |
| Eastern elliptio musse | Soft tissue | 6 | LPR6-ECST-Comp01 | 7 | U | No | 7 | U | No | 7 | U | No | 25 | | Yes | 7 | U | No | 15 | | Yes | 7 | U | No | 7 | U | No | 7 | U | No |
| Eastern elliptio musse | Soft tissue | 6 | LPR6-ECST-Comp02 | 7.4 | U | No | 7.4 | U | No | 7.4 | U | No | 36 | J | Yes | 7.4 | U | No | 16 | | Yes | 7.4 | U | No | 7.4 | U | No | 7.4 | U | No |
| Eastern elliptio musse | Soft tissue | 7 | LPR7-ECST-Comp03 | 7.5 | U | No | 7.5 | U | No | 7.5 | U | No | 39 | | Yes | 7.5 | U | No | 24 | | Yes | 7.5 | U | No | 7.5 | U | No | 7.5 | U | No |
| Eastern elliptio musse | Soft tissue | 7 | LPR7-ECST-Comp04 | 7.5 | U | No | 7.5 | U | No | 7.5 | U | No | 31 | J | Yes | 7.5 | U | No | 16 | | Yes | 7.5 | U | No | 7.5 | U | No | 7.5 | U | No |
| Eastern elliptio musse | Soft tissue | 8 | LPR8-ECST-Comp05 | 7.6 | U | No | 7.6 | U | No | 7.6 | U | No | 24 | J | Yes | 7.6 | U | No | 13 | | Yes | 7.6 | U | No | 7.6 | U | No | 7.6 | U | No |
| Ribbed mussel | Soft tissue | na | LPRBG-GDST-Comp01 | 7.5 | U | No | 7.5 | U | No | 7.5 | U | No | 7.5 | U | No | 7.5 | U | No | 7.5 | U | No | 7.5 | U | No | 7.5 | U | No | 7.5 | U | No |
| Ribbed mussel | Soft tissue | 1 | LPR1-GDST-Comp01 | 7.5 | U | No | 7.5 | U | No | 7.5 | U | No | 22 | | Yes | 7.5 | U | No | 14 | | Yes | 7.5 | U | No | 7.5 | U | No | 7.5 | U | No |
| Ribbed mussel | Soft tissue | 2 | LPR2-GDST-Comp02 | 7.5 | U | No | 7.5 | U | No | 7.5 | U | No | 20 | | Yes | 7.5 | U | No | 7.5 | U | No | 7.5 | U | No | 7.5 | U | No | 7.5 | U | No |
| Ribbed mussel | Soft tissue | 3 | LPR3-GDST-Comp03 | 7.4 | U | No | 7.4 | U | No | 7.4 | U | No | 7.4 | U | No | 7.4 | U | No | 7.4 | U | No | 7.4 | U | No | 7.4 | U | No | 7.4 | U | No |

[a] Equalized data are presented for PCB congeners. Non-equalized PCB congener data are provided on the laboratory Form 1s (Appendix M) and in the full laboratory data reports (Appendix N).

## 2011 Caged Bivalve Study Data for the LPRSA
## Appendix L
### Table L-5. Sample results - PCBs[a]

| | | | | PCB Aroclors | | | PCB Aroclors | | | PCB Aroclors | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Total PCB Aroclors | | | Total PCB Aroclors (ND=0.5RL) | | | Total PCB Aroclors (ND=RL) | | | PCB-1 | | | PCB-2 | | | PCB-3 | | | PCB-4 | | | PCB-5 | | |
| | | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | |
| Bivalve Type | Tissue Type | Reach | SampleID | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect |
| Eastern elliptio musse | Soft tissue | na | LPRBG-ECST-Comp01 | 7.5 | U | No | 7.5 | U | No | 7.5 | U | No | 0.00017 | U | No | 0.0002 | U | No | 0.00018 | U | No | 0.00073 | U | No | 0.00055 | U | No |
| Eastern elliptio musse | Soft tissue | 6 | LPR6-ECST-Comp01 | 40 | | Yes | 65 | | Yes | 89 | | Yes | 0.0025 | | Yes | 0.00091 | J | Yes | 0.0012 | | Yes | 0.069 | | Yes | 0.00096 | EMPC-J | Yes |
| Eastern elliptio musse | Soft tissue | 6 | LPR6-ECST-Comp02 | 52 | J | Yes | 78 | J | Yes | 100 | J | Yes | 0.0024 | | Yes | 0.00072 | J | Yes | 0.001 | | Yes | 0.081 | | Yes | 0.00094 | J | Yes |
| Eastern elliptio musse | Soft tissue | 7 | LPR7-ECST-Comp03 | 63 | | Yes | 89 | | Yes | 120 | | Yes | 0.003 | | Yes | 0.00049 | J | Yes | 0.0012 | | Yes | 0.091 | | Yes | 0.0016 | | Yes |
| Eastern elliptio musse | Soft tissue | 7 | LPR7-ECST-Comp04 | 47 | J | Yes | 73 | J | Yes | 100 | J | Yes | 0.0029 | | Yes | 0.00041 | J | Yes | 0.0011 | | Yes | 0.074 | | Yes | 0.00072 | EMPC-J | Yes |
| Eastern elliptio musse | Soft tissue | 8 | LPR8-ECST-Comp05 | 37 | J | Yes | 64 | J | Yes | 90 | J | Yes | 0.0033 | | Yes | 0.00082 | J | Yes | 0.0012 | | Yes | 0.068 | | Yes | 0.00088 | J | Yes |
| Ribbed mussel | Soft tissue | na | LPRBG-GDST-Comp01 | 7.5 | U | No | 7.5 | U | No | 7.5 | U | No | 0.00094 | J | Yes | 0.0011 | | Yes | 0.00062 | J | Yes | 0.0015 | | Yes | 0.00025 | J | Yes |
| Ribbed mussel | Soft tissue | 1 | LPR1-GDST-Comp01 | 36 | | Yes | 62 | | Yes | 89 | | Yes | 0.0067 | | Yes | 0.0024 | EMPC-J | Yes | 0.0013 | | Yes | 0.073 | | Yes | 0.0017 | | Yes |
| Ribbed mussel | Soft tissue | 2 | LPR2-GDST-Comp02 | 20 | | Yes | 50 | | Yes | 80 | | Yes | 0.0085 | | Yes | 0.002 | | Yes | 0.002 | | Yes | 0.064 | | Yes | 0.0011 | | Yes |
| Ribbed mussel | Soft tissue | 3 | LPR3-GDST-Comp03 | 7.4 | U | No | 7.4 | U | No | 7.4 | U | No | 0.004 | | Yes | 0.0015 | EMPC-J | Yes | 0.0013 | | Yes | 0.028 | | Yes | 0.00063 | U | No |

[a] Equalized data are presented for PCB congeners. Non-equa

## 2011 Caged Bivalve Study Data for the LPRSA
## Appendix L
### Table L-5. Sample results - PCBs[a]

| | | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | PCB-6 | | | PCB-7 | | | PCB-8 | | | PCB-9 | | | PCB-10 | | | PCB-11 | | | PCB-12 | | | PCB-13 | | |
| | | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | |
| Bivalve Type | Tissue Type | Reach | SampleID | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect |
| Eastern elliptio musse | Soft tissue | na | LPRBG-ECST-Comp01 | 0.00054 | U | No | 0.00052 | U | No | 0.00069 | J | Yes | 0.00053 | U | No | 0.0005 | U | No | 0.0038 | | Yes | 0.00052 | U | No | C12 | U | |
| Eastern elliptio musse | Soft tissue | 6 | LPR6-ECST-Comp01 | 0.039 | | Yes | 0.0037 | | Yes | 0.097 | | Yes | 0.006 | | Yes | 0.0045 | | Yes | 0.079 | | Yes | 0.022 | | Yes | C12 | | |
| Eastern elliptio musse | Soft tissue | 6 | LPR6-ECST-Comp02 | 0.031 | | Yes | 0.0034 | | Yes | 0.096 | | Yes | 0.0061 | | Yes | 0.0048 | | Yes | 0.071 | | Yes | 0.021 | | Yes | C12 | | |
| Eastern elliptio musse | Soft tissue | 7 | LPR7-ECST-Comp03 | 0.034 | | Yes | 0.005 | | Yes | 0.14 | | Yes | 0.0086 | | Yes | 0.0059 | | Yes | 0.075 | | Yes | 0.018 | | Yes | C12 | | |
| Eastern elliptio musse | Soft tissue | 7 | LPR7-ECST-Comp04 | 0.027 | | Yes | 0.0032 | | Yes | 0.073 | | Yes | 0.0052 | | Yes | 0.0047 | | Yes | 0.041 | | Yes | 0.015 | | Yes | C12 | | |
| Eastern elliptio musse | Soft tissue | 8 | LPR8-ECST-Comp05 | 0.027 | | Yes | 0.0028 | | Yes | 0.073 | | Yes | 0.0052 | | Yes | 0.0044 | | Yes | 0.04 | | Yes | 0.015 | | Yes | C12 | | |
| Ribbed mussel | Soft tissue | na | LPRBG-GDST-Comp01 | 0.0015 | | Yes | 0.00025 | J | Yes | 0.0049 | | Yes | 0.0004 | J | Yes | 0.00027 | U | No | 0.018 | | Yes | 0.00071 | J | Yes | C12 | J | |
| Ribbed mussel | Soft tissue | 1 | LPR1-GDST-Comp01 | 0.043 | | Yes | 0.003 | | Yes | 0.065 | | Yes | 0.007 | | Yes | 0.01 | | Yes | 0.083 | | Yes | 0.017 | | Yes | C12 | | |
| Ribbed mussel | Soft tissue | 2 | LPR2-GDST-Comp02 | 0.025 | | Yes | 0.0024 | | Yes | 0.05 | | Yes | 0.0043 | | Yes | 0.0063 | | Yes | 0.052 | | Yes | 0.011 | | Yes | C12 | | |
| Ribbed mussel | Soft tissue | 3 | LPR3-GDST-Comp03 | 0.011 | | Yes | 0.0013 | | Yes | 0.028 | | Yes | 0.0022 | | Yes | 0.0025 | | Yes | 0.024 | | Yes | 0.0048 | | Yes | C12 | | |

[a] Equalized data are presented for PCB congeners. Non-equa

## 2011 Caged Bivalve Study Data for the LPRSA
## Appendix L
### Table L-5. Sample results - PCBs[a]

| | | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | PCB-14 | | | PCB-15 | | | PCB-16 | | | PCB-17 | | | PCB-18 | | | PCB-19 | | | PCB-20 | | | PCB-21 | | |
| | | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | |
| Bivalve Type | Tissue Type | Reach | SampleID | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect |
| Eastern elliptio musse | Soft tissue | na | LPRBG-ECST-Comp01 | 0.00054 | U | No | 0.00052 | U | No | 0.00089 | J | Yes | 0.00068 | J | Yes | 0.0018 | J | Yes | 0.00023 | U | No | 0.0036 | EMPC-J | Yes | 0.0011 | J | Yes |
| Eastern elliptio musse | Soft tissue | 6 | LPR6-ECST-Comp01 | 0.00052 | U | No | 0.11 | | Yes | 0.28 | | Yes | 0.39 | | Yes | 0.7 | | Yes | 0.071 | | Yes | 1.3 | | Yes | 0.35 | | Yes |
| Eastern elliptio musse | Soft tissue | 6 | LPR6-ECST-Comp02 | 0.00035 | U | No | 0.12 | | Yes | 0.31 | | Yes | 0.44 | | Yes | 0.79 | | Yes | 0.083 | | Yes | 1.3 | | Yes | 0.4 | | Yes |
| Eastern elliptio musse | Soft tissue | 7 | LPR7-ECST-Comp03 | 0.0004 | U | No | 0.14 | | Yes | 0.38 | | Yes | 0.49 | | Yes | 0.93 | | Yes | 0.088 | | Yes | 1.5 | | Yes | 0.54 | | Yes |
| Eastern elliptio musse | Soft tissue | 7 | LPR7-ECST-Comp04 | 0.00047 | U | No | 0.1 | | Yes | 0.19 | | Yes | 0.29 | | Yes | 0.48 | | Yes | 0.068 | | Yes | 0.81 | | Yes | 0.23 | | Yes |
| Eastern elliptio musse | Soft tissue | 8 | LPR8-ECST-Comp05 | 0.00046 | U | No | 0.1 | | Yes | 0.18 | | Yes | 0.26 | | Yes | 0.46 | | Yes | 0.062 | | Yes | 0.86 | | Yes | 0.21 | | Yes |
| Ribbed mussel | Soft tissue | na | LPRBG-GDST-Comp01 | 0.0004 | U | No | 0.0013 | | Yes | 0.0027 | | Yes | 0.0048 | | Yes | 0.0059 | | Yes | 0.00049 | J | Yes | 0.01 | EMPC-J | Yes | 0.0068 | | Yes |
| Ribbed mussel | Soft tissue | 1 | LPR1-GDST-Comp01 | 0.00037 | U | No | 0.065 | | Yes | 0.18 | | Yes | 0.29 | | Yes | 0.46 | | Yes | 0.058 | | Yes | 0.86 | | Yes | 0.21 | | Yes |
| Ribbed mussel | Soft tissue | 2 | LPR2-GDST-Comp02 | 0.00032 | U | No | 0.044 | | Yes | 0.11 | | Yes | 0.16 | | Yes | 0.25 | | Yes | 0.038 | | Yes | 0.41 | | Yes | 0.11 | | Yes |
| Ribbed mussel | Soft tissue | 3 | LPR3-GDST-Comp03 | 0.00061 | U | No | 0.021 | | Yes | 0.041 | | Yes | 0.06 | | Yes | 0.09 | | Yes | 0.016 | | Yes | 0.15 | | Yes | 0.042 | | Yes |

[a] Equalized data are presented for PCB congeners. Non-equa

## 2011 Caged Bivalve Study Data for the LPRSA
## Appendix L
### Table L-5. Sample results - PCBs[a]

| | | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | PCB-22 | | | PCB-23 | | | PCB-24 | | | PCB-25 | | | PCB-26 | | | PCB-27 | | | PCB-28 | | |
| | | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | |
| Bivalve Type | Tissue Type | Reach | SampleID | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect |
| Eastern elliptio musse | Soft tissue | na | LPRBG-ECST-Comp01 | 0.00088 | J | Yes | 0.0004 | U | No | 0.00017 | U | No | 0.00037 | U | No | 0.00039 | U | No | 0.00017 | U | No | C20 | EMPC-J | |
| Eastern elliptio musse | Soft tissue | 6 | LPR6-ECST-Comp01 | 0.29 | | Yes | 0.00056 | U | No | 0.012 | | Yes | 0.16 | | Yes | 0.23 | | Yes | 0.075 | | Yes | C20 | | |
| Eastern elliptio musse | Soft tissue | 6 | LPR6-ECST-Comp02 | 0.32 | | Yes | 0.00069 | U | No | 0.011 | | Yes | 0.17 | | Yes | 0.26 | | Yes | 0.087 | | Yes | C20 | | |
| Eastern elliptio musse | Soft tissue | 7 | LPR7-ECST-Comp03 | 0.38 | | Yes | 0.0015 | | Yes | 0.012 | | Yes | 0.16 | | Yes | 0.29 | | Yes | 0.088 | | Yes | C20 | | |
| Eastern elliptio musse | Soft tissue | 7 | LPR7-ECST-Comp04 | 0.2 | | Yes | 0.00096 | U | No | 0.0097 | | Yes | 0.11 | | Yes | 0.18 | | Yes | 0.063 | | Yes | C20 | | |
| Eastern elliptio musse | Soft tissue | 8 | LPR8-ECST-Comp05 | 0.2 | | Yes | 0.00085 | U | No | 0.0085 | EMPC-J | Yes | 0.11 | | Yes | 0.18 | | Yes | 0.06 | | Yes | C20 | | |
| Ribbed mussel | Soft tissue | na | LPRBG-GDST-Comp01 | 0.0031 | | Yes | 0.0003 | U | No | 0.00014 | U | No | 0.002 | | Yes | 0.0036 | | Yes | 0.00082 | EMPC-J | Yes | C20 | EMPC-J | |
| Ribbed mussel | Soft tissue | 1 | LPR1-GDST-Comp01 | 0.19 | | Yes | 0.00084 | J | Yes | 0.0074 | | Yes | 0.12 | | Yes | 0.21 | | Yes | 0.082 | | Yes | C20 | | |
| Ribbed mussel | Soft tissue | 2 | LPR2-GDST-Comp02 | 0.099 | | Yes | 0.00036 | EMPC-J | Yes | 0.0039 | | Yes | 0.059 | | Yes | 0.091 | | Yes | 0.042 | | Yes | C20 | | |
| Ribbed mussel | Soft tissue | 3 | LPR3-GDST-Comp03 | 0.035 | | Yes | 0.00027 | U | No | 0.0017 | | Yes | 0.02 | | Yes | 0.03 | | Yes | 0.014 | | Yes | C20 | | |

[a] Equalized data are presented for PCB congeners. Non-equa

## 2011 Caged Bivalve Study Data for the LPRSA
## Appendix L
### Table L-5. Sample results - PCBs[a]

| | | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | PCB-29 | | | PCB-30 | | | PCB-31 | | | PCB-32 | | | PCB-33 | | | PCB-34 | | | PCB-35 | | | PCB-36 | | |
| | | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | |
| Bivalve Type | Tissue Type | Reach | SampleID | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect |
| Eastern elliptio musse | Soft tissue | na | LPRBG-ECST-Comp01 | C26 | U | | C18 | J | | 0.0023 | | Yes | 0.00059 | EMPC-J | Yes | C21 | J | | 0.00041 | U | No | 0.00042 | U | No | 0.00039 | U | No |
| Eastern elliptio musse | Soft tissue | 6 | LPR6-ECST-Comp01 | C26 | | | C18 | | | 0.94 | | Yes | 0.31 | | Yes | C21 | | | 0.0085 | | Yes | 0.016 | | Yes | 0.00054 | U | No |
| Eastern elliptio musse | Soft tissue | 6 | LPR6-ECST-Comp02 | C26 | | | C18 | | | 1.1 | | Yes | 0.36 | | Yes | C21 | | | 0.01 | | Yes | 0.019 | | Yes | 0.0012 | | Yes |
| Eastern elliptio musse | Soft tissue | 7 | LPR7-ECST-Comp03 | C26 | | | C18 | | | 1.3 | | Yes | 0.38 | | Yes | C21 | | | 0.0099 | | Yes | 0.021 | | Yes | 0.001 | | Yes |
| Eastern elliptio musse | Soft tissue | 7 | LPR7-ECST-Comp04 | C26 | | | C18 | | | 0.63 | | Yes | 0.24 | | Yes | C21 | | | 0.0066 | | Yes | 0.012 | | Yes | 0.0011 | | Yes |
| Eastern elliptio musse | Soft tissue | 8 | LPR8-ECST-Comp05 | C26 | | | C18 | | | 0.61 | | Yes | 0.23 | | Yes | C21 | | | 0.0061 | | Yes | 0.0098 | | Yes | 0.00083 | U | No |
| Ribbed mussel | Soft tissue | na | LPRBG-GDST-Comp01 | C26 | | | C18 | | | 0.015 | | Yes | 0.003 | | Yes | C21 | | | 0.00031 | U | No | 0.00059 | J | Yes | 0.00051 | EMPC-J | Yes |
| Ribbed mussel | Soft tissue | 1 | LPR1-GDST-Comp01 | C26 | | | C18 | | | 0.69 | | Yes | 0.25 | | Yes | C21 | | | 0.0095 | | Yes | 0.011 | | Yes | 0.0017 | | Yes |
| Ribbed mussel | Soft tissue | 2 | LPR2-GDST-Comp02 | C26 | | | C18 | | | 0.33 | | Yes | 0.14 | | Yes | C21 | | | 0.0037 | | Yes | 0.0053 | | Yes | 0.00064 | J | Yes |
| Ribbed mussel | Soft tissue | 3 | LPR3-GDST-Comp03 | C26 | | | C18 | | | 0.12 | | Yes | 0.047 | | Yes | C21 | | | 0.0012 | EMPC-J | Yes | 0.0021 | EMPC-J | Yes | 0.00027 | U | No |

[a] Equalized data are presented for PCB congeners. Non-equa

## 2011 Caged Bivalve Study Data for the LPRSA
## Appendix L
### Table L-5. Sample results - PCBs[a]

| | | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | PCB-37 | | | PCB-38 | | | PCB-39 | | | PCB-40 | | | PCB-41 | | | PCB-42 | | | PCB-43 | | |
| | | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | |
| Bivalve Type | Tissue Type | Reach | SampleID | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect |
| Eastern elliptio musse | Soft tissue | na | LPRBG-ECST-Comp01 | 0.00073 | J | Yes | 0.00041 | U | No | 0.00036 | U | No | 0.00084 | J | Yes | 0.0004 | U | No | 0.00064 | EMPC-J | Yes | 0.00038 | U | No |
| Eastern elliptio musse | Soft tissue | 6 | LPR6-ECST-Comp01 | 0.21 | J | Yes | 0.00057 | U | No | 0.006 | | Yes | 0.49 | | Yes | 0.07 | | Yes | 0.28 | | Yes | 0.047 | | Yes |
| Eastern elliptio musse | Soft tissue | 6 | LPR6-ECST-Comp02 | 0.25 | J | Yes | 0.00071 | U | No | 0.0077 | | Yes | 0.53 | | Yes | 0.08 | | Yes | 0.31 | | Yes | 0.048 | | Yes |
| Eastern elliptio musse | Soft tissue | 7 | LPR7-ECST-Comp03 | 0.3 | J | Yes | 0.00071 | U | No | 0.0076 | | Yes | 0.55 | | Yes | 0.1 | | Yes | 0.32 | | Yes | 0.052 | | Yes |
| Eastern elliptio musse | Soft tissue | 7 | LPR7-ECST-Comp04 | 0.17 | J | Yes | 0.00093 | EMPC-J | Yes | 0.0053 | | Yes | 0.32 | | Yes | 0.05 | | Yes | 0.19 | | Yes | 0.028 | | Yes |
| Eastern elliptio musse | Soft tissue | 8 | LPR8-ECST-Comp05 | 0.16 | J | Yes | 0.00086 | U | No | 0.0036 | EMPC-J | Yes | 0.33 | | Yes | 0.047 | | Yes | 0.19 | | Yes | 0.029 | | Yes |
| Ribbed mussel | Soft tissue | na | LPRBG-GDST-Comp01 | 0.002 | EMPC-J | Yes | 0.0003 | U | No | 0.00027 | U | No | 0.0055 | | Yes | 0.00059 | EMPC-J | Yes | 0.0021 | | Yes | 0.00048 | J | Yes |
| Ribbed mussel | Soft tissue | 1 | LPR1-GDST-Comp01 | 0.13 | J | Yes | 0.00065 | U | No | 0.0049 | | Yes | 0.43 | | Yes | 0.042 | | Yes | 0.27 | | Yes | 0.038 | | Yes |
| Ribbed mussel | Soft tissue | 2 | LPR2-GDST-Comp02 | 0.062 | J | Yes | 0.00024 | U | No | 0.0024 | | Yes | 0.17 | | Yes | 0.018 | | Yes | 0.11 | | Yes | 0.013 | | Yes |
| Ribbed mussel | Soft tissue | 3 | LPR3-GDST-Comp03 | 0.025 | J | Yes | 0.00028 | U | No | 0.00094 | J | Yes | 0.053 | | Yes | 0.0065 | | Yes | 0.03 | | Yes | 0.004 | | Yes |

[a] Equalized data are presented for PCB congeners. Non-equa

## 2011 Caged Bivalve Study Data for the LPRSA
## Appendix L
### Table L-5. Sample results - PCBs[a]

| | | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | PCB-44 | | | PCB-45 | | | PCB-46 | | | PCB-47 | | | PCB-48 | | | PCB-49 | | | PCB-50 | | | PCB-51 | | |
| | | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | |
| Bivalve Type | Tissue Type | Reach | SampleID | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect |
| Eastern elliptio musse | Soft tissue | na | LPRBG-ECST-Comp01 | 0.0035 | | Yes | 0.00041 | U | No | 0.00037 | U | No | C44 | | | 0.00061 | J | Yes | 0.0029 | | Yes | 0.00054 | J | Yes | 0.00028 | U | No |
| Eastern elliptio musse | Soft tissue | 6 | LPR6-ECST-Comp01 | 1.1 | | Yes | 0.2 | | Yes | 0.076 | | Yes | C44 | | | 0.22 | | Yes | 0.77 | | Yes | 0.23 | | Yes | 0.13 | | Yes |
| Eastern elliptio musse | Soft tissue | 6 | LPR6-ECST-Comp02 | 1.3 | | Yes | 0.22 | | Yes | 0.082 | | Yes | C44 | | | 0.23 | | Yes | 0.85 | | Yes | 0.26 | | Yes | 0.15 | | Yes |
| Eastern elliptio musse | Soft tissue | 7 | LPR7-ECST-Comp03 | 1.2 | | Yes | 0.25 | | Yes | 0.085 | | Yes | C44 | | | 0.26 | | Yes | 0.82 | | Yes | 0.24 | | Yes | 0.095 | | Yes |
| Eastern elliptio musse | Soft tissue | 7 | LPR7-ECST-Comp04 | 0.73 | | Yes | 0.13 | | Yes | 0.05 | | Yes | C44 | | | 0.13 | | Yes | 0.51 | | Yes | 0.15 | | Yes | 0.076 | | Yes |
| Eastern elliptio musse | Soft tissue | 8 | LPR8-ECST-Comp05 | 0.78 | | Yes | 0.13 | | Yes | 0.058 | | Yes | C44 | | | 0.13 | | Yes | 0.54 | | Yes | 0.18 | | Yes | 0.097 | | Yes |
| Ribbed mussel | Soft tissue | na | LPRBG-GDST-Comp01 | 0.01 | | Yes | 0.001 | | Yes | 0.00046 | J | Yes | C44 | | | 0.0025 | | Yes | 0.012 | | Yes | 0.0025 | | Yes | 0.00087 | EMPC-J | Yes |
| Ribbed mussel | Soft tissue | 1 | LPR1-GDST-Comp01 | 1 | | Yes | 0.1 | | Yes | 0.071 | | Yes | C44 | | | 0.16 | | Yes | 0.74 | | Yes | 0.23 | | Yes | 0.21 | | Yes |
| Ribbed mussel | Soft tissue | 2 | LPR2-GDST-Comp02 | 0.41 | | Yes | 0.045 | | Yes | 0.03 | | Yes | C44 | | | 0.064 | | Yes | 0.28 | | Yes | 0.1 | | Yes | 0.094 | | Yes |
| Ribbed mussel | Soft tissue | 3 | LPR3-GDST-Comp03 | 0.13 | | Yes | 0.014 | | Yes | 0.0093 | | Yes | C44 | | | 0.02 | | Yes | 0.088 | | Yes | 0.037 | | Yes | 0.037 | | Yes |

[a] Equalized data are presented for PCB congeners. Non-equa

## 2011 Caged Bivalve Study Data for the LPRSA
## Appendix L
### Table L-5. Sample results - PCBs[a]

| | | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | PCB-52 | | | PCB-53 | | | PCB-54 | | | PCB-55 | | | PCB-56 | | | PCB-57 | | | PCB-58 | | |
| | | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | |
| Bivalve Type | Tissue Type | Reach | SampleID | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect |
| Eastern elliptio musse | Soft tissue | na | LPRBG-ECST-Comp01 | 0.0053 | | Yes | C50 | J | | 0.00019 | U | No | 0.00034 | U | No | 0.0009 | EMPC-J | Yes | 0.00035 | U | No | 0.00033 | U | No |
| Eastern elliptio musse | Soft tissue | 6 | LPR6-ECST-Comp01 | 1.3 | | Yes | C50 | | | 0.013 | | Yes | 0.012 | | Yes | 0.33 | | Yes | 0.0054 | | Yes | 0.0047 | | Yes |
| Eastern elliptio musse | Soft tissue | 6 | LPR6-ECST-Comp02 | 1.4 | | Yes | C50 | | | 0.018 | | Yes | 0.013 | | Yes | 0.39 | | Yes | 0.0058 | EMPC-J | Yes | 0.0048 | | Yes |
| Eastern elliptio musse | Soft tissue | 7 | LPR7-ECST-Comp03 | 1.5 | | Yes | C50 | | | 0.011 | | Yes | 0.014 | | Yes | 0.46 | | Yes | 0.0076 | | Yes | 0.004 | | Yes |
| Eastern elliptio musse | Soft tissue | 7 | LPR7-ECST-Comp04 | 0.83 | | Yes | C50 | | | 0.0096 | | Yes | 0.0079 | | Yes | 0.24 | | Yes | 0.0051 | | Yes | 0.0026 | | Yes |
| Eastern elliptio musse | Soft tissue | 8 | LPR8-ECST-Comp05 | 0.91 | | Yes | C50 | | | 0.0094 | | Yes | 0.0066 | | Yes | 0.2 | | Yes | 0.0045 | | Yes | 0.0027 | | Yes |
| Ribbed mussel | Soft tissue | na | LPRBG-GDST-Comp01 | 0.022 | | Yes | C50 | | | 0.00014 | U | No | 0.00018 | U | No | 0.0037 | | Yes | 0.00019 | U | No | 0.00017 | U | No |
| Ribbed mussel | Soft tissue | 1 | LPR1-GDST-Comp01 | 1.1 | | Yes | C50 | | | 0.019 | | Yes | 0.0078 | | Yes | 0.26 | | Yes | 0.0053 | | Yes | 0.0005 | U | No |
| Ribbed mussel | Soft tissue | 2 | LPR2-GDST-Comp02 | 0.42 | | Yes | C50 | | | 0.011 | | Yes | 0.0031 | EMPC-J | Yes | 0.11 | | Yes | 0.0019 | | Yes | 0.0012 | | Yes |
| Ribbed mussel | Soft tissue | 3 | LPR3-GDST-Comp03 | 0.14 | | Yes | C50 | | | 0.005 | | Yes | 0.0011 | | Yes | 0.029 | | Yes | 0.0004 | U | No | 0.00037 | U | No |

[a] Equalized data are presented for PCB congeners. Non-equa

## 2011 Caged Bivalve Study Data for the LPRSA
## Appendix L
### Table L-5. Sample results - PCBs[a]

| | | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | PCB-59 | | | PCB-60 | | | PCB-61 | | | PCB-62 | | | PCB-63 | | | PCB-64 | | | PCB-65 | | | PCB-66 | | |
| | | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | |
| Bivalve Type | Tissue Type | Reach | SampleID | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect |
| Eastern elliptio musse | Soft tissue | na | LPRBG-ECST-Comp01 | 0.00024 | U | No | 0.00034 | U | No | 0.0066 | | Yes | C59 | U | | 0.00033 | U | No | 0.0015 | | Yes | C44 | | | 0.0028 | EMPC-J | Yes |
| Eastern elliptio musse | Soft tissue | 6 | LPR6-ECST-Comp01 | 0.11 | | Yes | 0.11 | | Yes | 1.3 | | Yes | C59 | | | 0.033 | | Yes | 0.46 | | Yes | C44 | | | 0.68 | | Yes |
| Eastern elliptio musse | Soft tissue | 6 | LPR6-ECST-Comp02 | 0.12 | | Yes | 0.14 | | Yes | 1.5 | | Yes | C59 | | | 0.039 | | Yes | 0.5 | | Yes | C44 | | | 0.81 | | Yes |
| Eastern elliptio musse | Soft tissue | 7 | LPR7-ECST-Comp03 | 0.12 | | Yes | 0.19 | | Yes | 1.7 | | Yes | C59 | | | 0.044 | | Yes | 0.54 | | Yes | C44 | | | 0.92 | | Yes |
| Eastern elliptio musse | Soft tissue | 7 | LPR7-ECST-Comp04 | 0.071 | | Yes | 0.085 | | Yes | 0.9 | | Yes | C59 | | | 0.027 | | Yes | 0.31 | | Yes | C44 | | | 0.52 | | Yes |
| Eastern elliptio musse | Soft tissue | 8 | LPR8-ECST-Comp05 | 0.076 | | Yes | 0.072 | | Yes | 0.77 | | Yes | C59 | | | 0.023 | | Yes | 0.31 | | Yes | C44 | | | 0.43 | | Yes |
| Ribbed mussel | Soft tissue | na | LPRBG-GDST-Comp01 | 0.00075 | EMPC-J | Yes | 0.0015 | | Yes | 0.025 | | Yes | C59 | EMPC-J | | 0.00076 | J | Yes | 0.004 | | Yes | C44 | | | 0.012 | | Yes |
| Ribbed mussel | Soft tissue | 1 | LPR1-GDST-Comp01 | 0.092 | | Yes | 0.093 | | Yes | 1.1 | | Yes | C59 | | | 0.029 | | Yes | 0.38 | | Yes | C44 | | | 0.56 | | Yes |
| Ribbed mussel | Soft tissue | 2 | LPR2-GDST-Comp02 | 0.034 | | Yes | 0.039 | | Yes | 0.39 | | Yes | C59 | | | 0.011 | | Yes | 0.15 | | Yes | C44 | | | 0.22 | | Yes |
| Ribbed mussel | Soft tissue | 3 | LPR3-GDST-Comp03 | 0.011 | | Yes | 0.011 | | Yes | 0.12 | | Yes | C59 | | | 0.0033 | | Yes | 0.045 | | Yes | C44 | | | 0.067 | | Yes |

[a] Equalized data are presented for PCB congeners. Non-equa

## 2011 Caged Bivalve Study Data for the LPRSA
## Appendix L
### Table L-5. Sample results - PCBs[a]

| | | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | PCB-67 | | | PCB-68 | | | PCB-69 | | | PCB-70 | | | PCB-71 | | | PCB-72 | | | PCB-73 | | | PCB-74 | | |
| | | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | |
| Bivalve Type | Tissue Type | Reach | SampleID | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect |
| Eastern elliptio musse | Soft tissue | na | LPRBG-ECST-Comp01 | 0.0003 | U | No | 0.0003 | U | No | C49 | | | C61 | | | C40 | J | | 0.00034 | U | No | 0.00024 | U | No | C61 | | |
| Eastern elliptio musse | Soft tissue | 6 | LPR6-ECST-Comp01 | 0.032 | | Yes | 0.0061 | EMPC-J | Yes | C49 | | | C61 | | | C40 | | | 0.011 | | Yes | 0.0059 | | Yes | C61 | | |
| Eastern elliptio musse | Soft tissue | 6 | LPR6-ECST-Comp02 | 0.037 | | Yes | 0.0083 | J | Yes | C49 | | | C61 | | | C40 | | | 0.014 | | Yes | 0.0091 | | Yes | C61 | | |
| Eastern elliptio musse | Soft tissue | 7 | LPR7-ECST-Comp03 | 0.04 | | Yes | 0.0067 | | Yes | C49 | | | C61 | | | C40 | | | 0.012 | | Yes | 0.0068 | | Yes | C61 | | |
| Eastern elliptio musse | Soft tissue | 7 | LPR7-ECST-Comp04 | 0.028 | | Yes | 0.0059 | | Yes | C49 | | | C61 | | | C40 | | | 0.01 | | Yes | 0.0055 | | Yes | C61 | | |
| Eastern elliptio musse | Soft tissue | 8 | LPR8-ECST-Comp05 | 0.022 | | Yes | 0.0057 | | Yes | C49 | | | C61 | | | C40 | | | 0.0088 | | Yes | 0.0067 | | Yes | C61 | | |
| Ribbed mussel | Soft tissue | na | LPRBG-GDST-Comp01 | 0.0011 | | Yes | 0.00035 | EMPC-J | Yes | C49 | | | C61 | | | C40 | | | 0.00064 | EMPC-J | Yes | 0.00015 | J | Yes | C61 | | |
| Ribbed mussel | Soft tissue | 1 | LPR1-GDST-Comp01 | 0.031 | | Yes | 0.0078 | | Yes | C49 | | | C61 | | | C40 | | | 0.015 | | Yes | 0.0069 | | Yes | C61 | | |
| Ribbed mussel | Soft tissue | 2 | LPR2-GDST-Comp02 | 0.0099 | | Yes | 0.0027 | EMPC-J | Yes | C49 | | | C61 | | | C40 | | | 0.0049 | | Yes | 0.003 | | Yes | C61 | | |
| Ribbed mussel | Soft tissue | 3 | LPR3-GDST-Comp03 | 0.0031 | | Yes | 0.0011 | | Yes | C49 | | | C61 | | | C40 | | | 0.0012 | EMPC-J | Yes | 0.0012 | | Yes | C61 | | |

[a] Equalized data are presented for PCB congeners. Non-equa

## 2011 Caged Bivalve Study Data for the LPRSA
## Appendix L
### Table L-5. Sample results - PCBs[a]

| | | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | PCB-75 | | | PCB-76 | | | PCB-77 | | | PCB-78 | | | PCB-79 | | | PCB-80 | | | PCB-81 | | | PCB-82 | | |
| | | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | |
| Bivalve Type | Tissue Type | Reach | SampleID | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect |
| Eastern elliptio musse | Soft tissue | na | LPRBG-ECST-Comp01 | C59 | U | | C61 | | | 0.00056 | EMPC-J | Yes | 0.00036 | U | No | 0.0003 | U | No | 0.00029 | U | No | 0.00036 | U | No | 0.0014 | | Yes |
| Eastern elliptio musse | Soft tissue | 6 | LPR6-ECST-Comp01 | C59 | | | C61 | | | 0.061 | | Yes | 0.00055 | U | No | 0.0071 | | Yes | 0.00045 | U | No | 0.0029 | | Yes | 0.094 | | Yes |
| Eastern elliptio musse | Soft tissue | 6 | LPR6-ECST-Comp02 | C59 | | | C61 | | | 0.078 | | Yes | 0.00056 | U | No | 0.0086 | J | Yes | 0.00046 | U | No | 0.0033 | | Yes | 0.12 | | Yes |
| Eastern elliptio musse | Soft tissue | 7 | LPR7-ECST-Comp03 | C59 | | | C61 | | | 0.091 | | Yes | 0.00076 | U | No | 0.0094 | | Yes | 0.00062 | U | No | 0.0036 | | Yes | 0.13 | | Yes |
| Eastern elliptio musse | Soft tissue | 7 | LPR7-ECST-Comp04 | C59 | | | C61 | | | 0.053 | | Yes | 0.00054 | U | No | 0.0069 | | Yes | 0.00044 | U | No | 0.0021 | | Yes | 0.082 | | Yes |
| Eastern elliptio musse | Soft tissue | 8 | LPR8-ECST-Comp05 | C59 | | | C61 | | | 0.046 | | Yes | 0.00054 | U | No | 0.0056 | | Yes | 0.00044 | U | No | 0.00053 | U | No | 0.066 | | Yes |
| Ribbed mussel | Soft tissue | na | LPRBG-GDST-Comp01 | C59 | EMPC-J | | C61 | | | 0.0014 | | Yes | 0.00019 | U | No | 0.00031 | J | Yes | 0.00015 | U | No | 0.00018 | U | No | 0.0012 | | Yes |
| Ribbed mussel | Soft tissue | 1 | LPR1-GDST-Comp01 | C59 | | | C61 | | | 0.046 | | Yes | 0.00054 | U | No | 0.0061 | | Yes | 0.00044 | U | No | 0.0017 | | Yes | 0.073 | | Yes |
| Ribbed mussel | Soft tissue | 2 | LPR2-GDST-Comp02 | C59 | | | C61 | | | 0.018 | | Yes | 0.00027 | U | No | 0.0025 | | Yes | 0.00022 | U | No | 0.00073 | J | Yes | 0.028 | | Yes |
| Ribbed mussel | Soft tissue | 3 | LPR3-GDST-Comp03 | C59 | | | C61 | | | 0.0057 | | Yes | 0.0004 | U | No | 0.00062 | EMPC-J | Yes | 0.00033 | U | No | 0.0004 | U | No | 0.0075 | | Yes |

[a] Equalized data are presented for PCB congeners. Non-equa

## 2011 Caged Bivalve Study Data for the LPRSA
## Appendix L
### Table L-5. Sample results - PCBs[a]

| | | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | PCB-83 | | | PCB-84 | | | PCB-85 | | | PCB-86 | | | PCB-87 | | | PCB-88 | | | PCB-89 | | | PCB-90 | | |
| | | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | |
| Bivalve Type | Tissue Type | Reach | SampleID | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect |
| Eastern elliptio musse | Soft tissue | na | LPRBG-ECST-Comp01 | 0.0005 | U | No | 0.0023 | | Yes | 0.0024 | | Yes | 0.0091 | | Yes | C86 | | | 0.00046 | U | No | 0.00046 | U | No | 0.015 | | Yes |
| Eastern elliptio musse | Soft tissue | 6 | LPR6-ECST-Comp01 | 0.044 | | Yes | 0.22 | | Yes | 0.11 | | Yes | 0.51 | | Yes | C86 | | | 0.0026 | U | No | 0.014 | | Yes | 0.77 | | Yes |
| Eastern elliptio musse | Soft tissue | 6 | LPR6-ECST-Comp02 | 0.056 | J | Yes | 0.27 | | Yes | 0.14 | J | Yes | 0.62 | J | Yes | C86 | J | | 0.0033 | U | No | 0.016 | | Yes | 0.95 | J | Yes |
| Eastern elliptio musse | Soft tissue | 7 | LPR7-ECST-Comp03 | 0.072 | | Yes | 0.28 | | Yes | 0.16 | | Yes | 0.7 | | Yes | C86 | | | 0.016 | | Yes | 0.018 | | Yes | 1 | | Yes |
| Eastern elliptio musse | Soft tissue | 7 | LPR7-ECST-Comp04 | 0.038 | | Yes | 0.19 | | Yes | 0.11 | | Yes | 0.47 | | Yes | C86 | | | 0.0057 | EMPC-J | Yes | 0.011 | | Yes | 0.72 | | Yes |
| Eastern elliptio musse | Soft tissue | 8 | LPR8-ECST-Comp05 | 0.035 | | Yes | 0.17 | | Yes | 0.096 | | Yes | 0.4 | | Yes | C86 | | | 0.0026 | U | No | 0.0089 | | Yes | 0.58 | | Yes |
| Ribbed mussel | Soft tissue | na | LPRBG-GDST-Comp01 | 0.0017 | EMPC-J | Yes | 0.0033 | | Yes | 0.0037 | | Yes | 0.014 | | Yes | C86 | | | 0.0004 | U | No | 0.00035 | U | No | 0.038 | | Yes |
| Ribbed mussel | Soft tissue | 1 | LPR1-GDST-Comp01 | 0.05 | | Yes | 0.19 | | Yes | 0.1 | | Yes | 0.41 | | Yes | C86 | | | 0.0017 | U | No | 0.011 | | Yes | 0.68 | | Yes |
| Ribbed mussel | Soft tissue | 2 | LPR2-GDST-Comp02 | 0.016 | | Yes | 0.067 | | Yes | 0.035 | | Yes | 0.14 | | Yes | C86 | | | 0.00079 | U | No | 0.0038 | | Yes | 0.23 | | Yes |
| Ribbed mussel | Soft tissue | 3 | LPR3-GDST-Comp03 | 0.0037 | EMPC-J | Yes | 0.017 | | Yes | 0.01 | | Yes | 0.041 | | Yes | C86 | | | 0.00062 | U | No | 0.00055 | U | No | 0.071 | | Yes |

[a] Equalized data are presented for PCB congeners. Non-equa

## 2011 Caged Bivalve Study Data for the LPRSA
## Appendix L
### Table L-5. Sample results - PCBs[a]

| | | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | PCB-91 | | | PCB-92 | | | PCB-93 | | | PCB-94 | | | PCB-95 | | | PCB-96 | | | PCB-97 | | | PCB-98 | | |
| | | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | |
| Bivalve Type | Tissue Type | Reach | SampleID | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect |
| Eastern elliptio musse | Soft tissue | na | LPRBG-ECST-Comp01 | 0.0015 | | Yes | 0.0031 | | Yes | 0.0004 | U | No | 0.00042 | U | No | 0.0085 | | Yes | 0.0002 | U | No | C86 | | | 0.00043 | U | No |
| Eastern elliptio musse | Soft tissue | 6 | LPR6-ECST-Comp01 | 0.12 | | Yes | 0.16 | | Yes | 0.027 | | Yes | 0.012 | | Yes | 0.68 | | Yes | 0.014 | | Yes | C86 | | | 0.0025 | U | No |
| Eastern elliptio musse | Soft tissue | 6 | LPR6-ECST-Comp02 | 0.15 | | Yes | 0.21 | J | Yes | 0.041 | | Yes | 0.017 | J | Yes | 0.83 | | Yes | 0.017 | | Yes | C86 | J | | 0.003 | U | No |
| Eastern elliptio musse | Soft tissue | 7 | LPR7-ECST-Comp03 | 0.13 | | Yes | 0.21 | | Yes | 0.026 | | Yes | 0.012 | | Yes | 0.83 | | Yes | 0.016 | | Yes | C86 | | | 0.0023 | U | No |
| Eastern elliptio musse | Soft tissue | 7 | LPR7-ECST-Comp04 | 0.1 | | Yes | 0.15 | | Yes | 0.024 | | Yes | 0.01 | | Yes | 0.61 | | Yes | 0.011 | | Yes | C86 | | | 0.0025 | | Yes |
| Eastern elliptio musse | Soft tissue | 8 | LPR8-ECST-Comp05 | 0.086 | | Yes | 0.13 | | Yes | 0.019 | | Yes | 0.009 | | Yes | 0.55 | | Yes | 0.0092 | | Yes | C86 | | | 0.0026 | U | No |
| Ribbed mussel | Soft tissue | na | LPRBG-GDST-Comp01 | 0.0026 | | Yes | 0.0072 | | Yes | 0.00069 | J | Yes | 0.00034 | U | No | 0.019 | | Yes | 0.00019 | J | Yes | C86 | | | 0.00039 | U | No |
| Ribbed mussel | Soft tissue | 1 | LPR1-GDST-Comp01 | 0.11 | | Yes | 0.15 | | Yes | 0.05 | | Yes | 0.016 | | Yes | 0.58 | | Yes | 0.012 | | Yes | C86 | | | 0.0017 | U | No |
| Ribbed mussel | Soft tissue | 2 | LPR2-GDST-Comp02 | 0.037 | | Yes | 0.049 | | Yes | 0.017 | | Yes | 0.0058 | | Yes | 0.2 | | Yes | 0.0048 | | Yes | C86 | | | 0.00078 | U | No |
| Ribbed mussel | Soft tissue | 3 | LPR3-GDST-Comp03 | 0.01 | | Yes | 0.014 | | Yes | 0.0047 | | Yes | 0.0017 | | Yes | 0.06 | | Yes | 0.0016 | EMPC-J | Yes | C86 | | | 0.00062 | U | No |

[a] Equalized data are presented for PCB congeners. Non-equa

## 2011 Caged Bivalve Study Data for the LPRSA
## Appendix L
### Table L-5. Sample results - PCBs[a]

| | | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | PCB-99 | | | PCB-100 | | | PCB-101 | | | PCB-102 | | | PCB-103 | | | PCB-104 | | | PCB-105 | | | PCB-106 | | |
| | | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | |
| Bivalve Type | Tissue Type | Reach | SampleID | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect |
| Eastern elliptio musse | Soft tissue | na | LPRBG-ECST-Comp01 | 0.0076 | | Yes | C93 | U | | C90 | | | 0.00036 | U | No | 0.00038 | U | No | 0.00018 | U | No | 0.0055 | | Yes | 0.00034 | U | No |
| Eastern elliptio musse | Soft tissue | 6 | LPR6-ECST-Comp01 | 0.37 | | Yes | C93 | | | C90 | | | 0.037 | | Yes | 0.014 | | Yes | 0.0032 | | Yes | 0.21 | | Yes | 0.0019 | U | No |
| Eastern elliptio musse | Soft tissue | 6 | LPR6-ECST-Comp02 | 0.46 | J | Yes | C93 | | | C90 | J | | 0.047 | J | Yes | 0.02 | J | Yes | 0.0052 | | Yes | 0.27 | | Yes | 0.0024 | U | No |
| Eastern elliptio musse | Soft tissue | 7 | LPR7-ECST-Comp03 | 0.46 | | Yes | C93 | | | C90 | | | 0.041 | | Yes | 0.013 | | Yes | 0.0025 | | Yes | 0.32 | | Yes | 0.0018 | U | No |
| Eastern elliptio musse | Soft tissue | 7 | LPR7-ECST-Comp04 | 0.35 | | Yes | C93 | | | C90 | | | 0.028 | | Yes | 0.011 | | Yes | 0.0023 | | Yes | 0.2 | | Yes | 0.0016 | U | No |
| Eastern elliptio musse | Soft tissue | 8 | LPR8-ECST-Comp05 | 0.26 | | Yes | C93 | | | C90 | | | 0.025 | | Yes | 0.0099 | | Yes | 0.0021 | | Yes | 0.16 | | Yes | 0.0017 | U | No |
| Ribbed mussel | Soft tissue | na | LPRBG-GDST-Comp01 | 0.023 | | Yes | C93 | J | | C90 | | | 0.0013 | | Yes | 0.00065 | J | Yes | 0.00012 | U | No | 0.0077 | | Yes | 0.00026 | U | No |
| Ribbed mussel | Soft tissue | 1 | LPR1-GDST-Comp01 | 0.34 | | Yes | C93 | | | C90 | | | 0.045 | | Yes | 0.023 | | Yes | 0.0063 | | Yes | 0.18 | | Yes | 0.0011 | U | No |
| Ribbed mussel | Soft tissue | 2 | LPR2-GDST-Comp02 | 0.11 | | Yes | C93 | | | C90 | | | 0.015 | | Yes | 0.0079 | | Yes | 0.0023 | | Yes | 0.059 | | Yes | 0.00051 | U | No |
| Ribbed mussel | Soft tissue | 3 | LPR3-GDST-Comp03 | 0.039 | | Yes | C93 | | | C90 | | | 0.0049 | | Yes | 0.0028 | | Yes | 0.00088 | EMPC-J | Yes | 0.019 | | Yes | 0.00041 | U | No |

[a] Equalized data are presented for PCB congeners. Non-equa

## 2011 Caged Bivalve Study Data for the LPRSA
## Appendix L
### Table L-5. Sample results - PCBs[a]

| | | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | PCB-107 | | | PCB-108 | | | PCB-109 | | | PCB-110 | | | PCB-111 | | | PCB-112 | | | PCB-113 | | | PCB-114 | | |
| | | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | |
| Bivalve Type | Tissue Type | Reach | SampleID | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect |
| Eastern elliptio musse | Soft tissue | na | LPRBG-ECST-Comp01 | 0.001 | | Yes | 0.00073 | EMPC-J | Yes | C86 | | | 0.016 | | Yes | 0.0003 | U | No | 0.0003 | U | No | C90 | | | 0.00035 | U | No |
| Eastern elliptio musse | Soft tissue | 6 | LPR6-ECST-Comp01 | 0.035 | | Yes | 0.024 | | Yes | C86 | | | 0.85 | | Yes | 0.0017 | U | No | 0.0023 | | Yes | C90 | | | 0.013 | | Yes |
| Eastern elliptio musse | Soft tissue | 6 | LPR6-ECST-Comp02 | 0.045 | | Yes | 0.03 | | Yes | C86 | J | | 1.1 | | Yes | 0.0021 | U | No | 0.0021 | U | No | C90 | J | | 0.016 | | Yes |
| Eastern elliptio musse | Soft tissue | 7 | LPR7-ECST-Comp03 | 0.052 | | Yes | 0.036 | | Yes | C86 | | | 1.1 | | Yes | 0.0016 | U | No | 0.0088 | | Yes | C90 | | | 0.02 | | Yes |
| Eastern elliptio musse | Soft tissue | 7 | LPR7-ECST-Comp04 | 0.035 | | Yes | 0.024 | | Yes | C86 | | | 0.78 | | Yes | 0.0014 | U | No | 0.0014 | U | No | C90 | | | 0.012 | | Yes |
| Eastern elliptio musse | Soft tissue | 8 | LPR8-ECST-Comp05 | 0.029 | | Yes | 0.019 | | Yes | C86 | | | 0.6 | | Yes | 0.0015 | U | No | 0.0015 | U | No | C90 | | | 0.01 | | Yes |
| Ribbed mussel | Soft tissue | na | LPRBG-GDST-Comp01 | 0.0041 | | Yes | 0.0011 | J | Yes | C86 | | | 0.023 | | Yes | 0.00023 | U | No | 0.00023 | U | No | C90 | | | 0.00028 | U | No |
| Ribbed mussel | Soft tissue | 1 | LPR1-GDST-Comp01 | 0.033 | | Yes | 0.019 | | Yes | C86 | | | 0.6 | | Yes | 0.001 | U | No | 0.0016 | | Yes | C90 | | | 0.0083 | | Yes |
| Ribbed mussel | Soft tissue | 2 | LPR2-GDST-Comp02 | 0.012 | | Yes | 0.0063 | | Yes | C86 | | | 0.21 | | Yes | 0.00046 | U | No | 0.0017 | EMPC-J | Yes | C90 | | | 0.0031 | | Yes |
| Ribbed mussel | Soft tissue | 3 | LPR3-GDST-Comp03 | 0.005 | | Yes | 0.0023 | | Yes | C86 | | | 0.059 | | Yes | 0.00036 | U | No | 0.00036 | U | No | C90 | | | 0.00099 | EMPC-J | Yes |

[a] Equalized data are presented for PCB congeners. Non-equa

## 2011 Caged Bivalve Study Data for the LPRSA
## Appendix L
### Table L-5. Sample results - PCBs[a]

| | | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | PCB-115 | | | PCB-116 | | | PCB-117 | | | PCB-118 | | | PCB-119 | | | PCB-120 | | | PCB-121 | | | PCB-122 | | |
| | | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | |
| Bivalve Type | Tissue Type | Reach | SampleID | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect |
| Eastern elliptio musse | Soft tissue | na | LPRBG-ECST-Comp01 | 0.00031 | U | No | C85 | | | 0.00041 | EMPC-J | Yes | 0.015 | | Yes | C86 | | | 0.00031 | U | No | 0.00029 | U | No | 0.00036 | U | No |
| Eastern elliptio musse | Soft tissue | 6 | LPR6-ECST-Comp01 | 0.031 | | Yes | C85 | | | 0.019 | | Yes | 0.57 | | Yes | C86 | | | 0.0017 | U | No | 0.0017 | U | No | 0.0021 | U | No |
| Eastern elliptio musse | Soft tissue | 6 | LPR6-ECST-Comp02 | 0.016 | J | Yes | C85 | J | | 0.028 | | Yes | 0.7 | J | Yes | C86 | J | | 0.0021 | U | No | 0.002 | U | No | 0.011 | | Yes |
| Eastern elliptio musse | Soft tissue | 7 | LPR7-ECST-Comp03 | 0.027 | | Yes | C85 | | | 0.025 | | Yes | 0.81 | | Yes | C86 | | | 0.0016 | U | No | 0.0016 | U | No | 0.011 | | Yes |
| Eastern elliptio musse | Soft tissue | 7 | LPR7-ECST-Comp04 | 0.033 | | Yes | C85 | | | 0.019 | | Yes | 0.53 | | Yes | C86 | | | 0.0015 | U | No | 0.0014 | U | No | 0.0077 | | Yes |
| Eastern elliptio musse | Soft tissue | 8 | LPR8-ECST-Comp05 | 0.012 | | Yes | C85 | | | 0.015 | | Yes | 0.41 | | Yes | C86 | | | 0.0016 | U | No | 0.0015 | U | No | 0.0069 | | Yes |
| Ribbed mussel | Soft tissue | na | LPRBG-GDST-Comp01 | 0.00025 | U | No | C85 | | | 0.00055 | J | Yes | 0.036 | | Yes | C86 | | | 0.0008 | EMPC-J | Yes | 0.00023 | U | No | 0.00031 | U | No |
| Ribbed mussel | Soft tissue | 1 | LPR1-GDST-Comp01 | 0.026 | | Yes | C85 | | | 0.017 | | Yes | 0.43 | | Yes | C86 | | | 0.0029 | | Yes | 0.00097 | U | No | 0.0071 | | Yes |
| Ribbed mussel | Soft tissue | 2 | LPR2-GDST-Comp02 | 0.0016 | | Yes | C85 | | | 0.0068 | | Yes | 0.15 | | Yes | C86 | | | 0.0012 | | Yes | 0.00044 | U | No | 0.0023 | EMPC-J | Yes |
| Ribbed mussel | Soft tissue | 3 | LPR3-GDST-Comp03 | 0.0012 | | Yes | C85 | | | 0.0019 | | Yes | 0.056 | | Yes | C86 | | | 0.00037 | U | No | 0.00035 | U | No | 0.00066 | EMPC-J | Yes |

[a] Equalized data are presented for PCB congeners. Non-equa

## 2011 Caged Bivalve Study Data for the LPRSA
## Appendix L
### Table L-5. Sample results - PCBs[a]

| | | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | PCB-123 | | | PCB-124 | | | PCB-125 | | | PCB-126 | | | PCB-127 | | | PCB-128 | | | PCB-129 | | | PCB-130 | | |
| | | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | |
| Bivalve Type | Tissue Type | Reach | SampleID | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect |
| Eastern elliptio musse | Soft tissue | na | LPRBG-ECST-Comp01 | 0.00034 | U | No | C108 | EMPC-J | | C86 | | | 0.00029 | U | No | 0.00036 | U | No | 0.0039 | | Yes | 0.044 | | Yes | 0.0026 | | Yes |
| Eastern elliptio musse | Soft tissue | 6 | LPR6-ECST-Comp01 | 0.012 | | Yes | C108 | | | C86 | | | 0.0018 | | Yes | 0.002 | U | No | 0.083 | | Yes | 0.72 | | Yes | 0.044 | | Yes |
| Eastern elliptio musse | Soft tissue | 6 | LPR6-ECST-Comp02 | 0.014 | | Yes | C108 | | | C86 | J | | 0.0021 | | Yes | 0.0027 | U | No | 0.11 | | Yes | 0.88 | J | Yes | 0.052 | J | Yes |
| Eastern elliptio musse | Soft tissue | 7 | LPR7-ECST-Comp03 | 0.016 | | Yes | C108 | | | C86 | | | 0.002 | | Yes | 0.0019 | U | No | 0.13 | | Yes | 0.99 | | Yes | 0.06 | | Yes |
| Eastern elliptio musse | Soft tissue | 7 | LPR7-ECST-Comp04 | 0.01 | | Yes | C108 | | | C86 | | | 0.0014 | EMPC-J | Yes | 0.0017 | U | No | 0.093 | | Yes | 0.75 | | Yes | 0.045 | | Yes |
| Eastern elliptio musse | Soft tissue | 8 | LPR8-ECST-Comp05 | 0.0095 | | Yes | C108 | | | C86 | | | 0.0016 | | Yes | 0.0019 | U | No | 0.076 | | Yes | 0.59 | | Yes | 0.036 | | Yes |
| Ribbed mussel | Soft tissue | na | LPRBG-GDST-Comp01 | 0.00057 | EMPC-J | Yes | C108 | | | C86 | | | 0.00028 | U | No | 0.00027 | U | No | 0.0054 | | Yes | 0.061 | | Yes | 0.0027 | EMPC-J | Yes |
| Ribbed mussel | Soft tissue | 1 | LPR1-GDST-Comp01 | 0.01 | | Yes | C108 | | | C86 | | | 0.00083 | EMPC-J | Yes | 0.0012 | U | No | 0.063 | | Yes | 0.53 | | Yes | 0.031 | | Yes |
| Ribbed mussel | Soft tissue | 2 | LPR2-GDST-Comp02 | 0.0028 | EMPC-J | Yes | C108 | | | C86 | | | 0.00038 | J | Yes | 0.00051 | U | No | 0.022 | | Yes | 0.18 | | Yes | 0.01 | | Yes |
| Ribbed mussel | Soft tissue | 3 | LPR3-GDST-Comp03 | 0.001 | | Yes | C108 | | | C86 | | | 0.00062 | U | No | 0.00043 | U | No | 0.0089 | | Yes | 0.081 | | Yes | 0.0037 | EMPC-J | Yes |

[a] Equalized data are presented for PCB congeners. Non-equa

## 2011 Caged Bivalve Study Data for the LPRSA
## Appendix L
### Table L-5. Sample results - PCBs[a]

| | | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | PCB-131 | | | PCB-132 | | | PCB-133 | | | PCB-134 | | | PCB-135 | | | PCB-136 | | | PCB-137 | | | PCB-138 | | |
| | | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | |
| Bivalve Type | Tissue Type | Reach | SampleID | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect |
| Eastern elliptio musse | Soft tissue | na | LPRBG-ECST-Comp01 | 0.00035 | U | No | 0.0065 | | Yes | 0.00034 | U | No | 0.0004 | U | No | 0.011 | | Yes | 0.0027 | | Yes | 0.00031 | U | No | C129 | | |
| Eastern elliptio musse | Soft tissue | 6 | LPR6-ECST-Comp01 | 0.009 | | Yes | 0.24 | | Yes | 0.012 | | Yes | 0.048 | | Yes | 0.29 | | Yes | 0.11 | | Yes | 0.031 | | Yes | C129 | | |
| Eastern elliptio musse | Soft tissue | 6 | LPR6-ECST-Comp02 | 0.012 | J | Yes | 0.29 | J | Yes | 0.016 | J | Yes | 0.057 | J | Yes | 0.36 | J | Yes | 0.14 | | Yes | 0.033 | J | Yes | C129 | J | |
| Eastern elliptio musse | Soft tissue | 7 | LPR7-ECST-Comp03 | 0.015 | | Yes | 0.34 | | Yes | 0.017 | | Yes | 0.059 | | Yes | 0.39 | | Yes | 0.14 | | Yes | 0.036 | | Yes | C129 | | |
| Eastern elliptio musse | Soft tissue | 7 | LPR7-ECST-Comp04 | 0.009 | | Yes | 0.24 | | Yes | 0.013 | | Yes | 0.043 | | Yes | 0.28 | | Yes | 0.1 | | Yes | 0.027 | | Yes | C129 | | |
| Eastern elliptio musse | Soft tissue | 8 | LPR8-ECST-Comp05 | 0.0075 | | Yes | 0.19 | | Yes | 0.0097 | | Yes | 0.035 | | Yes | 0.23 | | Yes | 0.08 | | Yes | 0.024 | | Yes | C129 | | |
| Ribbed mussel | Soft tissue | na | LPRBG-GDST-Comp01 | 0.00021 | U | No | 0.0069 | | Yes | 0.0037 | EMPC-J | Yes | 0.0017 | EMPC-J | Yes | 0.022 | | Yes | 0.0042 | | Yes | 0.0002 | U | No | C129 | | |
| Ribbed mussel | Soft tissue | 1 | LPR1-GDST-Comp01 | 0.0033 | | Yes | 0.17 | | Yes | 0.013 | | Yes | 0.035 | | Yes | 0.27 | | Yes | 0.096 | | Yes | 0.0085 | EMPC-J | Yes | C129 | | |
| Ribbed mussel | Soft tissue | 2 | LPR2-GDST-Comp02 | 0.0008 | EMPC-J | Yes | 0.054 | | Yes | 0.0055 | | Yes | 0.012 | | Yes | 0.09 | | Yes | 0.031 | | Yes | 0.0041 | | Yes | C129 | | |
| Ribbed mussel | Soft tissue | 3 | LPR3-GDST-Comp03 | 0.00035 | U | No | 0.019 | | Yes | 0.0033 | | Yes | 0.0038 | | Yes | 0.033 | | Yes | 0.0096 | | Yes | 0.0018 | | Yes | C129 | | |

[a] Equalized data are presented for PCB congeners. Non-equa

## 2011 Caged Bivalve Study Data for the LPRSA
## Appendix L
### Table L-5. Sample results - PCBs[a]

| | | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | PCB-139 | | | PCB-140 | | | PCB-141 | | | PCB-142 | | | PCB-143 | | | PCB-144 | | | PCB-145 | | |
| | | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | |
| Bivalve Type | Tissue Type | Reach | SampleID | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect |
| Eastern elliptio musse | Soft tissue | na | LPRBG-ECST-Comp01 | 0.00029 | U | No | C139 | U | | 0.0047 | EMPC-J | Yes | 0.00036 | U | No | 0.00031 | U | No | 0.0003 | U | No | 0.00023 | U | No |
| Eastern elliptio musse | Soft tissue | 6 | LPR6-ECST-Comp01 | 0.011 | | Yes | C139 | | | 0.13 | | Yes | 0.00028 | U | No | 0.00024 | U | No | 0.032 | | Yes | 0.00019 | U | No |
| Eastern elliptio musse | Soft tissue | 6 | LPR6-ECST-Comp02 | 0.015 | J | Yes | C139 | J | | 0.16 | J | Yes | 0.00023 | U | No | 0.0002 | U | No | 0.041 | J | Yes | 0.00015 | U | No |
| Eastern elliptio musse | Soft tissue | 7 | LPR7-ECST-Comp03 | 0.016 | | Yes | C139 | | | 0.18 | | Yes | 0.00031 | U | No | 0.0036 | | Yes | 0.049 | | Yes | 0.00018 | U | No |
| Eastern elliptio musse | Soft tissue | 7 | LPR7-ECST-Comp04 | 0.012 | | Yes | C139 | | | 0.13 | | Yes | 0.00034 | U | No | 0.0026 | | Yes | 0.031 | | Yes | 0.0002 | U | No |
| Eastern elliptio musse | Soft tissue | 8 | LPR8-ECST-Comp05 | 0.0088 | | Yes | C139 | | | 0.092 | | Yes | 0.00031 | U | No | 0.00029 | U | No | 0.026 | | Yes | 0.00016 | U | No |
| Ribbed mussel | Soft tissue | na | LPRBG-GDST-Comp01 | 0.00035 | EMPC-J | Yes | C139 | EMPC-J | | 0.00017 | U | No | 0.00022 | U | No | 0.0002 | U | No | 0.00019 | U | No | 0.00012 | U | No |
| Ribbed mussel | Soft tissue | 1 | LPR1-GDST-Comp01 | 0.0066 | | Yes | C139 | | | 0.013 | | Yes | 0.00023 | U | No | 0.00021 | U | No | 0.0055 | | Yes | 0.00014 | U | No |
| Ribbed mussel | Soft tissue | 2 | LPR2-GDST-Comp02 | 0.002 | J | Yes | C139 | J | | 0.0067 | | Yes | 0.00015 | U | No | 0.00014 | U | No | 0.0022 | | Yes | 0.000089 | U | No |
| Ribbed mussel | Soft tissue | 3 | LPR3-GDST-Comp03 | 0.0003 | U | No | C139 | U | | 0.0051 | | Yes | 0.00037 | U | No | 0.00034 | U | No | 0.0015 | | Yes | 0.00021 | U | No |

[a] Equalized data are presented for PCB congeners. Non-equa

## 2011 Caged Bivalve Study Data for the LPRSA
## Appendix L
### Table L-5. Sample results - PCBs[a]

| | | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | PCB-146 | | | PCB-147 | | | PCB-148 | | | PCB-149 | | | PCB-150 | | | PCB-151 | | | PCB-152 | | | PCB-153 | | |
| | | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | |
| Bivalve Type | Tissue Type | Reach | SampleID | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect |
| Eastern elliptio musse | Soft tissue | na | LPRBG-ECST-Comp01 | 0.0066 | | Yes | 0.02 | | Yes | 0.00031 | U | No | C147 | | | 0.00022 | U | No | C135 | | | 0.00023 | U | No | 0.038 | | Yes |
| Eastern elliptio musse | Soft tissue | 6 | LPR6-ECST-Comp01 | 0.092 | | Yes | 0.57 | | Yes | 0.00024 | U | No | C147 | | | 0.0016 | | Yes | C135 | | | 0.0019 | | Yes | 0.49 | | Yes |
| Eastern elliptio musse | Soft tissue | 6 | LPR6-ECST-Comp02 | 0.12 | J | Yes | 0.74 | J | Yes | 0.0029 | | Yes | C147 | J | | 0.003 | | Yes | C135 | J | | 0.0031 | | Yes | 0.63 | J | Yes |
| Eastern elliptio musse | Soft tissue | 7 | LPR7-ECST-Comp03 | 0.13 | | Yes | 0.8 | | Yes | 0.0018 | EMPC-J | Yes | C147 | | | 0.0016 | EMPC-J | Yes | C135 | | | 0.0019 | | Yes | 0.68 | | Yes |
| Eastern elliptio musse | Soft tissue | 7 | LPR7-ECST-Comp04 | 0.098 | | Yes | 0.57 | | Yes | 0.0021 | | Yes | C147 | | | 0.0017 | | Yes | C135 | | | 0.0016 | | Yes | 0.5 | | Yes |
| Eastern elliptio musse | Soft tissue | 8 | LPR8-ECST-Comp05 | 0.079 | | Yes | 0.46 | | Yes | 0.0016 | | Yes | C147 | | | 0.0012 | | Yes | C135 | | | 0.0013 | | Yes | 0.37 | | Yes |
| Ribbed mussel | Soft tissue | na | LPRBG-GDST-Comp01 | 0.026 | | Yes | 0.045 | | Yes | 0.00082 | EMPC-J | Yes | C147 | | | 0.00063 | J | Yes | C135 | | | 0.00012 | U | No | 0.081 | | Yes |
| Ribbed mussel | Soft tissue | 1 | LPR1-GDST-Comp01 | 0.1 | | Yes | 0.55 | | Yes | 0.003 | | Yes | C147 | | | 0.0036 | | Yes | C135 | | | 0.0026 | | Yes | 0.44 | | Yes |
| Ribbed mussel | Soft tissue | 2 | LPR2-GDST-Comp02 | 0.038 | | Yes | 0.18 | | Yes | 0.0014 | | Yes | C147 | | | 0.0013 | | Yes | C135 | | | 0.00085 | J | Yes | 0.15 | | Yes |
| Ribbed mussel | Soft tissue | 3 | LPR3-GDST-Comp03 | 0.024 | | Yes | 0.069 | | Yes | 0.00031 | U | No | C147 | | | 0.00019 | U | No | C135 | | | 0.00021 | U | No | 0.083 | | Yes |

[a] Equalized data are presented for PCB congeners. Non-equa

## 2011 Caged Bivalve Study Data for the LPRSA
## Appendix L
### Table L-5. Sample results - PCBs[a]

| | | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | PCB-154 | | | PCB-155 | | | PCB-156 | | | PCB-157 | | | PCB-158 | | | PCB-159 | | | PCB-160 | | | PCB-161 | | |
| | | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | |
| Bivalve Type | Tissue Type | Reach | SampleID | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect |
| Eastern elliptio musse | Soft tissue | na | LPRBG-ECST-Comp01 | 0.00025 | U | No | 0.00021 | U | No | 0.0025 | | Yes | C156 | | | 0.002 | | Yes | 0.00033 | U | No | 0.00024 | U | No | 0.00025 | U | No |
| Eastern elliptio musse | Soft tissue | 6 | LPR6-ECST-Comp01 | 0.011 | | Yes | 0.0083 | | Yes | 0.05 | | Yes | C156 | | | 0.054 | | Yes | 0.0047 | | Yes | 0.00019 | U | No | 0.0002 | U | No |
| Eastern elliptio musse | Soft tissue | 6 | LPR6-ECST-Comp02 | 0.015 | J | Yes | 0.0082 | J | Yes | 0.064 | J | Yes | C156 | J | | 0.068 | J | Yes | 0.00052 | U | No | 0.00016 | U | No | 0.00016 | U | No |
| Eastern elliptio musse | Soft tissue | 7 | LPR7-ECST-Comp03 | 0.012 | | Yes | 0.0019 | | Yes | 0.078 | | Yes | C156 | | | 0.081 | | Yes | 0.0075 | | Yes | 0.00021 | U | No | 0.00022 | U | No |
| Eastern elliptio musse | Soft tissue | 7 | LPR7-ECST-Comp04 | 0.009 | | Yes | 0.0013 | EMPC-J | Yes | 0.053 | | Yes | C156 | | | 0.056 | | Yes | 0.0056 | | Yes | 0.00023 | U | No | 0.00024 | U | No |
| Eastern elliptio musse | Soft tissue | 8 | LPR8-ECST-Comp05 | 0.0078 | | Yes | 0.0011 | | Yes | 0.041 | | Yes | C156 | | | 0.046 | | Yes | 0.0041 | | Yes | 0.00021 | U | No | 0.00021 | U | No |
| Ribbed mussel | Soft tissue | na | LPRBG-GDST-Comp01 | 0.0053 | | Yes | 0.00033 | J | Yes | 0.00097 | J | Yes | C156 | J | | 0.00013 | U | No | 0.00025 | U | No | 0.00015 | U | No | 0.00015 | U | No |
| Ribbed mussel | Soft tissue | 1 | LPR1-GDST-Comp01 | 0.019 | | Yes | 0.0059 | | Yes | 0.021 | | Yes | C156 | | | 0.014 | | Yes | 0.0004 | U | No | 0.00016 | U | No | 0.00016 | U | No |
| Ribbed mussel | Soft tissue | 2 | LPR2-GDST-Comp02 | 0.0073 | | Yes | 0.002 | | Yes | 0.0067 | | Yes | C156 | | | 0.0049 | | Yes | 0.00018 | U | No | 0.0001 | U | No | 0.0001 | U | No |
| Ribbed mussel | Soft tissue | 3 | LPR3-GDST-Comp03 | 0.0047 | | Yes | 0.00071 | J | Yes | 0.0035 | | Yes | C156 | | | 0.0029 | EMPC-J | Yes | 0.00038 | U | No | 0.00025 | U | No | 0.00025 | U | No |

[a] Equalized data are presented for PCB congeners. Non-equa

## 2011 Caged Bivalve Study Data for the LPRSA
## Appendix L
### Table L-5. Sample results - PCBs[a]

| | | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | PCB-162 | | | PCB-163 | | | PCB-164 | | | PCB-165 | | | PCB-166 | | | PCB-167 | | | PCB-168 | | | PCB-169 | | |
| | | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | |
| Bivalve Type | Tissue Type | Reach | SampleID | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect |
| Eastern elliptio musse | Soft tissue | na | LPRBG-ECST-Comp01 | 0.0003 | U | No | C129 | | | 0.0024 | | Yes | 0.00025 | U | No | C128 | | | 0.0014 | | Yes | C153 | | | 0.00033 | U | No |
| Eastern elliptio musse | Soft tissue | 6 | LPR6-ECST-Comp01 | 0.0019 | EMPC-J | Yes | C129 | | | 0.048 | | Yes | 0.0002 | U | No | C128 | | | 0.019 | | Yes | C153 | | | 0.00059 | U | No |
| Eastern elliptio musse | Soft tissue | 6 | LPR6-ECST-Comp02 | 0.0027 | EMPC-J | Yes | C129 | J | | 0.062 | J | Yes | 0.00049 | J | Yes | C128 | | | 0.025 | J | Yes | C153 | J | | 0.00077 | EMPC-J | Yes |
| Eastern elliptio musse | Soft tissue | 7 | LPR7-ECST-Comp03 | 0.003 | EMPC-J | Yes | C129 | | | 0.074 | | Yes | 0.00022 | U | No | C128 | | | 0.029 | | Yes | C153 | | | 0.00057 | U | No |
| Eastern elliptio musse | Soft tissue | 7 | LPR7-ECST-Comp04 | 0.0022 | | Yes | C129 | | | 0.054 | | Yes | 0.00024 | U | No | C128 | | | 0.02 | | Yes | C153 | | | 0.00091 | EMPC-J | Yes |
| Eastern elliptio musse | Soft tissue | 8 | LPR8-ECST-Comp05 | 0.0018 | | Yes | C129 | | | 0.039 | | Yes | 0.00021 | U | No | C128 | | | 0.016 | | Yes | C153 | | | 0.0005 | U | No |
| Ribbed mussel | Soft tissue | na | LPRBG-GDST-Comp01 | 0.00057 | J | Yes | C129 | | | 0.0015 | | Yes | 0.00015 | U | No | C128 | | | 0.0028 | | Yes | C153 | | | 0.00027 | U | No |
| Ribbed mussel | Soft tissue | 1 | LPR1-GDST-Comp01 | 0.002 | EMPC-J | Yes | C129 | | | 0.029 | | Yes | 0.00016 | U | No | C128 | | | 0.016 | | Yes | C153 | | | 0.00043 | U | No |
| Ribbed mussel | Soft tissue | 2 | LPR2-GDST-Comp02 | 0.00075 | EMPC-J | Yes | C129 | | | 0.0092 | | Yes | 0.0001 | U | No | C128 | | | 0.0052 | | Yes | C153 | | | 0.0002 | U | No |
| Ribbed mussel | Soft tissue | 3 | LPR3-GDST-Comp03 | 0.00034 | U | No | C129 | | | 0.0032 | | Yes | 0.00025 | U | No | C128 | | | 0.0026 | | Yes | C153 | | | 0.00037 | U | No |

[a] Equalized data are presented for PCB congeners. Non-equa

## 2011 Caged Bivalve Study Data for the LPRSA
## Appendix L
### Table L-5. Sample results - PCBs[a]

| | | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | PCB-170 | | | PCB-171 | | | PCB-172 | | | PCB-173 | | | PCB-174 | | | PCB-175 | | | PCB-176 | | |
| | | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | |
| Bivalve Type | Tissue Type | Reach | SampleID | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect |
| Eastern elliptio musse | Soft tissue | na | LPRBG-ECST-Comp01 | 0.0052 | EMPC-J | Yes | 0.0012 | J | Yes | 0.002 | | Yes | C171 | J | | 0.0085 | EMPC-J | Yes | 0.00046 | U | No | 0.00023 | U | No |
| Eastern elliptio musse | Soft tissue | 6 | LPR6-ECST-Comp01 | 0.082 | | Yes | 0.031 | | Yes | 0.025 | | Yes | C171 | | | 0.16 | | Yes | 0.0052 | | Yes | 0.018 | | Yes |
| Eastern elliptio musse | Soft tissue | 6 | LPR6-ECST-Comp02 | 0.11 | J | Yes | 0.047 | J | Yes | 0.034 | J | Yes | C171 | J | | 0.22 | J | Yes | 0.0079 | J | Yes | 0.025 | J | Yes |
| Eastern elliptio musse | Soft tissue | 7 | LPR7-ECST-Comp03 | 0.12 | | Yes | 0.05 | | Yes | 0.035 | | Yes | C171 | | | 0.22 | | Yes | 0.0075 | | Yes | 0.024 | | Yes |
| Eastern elliptio musse | Soft tissue | 7 | LPR7-ECST-Comp04 | 0.082 | | Yes | 0.03 | | Yes | 0.025 | | Yes | C171 | | | 0.16 | | Yes | 0.0047 | | Yes | 0.017 | | Yes |
| Eastern elliptio musse | Soft tissue | 8 | LPR8-ECST-Comp05 | 0.066 | | Yes | 0.022 | | Yes | 0.017 | | Yes | C171 | | | 0.12 | | Yes | 0.0037 | EMPC-J | Yes | 0.011 | | Yes |
| Ribbed mussel | Soft tissue | na | LPRBG-GDST-Comp01 | 0.00029 | U | No | 0.00038 | U | No | 0.00038 | U | No | C171 | U | | 0.00034 | U | No | 0.00037 | U | No | 0.00011 | U | No |
| Ribbed mussel | Soft tissue | 1 | LPR1-GDST-Comp01 | 0.032 | | Yes | 0.01 | | Yes | 0.0085 | | Yes | C171 | | | 0.018 | | Yes | 0.00035 | U | No | 0.0043 | | Yes |
| Ribbed mussel | Soft tissue | 2 | LPR2-GDST-Comp02 | 0.011 | | Yes | 0.0038 | | Yes | 0.0032 | | Yes | C171 | | | 0.0098 | | Yes | 0.00032 | U | No | 0.0014 | | Yes |
| Ribbed mussel | Soft tissue | 3 | LPR3-GDST-Comp03 | 0.0059 | | Yes | 0.0019 | EMPC-J | Yes | 0.0017 | EMPC-J | Yes | C171 | EMPC-J | | 0.0068 | | Yes | 0.0005 | U | No | 0.00072 | EMPC-J | Yes |

[a] Equalized data are presented for PCB congeners. Non-equa

## 2011 Caged Bivalve Study Data for the LPRSA
## Appendix L
### Table L-5. Sample results - PCBs[a]

| | | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | PCB-177 | | | PCB-178 | | | PCB-179 | | | PCB-180 | | | PCB-181 | | | PCB-182 | | | PCB-183 | | | PCB-184 | | |
| | | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | |
| Bivalve Type | Tissue Type | Reach | SampleID | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect |
| Eastern elliptio musse | Soft tissue | na | LPRBG-ECST-Comp01 | 0.0053 | | Yes | 0.0033 | | Yes | 0.0044 | | Yes | 0.018 | | Yes | 0.00045 | U | No | 0.00042 | U | No | 0.0039 | | Yes | 0.0002 | U | No |
| Eastern elliptio musse | Soft tissue | 6 | LPR6-ECST-Comp01 | 0.082 | | Yes | 0.033 | | Yes | 0.074 | | Yes | 0.22 | | Yes | 0.00038 | U | No | 0.00036 | U | No | 0.071 | | Yes | 0.00014 | U | No |
| Eastern elliptio musse | Soft tissue | 6 | LPR6-ECST-Comp02 | 0.12 | J | Yes | 0.043 | J | Yes | 0.099 | J | Yes | 0.32 | J | Yes | 0.0018 | | Yes | 0.0016 | | Yes | 0.11 | J | Yes | 0.0011 | | Yes |
| Eastern elliptio musse | Soft tissue | 7 | LPR7-ECST-Comp03 | 0.11 | | Yes | 0.041 | | Yes | 0.095 | | Yes | 0.33 | | Yes | 0.00055 | U | No | 0.0013 | | Yes | 0.11 | | Yes | 0.001 | | Yes |
| Eastern elliptio musse | Soft tissue | 7 | LPR7-ECST-Comp04 | 0.083 | | Yes | 0.032 | | Yes | 0.069 | | Yes | 0.23 | | Yes | 0.0013 | | Yes | 0.00049 | U | No | 0.072 | | Yes | 0.0012 | | Yes |
| Eastern elliptio musse | Soft tissue | 8 | LPR8-ECST-Comp05 | 0.063 | | Yes | 0.026 | | Yes | 0.049 | | Yes | 0.17 | | Yes | 0.00092 | J | Yes | 0.00058 | U | No | 0.052 | | Yes | 0.00088 | J | Yes |
| Ribbed mussel | Soft tissue | na | LPRBG-GDST-Comp01 | 0.012 | | Yes | 0.01 | | Yes | 0.0063 | | Yes | 0.0048 | | Yes | 0.00033 | U | No | 0.00034 | U | No | 0.00035 | U | No | 0.0001 | U | No |
| Ribbed mussel | Soft tissue | 1 | LPR1-GDST-Comp01 | 0.078 | | Yes | 0.033 | | Yes | 0.06 | | Yes | 0.094 | | Yes | 0.00032 | U | No | 0.00033 | U | No | 0.015 | | Yes | 0.00013 | U | No |
| Ribbed mussel | Soft tissue | 2 | LPR2-GDST-Comp02 | 0.025 | | Yes | 0.012 | | Yes | 0.017 | | Yes | 0.033 | | Yes | 0.0003 | U | No | 0.00031 | U | No | 0.007 | | Yes | 0.00011 | U | No |
| Ribbed mussel | Soft tissue | 3 | LPR3-GDST-Comp03 | 0.01 | | Yes | 0.0082 | | Yes | 0.0078 | | Yes | 0.016 | | Yes | 0.00046 | U | No | 0.00047 | U | No | 0.0049 | | Yes | 0.00021 | U | No |

[a] Equalized data are presented for PCB congeners. Non-equa

## 2011 Caged Bivalve Study Data for the LPRSA
## Appendix L
### Table L-5. Sample results - PCBs[a]

| | | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | PCB-185 | | | PCB-186 | | | PCB-187 | | | PCB-188 | | | PCB-189 | | | PCB-190 | | | PCB-191 | | |
| | | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | |
| Bivalve Type | Tissue Type | Reach | SampleID | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect |
| Eastern elliptio musse | Soft tissue | na | LPRBG-ECST-Comp01 | 0.00042 | U | No | 0.00023 | U | No | 0.019 | | Yes | 0.0002 | U | No | 0.00045 | U | No | 0.0015 | | Yes | 0.00037 | U | No |
| Eastern elliptio musse | Soft tissue | 6 | LPR6-ECST-Comp01 | 0.018 | | Yes | 0.00016 | U | No | 0.2 | | Yes | 0.00014 | U | No | 0.0028 | | Yes | 0.019 | | Yes | 0.0038 | | Yes |
| Eastern elliptio musse | Soft tissue | 6 | LPR6-ECST-Comp02 | 0.019 | J | Yes | 0.00019 | U | No | 0.28 | J | Yes | 0.0006 | J | Yes | 0.0042 | | Yes | 0.027 | J | Yes | 0.0054 | J | Yes |
| Eastern elliptio musse | Soft tissue | 7 | LPR7-ECST-Comp03 | 0.02 | | Yes | 0.0002 | U | No | 0.28 | | Yes | 0.00046 | J | Yes | 0.0035 | EMPC-J | Yes | 0.029 | | Yes | 0.0062 | | Yes |
| Eastern elliptio musse | Soft tissue | 7 | LPR7-ECST-Comp04 | 0.014 | | Yes | 0.00023 | U | No | 0.21 | | Yes | 0.0002 | U | No | 0.0026 | | Yes | 0.02 | | Yes | 0.0035 | EMPC-J | Yes |
| Eastern elliptio musse | Soft tissue | 8 | LPR8-ECST-Comp05 | 0.012 | | Yes | 0.00017 | U | No | 0.16 | | Yes | 0.00016 | U | No | 0.002 | | Yes | 0.015 | | Yes | 0.0025 | | Yes |
| Ribbed mussel | Soft tissue | na | LPRBG-GDST-Comp01 | 0.00038 | U | No | 0.00011 | U | No | 0.06 | | Yes | 0.0014 | | Yes | 0.00039 | U | No | 0.00022 | U | No | 0.00028 | U | No |
| Ribbed mussel | Soft tissue | 1 | LPR1-GDST-Comp01 | 0.00099 | J | Yes | 0.00013 | U | No | 0.22 | | Yes | 0.0011 | | Yes | 0.0012 | | Yes | 0.0035 | | Yes | 0.00027 | U | No |
| Ribbed mussel | Soft tissue | 2 | LPR2-GDST-Comp02 | 0.00033 | U | No | 0.00012 | U | No | 0.082 | | Yes | 0.0007 | J | Yes | 0.00043 | J | Yes | 0.0016 | | Yes | 0.00025 | U | No |
| Ribbed mussel | Soft tissue | 3 | LPR3-GDST-Comp03 | 0.00051 | U | No | 0.00023 | U | No | 0.047 | | Yes | 0.00074 | J | Yes | 0.00041 | U | No | 0.00034 | U | No | 0.00038 | U | No |

[a] Equalized data are presented for PCB congeners. Non-equa

## 2011 Caged Bivalve Study Data for the LPRSA
## Appendix L
### Table L-5. Sample results - PCBs[a]

| | | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | PCB-192 | | | PCB-193 | | | PCB-194 | | | PCB-195 | | | PCB-196 | | | PCB-197 | | | PCB-198 | | |
| | | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | |
| Bivalve Type | Tissue Type | Reach | SampleID | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect |
| Eastern elliptio musse | Soft tissue | na | LPRBG-ECST-Comp01 | 0.00038 | U | No | C180 | | | 0.0056 | | Yes | 0.0025 | EMPC-J | Yes | 0.00032 | U | No | 0.00022 | U | No | 0.011 | | Yes |
| Eastern elliptio musse | Soft tissue | 6 | LPR6-ECST-Comp01 | 0.00032 | U | No | C180 | | | 0.053 | | Yes | 0.021 | | Yes | 0.015 | | Yes | 0.0013 | | Yes | 0.067 | | Yes |
| Eastern elliptio musse | Soft tissue | 6 | LPR6-ECST-Comp02 | 0.00036 | U | No | C180 | J | | 0.075 | J | Yes | 0.034 | J | Yes | 0.026 | J | Yes | 0.0018 | | Yes | 0.1 | J | Yes |
| Eastern elliptio musse | Soft tissue | 7 | LPR7-ECST-Comp03 | 0.00045 | U | No | C180 | | | 0.076 | | Yes | 0.034 | | Yes | 0.027 | | Yes | 0.0016 | EMPC-J | Yes | 0.11 | | Yes |
| Eastern elliptio musse | Soft tissue | 7 | LPR7-ECST-Comp04 | 0.00043 | U | No | C180 | | | 0.057 | | Yes | 0.023 | | Yes | 0.016 | | Yes | 0.0011 | EMPC-J | Yes | 0.088 | | Yes |
| Eastern elliptio musse | Soft tissue | 8 | LPR8-ECST-Comp05 | 0.00045 | U | No | C180 | | | 0.038 | | Yes | 0.016 | | Yes | 0.012 | | Yes | 0.00076 | EMPC-J | Yes | 0.073 | | Yes |
| Ribbed mussel | Soft tissue | na | LPRBG-GDST-Comp01 | 0.00027 | U | No | C180 | | | 0.00086 | U | No | 0.00094 | U | No | 0.00016 | U | No | 0.00011 | U | No | 0.00016 | U | No |
| Ribbed mussel | Soft tissue | 1 | LPR1-GDST-Comp01 | 0.00026 | U | No | C180 | | | 0.012 | | Yes | 0.0019 | | Yes | 0.0014 | | Yes | 0.00038 | EMPC-J | Yes | 0.0091 | | Yes |
| Ribbed mussel | Soft tissue | 2 | LPR2-GDST-Comp02 | 0.00024 | U | No | C180 | | | 0.0047 | | Yes | 0.0012 | EMPC-J | Yes | 0.001 | EMPC-J | Yes | 0.00016 | EMPC-J | Yes | 0.0043 | | Yes |
| Ribbed mussel | Soft tissue | 3 | LPR3-GDST-Comp03 | 0.00036 | U | No | C180 | | | 0.0031 | EMPC-J | Yes | 0.0017 | EMPC-J | Yes | 0.0016 | | Yes | 0.00028 | U | No | 0.0041 | | Yes |

[a] Equalized data are presented for PCB congeners. Non-equa

## 2011 Caged Bivalve Study Data for the LPRSA
## Appendix L
### Table L-5. Sample results - PCBs[a]

| | | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | PCB-199 | | | PCB-200 | | | PCB-201 | | | PCB-202 | | | PCB-203 | | | PCB-204 | | | PCB-205 | | |
| | | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | |
| Bivalve Type | Tissue Type | Reach | SampleID | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect |
| Eastern elliptio musse | Soft tissue | na | LPRBG-ECST-Comp01 | C198 | | | 0.00094 | EMPC-J | Yes | 0.00024 | U | No | 0.0037 | | Yes | 0.0074 | | Yes | 0.00024 | U | No | 0.00047 | U | No |
| Eastern elliptio musse | Soft tissue | 6 | LPR6-ECST-Comp01 | C198 | | | 0.0079 | | Yes | 0.0076 | | Yes | 0.021 | | Yes | 0.043 | | Yes | 0.0002 | U | No | 0.0019 | | Yes |
| Eastern elliptio musse | Soft tissue | 6 | LPR6-ECST-Comp02 | C198 | J | | 0.011 | J | Yes | 0.0097 | J | Yes | 0.028 | J | Yes | 0.063 | J | Yes | 0.00017 | U | No | 0.0029 | | Yes |
| Eastern elliptio musse | Soft tissue | 7 | LPR7-ECST-Comp03 | C198 | | | 0.012 | | Yes | 0.01 | | Yes | 0.029 | | Yes | 0.064 | | Yes | 0.00019 | U | No | 0.0027 | EMPC-J | Yes |
| Eastern elliptio musse | Soft tissue | 7 | LPR7-ECST-Comp04 | C198 | | | 0.0087 | | Yes | 0.0071 | | Yes | 0.027 | | Yes | 0.052 | | Yes | 0.00022 | U | No | 0.0022 | | Yes |
| Eastern elliptio musse | Soft tissue | 8 | LPR8-ECST-Comp05 | C198 | | | 0.0079 | | Yes | 0.0057 | | Yes | 0.021 | | Yes | 0.04 | | Yes | 0.00017 | U | No | 0.0015 | | Yes |
| Ribbed mussel | Soft tissue | na | LPRBG-GDST-Comp01 | C198 | U | | 0.00014 | U | No | 0.00012 | U | No | 0.011 | | Yes | 0.00013 | U | No | 0.00011 | U | No | 0.00055 | U | No |
| Ribbed mussel | Soft tissue | 1 | LPR1-GDST-Comp01 | C198 | | | 0.00013 | U | No | 0.0013 | | Yes | 0.017 | | Yes | 0.0039 | | Yes | 0.00011 | U | No | 0.00028 | U | No |
| Ribbed mussel | Soft tissue | 2 | LPR2-GDST-Comp02 | C198 | | | 0.00024 | J | Yes | 0.00045 | EMPC-J | Yes | 0.0075 | | Yes | 0.002 | | Yes | 0.000082 | U | No | 0.00024 | U | No |
| Ribbed mussel | Soft tissue | 3 | LPR3-GDST-Comp03 | C198 | | | 0.00035 | U | No | 0.00032 | U | No | 0.008 | | Yes | 0.0018 | EMPC-J | Yes | 0.0003 | U | No | 0.00064 | U | No |

[a] Equalized data are presented for PCB congeners. Non-equa

## 2011 Caged Bivalve Study Data for the LPRSA
## Appendix L
### Table L-5. Sample results - PCBs[a]

| | | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | PCB-206 | | | PCB-207 | | | PCB-208 | | | Decachlorobiphenyl | | | Total PCB Congeners | | | Total PCB Congeners (ND=0.5RL) | | | Total PCB Congeners (ND=RL) | | | Monochlorobiphenyl | | |
| | | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | |
| Bivalve Type | Tissue Type | Reach | SampleID | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect |
| Eastern elliptio musse | Soft tissue | na | LPRBG-ECST-Comp01 | 0.0087 | J | Yes | 0.00061 | U | No | 0.004 | | Yes | 0.01 | | Yes | 0.41 | J | Yes | 0.43 | J | Yes | 0.44 | J | Yes | 0.00018 | U | No |
| Eastern elliptio musse | Soft tissue | 6 | LPR6-ECST-Comp01 | 0.034 | J | Yes | 0.0023 | | Yes | 0.016 | | Yes | 0.031 | | Yes | 23 | J | Yes | 23 | J | Yes | 23 | J | Yes | 0.0046 | | Yes |
| Eastern elliptio musse | Soft tissue | 6 | LPR6-ECST-Comp02 | 0.049 | J | Yes | 0.004 | | Yes | 0.023 | J | Yes | 0.042 | J | Yes | 28 | J | Yes | 28 | J | Yes | 28 | J | Yes | 0.0041 | | Yes |
| Eastern elliptio musse | Soft tissue | 7 | LPR7-ECST-Comp03 | 0.051 | J | Yes | 0.0041 | | Yes | 0.025 | | Yes | 0.044 | | Yes | 30 | J | Yes | 30 | J | Yes | 30 | J | Yes | 0.0047 | | Yes |
| Eastern elliptio musse | Soft tissue | 7 | LPR7-ECST-Comp04 | 0.052 | J | Yes | 0.0036 | | Yes | 0.025 | | Yes | 0.05 | | Yes | 19 | J | Yes | 19 | J | Yes | 19 | J | Yes | 0.0044 | | Yes |
| Eastern elliptio musse | Soft tissue | 8 | LPR8-ECST-Comp05 | 0.039 | J | Yes | 0.0026 | | Yes | 0.019 | | Yes | 0.039 | | Yes | 17 | J | Yes | 17 | J | Yes | 17 | J | Yes | 0.0054 | | Yes |
| Ribbed mussel | Soft tissue | na | LPRBG-GDST-Comp01 | 0.00079 | U | No | 0.0006 | U | No | 0.00057 | U | No | 0.00037 | U | No | 0.77 | J | Yes | 0.78 | J | Yes | 0.79 | J | Yes | 0.0027 | | Yes |
| Ribbed mussel | Soft tissue | 1 | LPR1-GDST-Comp01 | 0.0015 | EMPC-J | Yes | 0.00038 | U | No | 0.00044 | EMPC-J | Yes | 0.0015 | | Yes | 18 | J | Yes | 18 | J | Yes | 18 | J | Yes | 0.01 | EMPC-J | Yes |
| Ribbed mussel | Soft tissue | 2 | LPR2-GDST-Comp02 | 0.0014 | EMPC-J | Yes | 0.0006 | U | No | 0.00057 | U | No | 0.0011 | | Yes | 7.4 | J | Yes | 7.4 | J | Yes | 7.5 | J | Yes | 0.013 | | Yes |
| Ribbed mussel | Soft tissue | 3 | LPR3-GDST-Comp03 | 0.0017 | J | Yes | 0.0013 | U | No | 0.0012 | U | No | 0.0013 | | Yes | 2.6 | J | Yes | 2.6 | J | Yes | 2.7 | J | Yes | 0.0068 | EMPC-J | Yes |

[a] Equalized data are presented for PCB congeners. Non-equa

## 2011 Caged Bivalve Study Data for the LPRSA
## Appendix L
### Table L-5. Sample results - PCBs[a]

| | | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | | PCB Congeners | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Dichlorobiphenyl | | | Trichlorobiphenyl | | | Tetrachlorobiphenyl | | | Pentachlorobiphenyl | | | Hexachlorobiphenyl | | | Heptachlorobiphenyl | | | Octachlorobiphenyl | | | Nonachlorobiphenyl | | |
| | | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | |
| Bivalve Type | Tissue Type | Reach | SampleID | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect |
| Eastern elliptio musse | Soft tissue | na | LPRBG-ECST-Comp01 | 0.0045 | J | Yes | 0.012 | EMPC-J | Yes | 0.027 | EMPC-J | Yes | 0.09 | EMPC-J | Yes | 0.15 | EMPC-J | Yes | 0.072 | EMPC-J | Yes | 0.031 | EMPC-J | Yes | 0.013 | J | Yes |
| Eastern elliptio musse | Soft tissue | 6 | LPR6-ECST-Comp01 | 0.43 | EMPC-J | Yes | 5.3 | J | Yes | 8.1 | EMPC-J | Yes | 5 | | Yes | 3.1 | EMPC-J | Yes | 1 | | Yes | 0.24 | | Yes | 0.052 | J | Yes |
| Eastern elliptio musse | Soft tissue | 6 | LPR6-ECST-Comp02 | 0.44 | | Yes | 5.9 | J | Yes | 9.1 | EMPC-J | Yes | 6.1 | J | Yes | 3.9 | EMPC-J | Yes | 1.5 | J | Yes | 0.35 | J | Yes | 0.076 | J | Yes |
| Eastern elliptio musse | Soft tissue | 7 | LPR7-ECST-Comp03 | 0.52 | | Yes | 6.8 | J | Yes | 9.6 | | Yes | 6.6 | | Yes | 4.3 | EMPC-J | Yes | 1.5 | EMPC-J | Yes | 0.36 | EMPC-J | Yes | 0.079 | J | Yes |
| Eastern elliptio musse | Soft tissue | 7 | LPR7-ECST-Comp04 | 0.35 | EMPC-J | Yes | 3.7 | EMPC-J | Yes | 5.5 | | Yes | 4.6 | EMPC-J | Yes | 3.2 | EMPC-J | Yes | 1.1 | EMPC-J | Yes | 0.28 | EMPC-J | Yes | 0.08 | J | Yes |
| Eastern elliptio musse | Soft tissue | 8 | LPR8-ECST-Comp05 | 0.34 | | Yes | 3.6 | EMPC-J | Yes | 5.5 | | Yes | 3.7 | | Yes | 2.5 | | Yes | 0.78 | EMPC-J | Yes | 0.22 | EMPC-J | Yes | 0.061 | J | Yes |
| Ribbed mussel | Soft tissue | na | LPRBG-GDST-Comp01 | 0.029 | J | Yes | 0.061 | EMPC-J | Yes | 0.11 | EMPC-J | Yes | 0.19 | EMPC-J | Yes | 0.27 | EMPC-J | Yes | 0.095 | | Yes | 0.011 | | Yes | 0.00068 | U | No |
| Ribbed mussel | Soft tissue | 1 | LPR1-GDST-Comp01 | 0.37 | | Yes | 3.7 | J | Yes | 7.1 | | Yes | 4.2 | EMPC-J | Yes | 2.4 | EMPC-J | Yes | 0.58 | | Yes | 0.047 | EMPC-J | Yes | 0.0019 | EMPC-J | Yes |
| Ribbed mussel | Soft tissue | 2 | LPR2-GDST-Comp02 | 0.26 | | Yes | 1.9 | EMPC-J | Yes | 2.8 | EMPC-J | Yes | 1.4 | EMPC-J | Yes | 0.83 | EMPC-J | Yes | 0.21 | | Yes | 0.022 | EMPC-J | Yes | 0.0014 | EMPC-J | Yes |
| Ribbed mussel | Soft tissue | 3 | LPR3-GDST-Comp03 | 0.12 | | Yes | 0.69 | EMPC-J | Yes | 0.86 | EMPC-J | Yes | 0.44 | EMPC-J | Yes | 0.36 | EMPC-J | Yes | 0.11 | EMPC-J | Yes | 0.02 | EMPC-J | Yes | 0.0017 | J | Yes |

[a] Equalized data are presented for PCB congeners. Non-equa

## 2011 Caged Bivalve Study Data for the LPRSA
## Appendix L
### Table L-6. Sample results - PCDDs/PCDFs

| | | | | 1,2,3,4,6,7,8-HpCDD | | | 1,2,3,4,7,8-HxCDD | | | 1,2,3,6,7,8-HxCDD | | | 1,2,3,7,8,9-HxCDD | | | 1,2,3,7,8-PeCDD | | | 2,3,7,8-TCDD | | | OCDD | | | 1,2,3,4,6,7,8-HpCDF | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | ng/kg | | | ng/kg | | | ng/kg | | | ng/kg | | | ng/kg | | | ng/kg | | | ng/kg | | | ng/kg | | |
| Bivalve Type | Tissue Type | Reach | SampleID | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect |
| Eastern elliptio musse | Soft tissue | na | LPRBG-ECST-Comp01 | 0.37 | J | Yes | 0.035 | U | No | 0.055 | EMPC-J | Yes | 0.087 | UJ | No | 0.032 | EMPC-J | Yes | 0.047 | U | No | 5.4 | | Yes | 0.086 | U | No |
| Eastern elliptio musse | Soft tissue | 6 | LPR6-ECST-Comp01 | 0.51 | J | Yes | 0.067 | U | No | 0.1 | J | Yes | 0.13 | U | No | 0.058 | J | Yes | 2.1 | | Yes | 4.1 | J | Yes | 0.26 | J | Yes |
| Eastern elliptio musse | Soft tissue | 6 | LPR6-ECST-Comp02 | 0.62 | J | Yes | 0.058 | U | No | 0.11 | J | Yes | 0.13 | U | No | 0.05 | EMPC-J | Yes | 2.8 | | Yes | 5.4 | | Yes | 0.51 | J | Yes |
| Eastern elliptio musse | Soft tissue | 7 | LPR7-ECST-Comp03 | 0.65 | J | Yes | 0.05 | U | No | 0.096 | J | Yes | 0.12 | U | No | 0.071 | J | Yes | 3.6 | | Yes | 6.1 | | Yes | 0.33 | J | Yes |
| Eastern elliptio musse | Soft tissue | 7 | LPR7-ECST-Comp04 | 0.85 | J | Yes | 0.042 | U | No | 0.12 | J | Yes | 0.11 | UJ | No | 0.058 | J | Yes | 0.18 | EMPC-J | Yes | 12 | | Yes | 0.28 | J | Yes |
| Eastern elliptio musse | Soft tissue | 8 | LPR8-ECST-Comp05 | 0.56 | J | Yes | 0.035 | J | Yes | 0.081 | EMPC-J | Yes | 0.11 | U | No | 0.062 | J | Yes | 0.077 | EMPC-J | Yes | 4.9 | | Yes | 0.2 | J | Yes |
| Ribbed mussel | Soft tissue | na | LPRBG-GDST-Comp01 | 0.36 | J | Yes | 0.036 | U | No | 0.066 | J | Yes | 0.12 | UJ | No | 0.059 | J | Yes | 0.031 | EMPC-J | Yes | 3.3 | J | Yes | 0.029 | UJ | No |
| Ribbed mussel | Soft tissue | 1 | LPR1-GDST-Comp01 | 0.28 | EMPC-J | Yes | 0.04 | U | No | 0.079 | J | Yes | 0.11 | U | No | 0.046 | EMPC-J | Yes | 1.2 | | Yes | 3.9 | J | Yes | 0.37 | J | Yes |
| Ribbed mussel | Soft tissue | 2 | LPR2-GDST-Comp02 | 0.25 | EMPC-J | Yes | 0.052 | U | No | 0.052 | U | No | 0.11 | U | No | 0.044 | U | No | 0.54 | | Yes | 3 | J | Yes | 0.27 | J | Yes |
| Ribbed mussel | Soft tissue | 3 | LPR3-GDST-Comp03 | 0.3 | J | Yes | 0.044 | U | No | 0.043 | U | No | 0.11 | U | No | 0.045 | J | Yes | 0.25 | J | Yes | 3.9 | J | Yes | 0.2 | EMPC-J | Yes |

[a] Equalized data are presented for PCB congeners. Non-equalized PCB congener data are provided in the laboratory data report (Appendix N).

## 2011 Caged Bivalve Study Data for the LPRSA
## Appendix L
### Table L-6. Sample results - PCDDs/PCDFs

| | | | | 1,2,3,4,7,8,9-HpCDF | | | 1,2,3,4,7,8-HxCDF | | | 1,2,3,6,7,8-HxCDF | | | 1,2,3,7,8,9-HxCDF | | | 1,2,3,7,8-PeCDF | | | 2,3,4,6,7,8-HxCDF | | | 2,3,4,7,8-PeCDF | | | 2,3,7,8-TCDF | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | ng/kg | | | ng/kg | | | ng/kg | | | ng/kg | | | ng/kg | | | ng/kg | | | ng/kg | | | ng/kg | | |
| Bivalve Type | Tissue Type | Reach | SampleID | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect |
| Eastern elliptio musse | Soft tissue | na | LPRBG-ECST-Comp01 | 0.023 | U | No | 0.027 | J | Yes | 0.021 | U | No | 0.029 | U | No | 0.026 | U | No | 0.027 | EMPC-J | Yes | 0.035 | EMPC-J | Yes | 0.057 | U | No |
| Eastern elliptio musse | Soft tissue | 6 | LPR6-ECST-Comp01 | 0.054 | U | No | 0.1 | J | Yes | 0.054 | J | Yes | 0.048 | U | No | 0.04 | U | No | 0.05 | EMPC-J | Yes | 0.19 | J | Yes | 0.37 | J | Yes |
| Eastern elliptio musse | Soft tissue | 6 | LPR6-ECST-Comp02 | 0.045 | U | No | 0.13 | J | Yes | 0.062 | EMPC-J | Yes | 0.042 | U | No | 0.066 | J | Yes | 0.076 | J | Yes | 0.21 | J | Yes | 0.43 | J | Yes |
| Eastern elliptio musse | Soft tissue | 7 | LPR7-ECST-Comp03 | 0.038 | U | No | 0.1 | J | Yes | 0.054 | J | Yes | 0.033 | U | No | 0.058 | EMPC-J | Yes | 0.072 | J | Yes | 0.19 | EMPC-J | Yes | 0.36 | J | Yes |
| Eastern elliptio musse | Soft tissue | 7 | LPR7-ECST-Comp04 | 0.033 | U | No | 0.049 | J | Yes | 0.046 | J | Yes | 0.029 | U | No | 0.059 | J | Yes | 0.05 | EMPC-J | Yes | 0.17 | J | Yes | 0.44 | J | Yes |
| Eastern elliptio musse | Soft tissue | 8 | LPR8-ECST-Comp05 | 0.026 | U | No | 0.052 | J | Yes | 0.05 | J | Yes | 0.021 | U | No | 0.043 | J | Yes | 0.065 | J | Yes | 0.15 | EMPC-J | Yes | 0.38 | J | Yes |
| Ribbed mussel | Soft tissue | na | LPRBG-GDST-Comp01 | 0.027 | U | No | 0.015 | EMPC-J | Yes | 0.013 | J | Yes | 0.016 | U | No | 0.021 | U | No | 0.018 | J | Yes | 0.019 | U | No | 0.049 | J | Yes |
| Ribbed mussel | Soft tissue | 1 | LPR1-GDST-Comp01 | 0.031 | U | No | 0.077 | EMPC-J | Yes | 0.036 | J | Yes | 0.032 | U | No | 0.026 | U | No | 0.047 | J | Yes | 0.17 | J | Yes | 0.22 | J | Yes |
| Ribbed mussel | Soft tissue | 2 | LPR2-GDST-Comp02 | 0.034 | U | No | 0.069 | J | Yes | 0.027 | EMPC-J | Yes | 0.033 | U | No | 0.04 | U | No | 0.033 | J | Yes | 0.037 | U | No | 0.091 | J | Yes |
| Ribbed mussel | Soft tissue | 3 | LPR3-GDST-Comp03 | 0.031 | U | No | 0.061 | J | Yes | 0.023 | EMPC-J | Yes | 0.033 | U | No | 0.028 | U | No | 0.025 | U | No | 0.025 | U | No | 0.065 | J | Yes |

[a] Equalized data are presented for PCB congeners. Non-equalized PC

## 2011 Caged Bivalve Study Data for the LPRSA
## Appendix L
### Table L-6. Sample results - PCDDs/PCDFs

| | | | | OCDF | | | Total HpCDD | | | Total HxCDD | | | Total PeCDD | | | Total TCDD | | | Total HpCDF | | | Total HxCDF | | | Total PeCDF | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | ng/kg | | | ng/kg | | | ng/kg | | | ng/kg | | | ng/kg | | | ng/kg | | | ng/kg | | | ng/kg | | |
| Bivalve Type | Tissue Type | Reach | SampleID | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect |
| Eastern elliptio musse | Soft tissue | na | LPRBG-ECST-Comp01 | 0.11 | U | No | 0.77 | | Yes | 0.43 | EMPC-J | Yes | 0.17 | EMPC-J | Yes | 0.12 | | Yes | 0.14 | | Yes | 0.16 | EMPC-J | Yes | 0.3 | EMPC-J | Yes |
| Eastern elliptio musse | Soft tissue | 6 | LPR6-ECST-Comp01 | 0.37 | J | Yes | 1.1 | | Yes | 0.6 | | Yes | 0.28 | EMPC-J | Yes | 4.8 | EMPC-J | Yes | 0.49 | | Yes | 0.74 | EMPC-J | Yes | 2.1 | EMPC-J | Yes |
| Eastern elliptio musse | Soft tissue | 6 | LPR6-ECST-Comp02 | 0.62 | J | Yes | 1.2 | | Yes | 0.65 | | Yes | 0.43 | EMPC-J | Yes | 5.8 | | Yes | 0.8 | | Yes | 0.97 | EMPC-J | Yes | 2.6 | EMPC-J | Yes |
| Eastern elliptio musse | Soft tissue | 7 | LPR7-ECST-Comp03 | 0.47 | J | Yes | 1.3 | | Yes | 0.64 | | Yes | 0.43 | EMPC-J | Yes | 7.2 | EMPC-J | Yes | 0.64 | | Yes | 0.95 | EMPC-J | Yes | 2.9 | EMPC-J | Yes |
| Eastern elliptio musse | Soft tissue | 7 | LPR7-ECST-Comp04 | 0.39 | J | Yes | 1.8 | | Yes | 0.72 | EMPC-J | Yes | 0.45 | EMPC-J | Yes | 4.1 | EMPC-J | Yes | 0.57 | | Yes | 0.83 | EMPC-J | Yes | 2 | EMPC-J | Yes |
| Eastern elliptio musse | Soft tissue | 8 | LPR8-ECST-Comp05 | 0.29 | J | Yes | 1.1 | | Yes | 0.59 | EMPC-J | Yes | 0.42 | EMPC-J | Yes | 3.2 | EMPC-J | Yes | 0.43 | J | Yes | 0.72 | | Yes | 1.6 | EMPC-J | Yes |
| Ribbed mussel | Soft tissue | na | LPRBG-GDST-Comp01 | 0.063 | UJ | No | 1.8 | | Yes | 5.2 | EMPC-J | Yes | 2.5 | EMPC-J | Yes | 3.5 | EMPC-J | Yes | 0.029 | UJ | No | 0.12 | EMPC-J | Yes | 0.33 | EMPC-J | Yes |
| Ribbed mussel | Soft tissue | 1 | LPR1-GDST-Comp01 | 0.58 | J | Yes | 0.82 | EMPC-J | Yes | 3 | | Yes | 1.5 | EMPC-J | Yes | 5.2 | EMPC-J | Yes | 0.49 | J | Yes | 0.64 | EMPC-J | Yes | 2 | EMPC-J | Yes |
| Ribbed mussel | Soft tissue | 2 | LPR2-GDST-Comp02 | 0.44 | J | Yes | 0.86 | EMPC-J | Yes | 3.6 | | Yes | 1.4 | | Yes | 3.6 | EMPC-J | Yes | 0.38 | J | Yes | 0.35 | EMPC-J | Yes | 0.75 | | Yes |
| Ribbed mussel | Soft tissue | 3 | LPR3-GDST-Comp03 | 0.35 | J | Yes | 1.1 | | Yes | 3.9 | | Yes | 1.6 | EMPC-J | Yes | 2.6 | EMPC-J | Yes | 0.3 | EMPC-J | Yes | 0.24 | EMPC-J | Yes | 0.42 | EMPC-J | Yes |

[a] Equalized data are presented for PCB congeners. Non-equalized PC

## 2011 Caged Bivalve Study Data for the LPRSA
## Appendix L
### Table L-6. Sample results - PCDDs/PCDFs

| Bivalve Type | Tissue Type | Reach | SampleID | Total TCDF ng/kg Value | Qual | Detect |
|---|---|---|---|---|---|---|
| Eastern elliptio musse | Soft tissue | na | LPRBG-ECST-Comp01 | 0.34 | EMPC-J | Yes |
| Eastern elliptio musse | Soft tissue | 6 | LPR6-ECST-Comp01 | 6.4 | EMPC-J | Yes |
| Eastern elliptio musse | Soft tissue | 6 | LPR6-ECST-Comp02 | 8.3 | EMPC-J | Yes |
| Eastern elliptio musse | Soft tissue | 7 | LPR7-ECST-Comp03 | 8.9 | EMPC-J | Yes |
| Eastern elliptio musse | Soft tissue | 7 | LPR7-ECST-Comp04 | 5.3 | EMPC-J | Yes |
| Eastern elliptio musse | Soft tissue | 8 | LPR8-ECST-Comp05 | 4.6 | EMPC-J | Yes |
| Ribbed mussel | Soft tissue | na | LPRBG-GDST-Comp01 | 1.5 | EMPC-J | Yes |
| Ribbed mussel | Soft tissue | 1 | LPR1-GDST-Comp01 | 6.7 | | Yes |
| Ribbed mussel | Soft tissue | 2 | LPR2-GDST-Comp02 | 3 | EMPC-J | Yes |
| Ribbed mussel | Soft tissue | 3 | LPR3-GDST-Comp03 | 1.5 | EMPC-J | Yes |

[a] Equalized data are presented for PCB congeners. Non-equalized PC

## 2011 Caged Bivalve Study Data for the LPRSA
## Appendix L
### Table L-7. Sample results - organochlorine pesticides

| | | | | 2,4'-DDD | | | 2,4'-DDE | | | 2,4'-DDT | | | 4,4'-DDD | | | 4,4'-DDE | | | 4,4'-DDT | | | Aldrin | | | alpha-BHC | | | alpha-Chlordane | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | |
| Bivalve Type | Tissue Type | Reach | SampleID | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect |
| Eastern elliptio musse | Soft tissue | na | LPRBG-ECST-Comp01 | 2 | U | No | 2.6 | UJ | No | 2.4 | UJ | No | 2.4 | U | No | 3.5 | U | No | 2.3 | UJ | No | 0.03 | U | No | 0.12 | U | No | 0.54 | J | Yes |
| Eastern elliptio musse | Soft tissue | 6 | LPR6-ECST-Comp01 | 1.3 | U | No | 1.1 | UJ | No | 0.97 | UJ | No | 1.7 | | Yes | 4 | | Yes | 0.94 | UJ | No | 0.039 | J | Yes | 0.082 | U | No | 3.8 | | Yes |
| Eastern elliptio musse | Soft tissue | 6 | LPR6-ECST-Comp02 | 2.5 | U | No | 1.7 | UJ | No | 2 | UJ | No | 2.1 | | Yes | 3.8 | | Yes | 1.9 | UJ | No | 0.07 | J | Yes | 0.12 | U | No | 5.3 | | Yes |
| Eastern elliptio musse | Soft tissue | 7 | LPR7-ECST-Comp03 | 2.4 | U | No | 1.5 | UJ | No | 2.7 | UJ | No | 2.8 | U | No | 3.4 | | Yes | 2.7 | UJ | No | 0.026 | J | Yes | 0.12 | U | No | 4.2 | | Yes |
| Eastern elliptio musse | Soft tissue | 7 | LPR7-ECST-Comp04 | 1.8 | U | No | 1.7 | UJ | No | 2 | UJ | No | 2.1 | U | No | 3.4 | | Yes | 2 | UJ | No | 0.029 | U | No | 0.13 | U | No | 4.6 | | Yes |
| Eastern elliptio musse | Soft tissue | 8 | LPR8-ECST-Comp05 | 1.5 | U | No | 1.3 | UJ | No | 1.4 | UJ | No | 1.4 | U | No | 2.6 | | Yes | 1.4 | UJ | No | 0.032 | U | No | 0.12 | U | No | 3.9 | | Yes |
| Ribbed mussel | Soft tissue | na | LPRBG-GDST-Comp01 | 1.6 | U | No | 1.6 | UJ | No | 1.7 | UJ | No | 1.7 | U | No | 2.2 | U | No | 1.6 | UJ | No | 0.027 | U | No | 0.1 | U | No | 0.15 | U | No |
| Ribbed mussel | Soft tissue | 1 | LPR1-GDST-Comp01 | 2.6 | U | No | 1.5 | UJ | No | 1.7 | UJ | No | 3 | | Yes | 3.9 | | Yes | 1.6 | UJ | No | 0.033 | J | Yes | 0.12 | U | No | 2.9 | | Yes |
| Ribbed mussel | Soft tissue | 2 | LPR2-GDST-Comp02 | 1.4 | U | No | 1.2 | UJ | No | 1.7 | UJ | No | 1.7 | U | No | 2.3 | | Yes | 1.6 | UJ | No | 0.031 | J | Yes | 0.13 | U | No | 1.4 | | Yes |
| Ribbed mussel | Soft tissue | 3 | LPR3-GDST-Comp03 | 2.6 | U | No | 1.8 | UJ | No | 2.7 | UJ | No | 2.7 | U | No | 2.5 | U | No | 2.6 | UJ | No | 0.046 | U | No | 0.14 | U | No | 0.8 | J | Yes |

## 2011 Caged Bivalve Study Data for the LPRSA
## Appendix L
### Table L-7. Sample results - organochlorine pesticide

| | | | | beta-BHC | | | cis-Nonachlor | | | delta-BHC | | | Dieldrin | | | Endosulfan I | | | Endosulfan II | | | Endosulfan sulfate | | | Endrin | | | Endrin aldehyde | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | |
| Bivalve Type | Tissue Type | Reach | SampleID | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect |
| Eastern elliptio musse | Soft tissue | na | LPRBG-ECST-Comp01 | 0.15 | U | No | 0.34 | U | No | 0.16 | U | No | 0.11 | U | No | 1.6 | U | No | 2.6 | U | No | 0.63 | U | No | 0.32 | U | No | 0.51 | U | No |
| Eastern elliptio musse | Soft tissue | 6 | LPR6-ECST-Comp01 | 0.1 | U | No | 1 | | Yes | 0.11 | U | No | 2.3 | | Yes | 2.5 | U | No | 1.5 | U | No | 0.17 | J | Yes | 0.29 | U | No | 0.17 | U | No |
| Eastern elliptio musse | Soft tissue | 6 | LPR6-ECST-Comp02 | 0.14 | U | No | 1.1 | | Yes | 0.21 | U | No | 2.9 | | Yes | 1.6 | U | No | 2.8 | U | No | 0.12 | U | No | 0.31 | U | No | 0.31 | U | No |
| Eastern elliptio musse | Soft tissue | 7 | LPR7-ECST-Comp03 | 0.15 | U | No | 1.1 | | Yes | 0.17 | U | No | 2.9 | | Yes | 1.5 | U | No | 3 | U | No | 0.77 | U | No | 0.42 | U | No | 0.47 | U | No |
| Eastern elliptio musse | Soft tissue | 7 | LPR7-ECST-Comp04 | 0.16 | U | No | 1 | | Yes | 0.18 | U | No | 3 | | Yes | 1.1 | U | No | 2.1 | U | No | 0.37 | J | Yes | 0.29 | U | No | 0.18 | U | No |
| Eastern elliptio musse | Soft tissue | 8 | LPR8-ECST-Comp05 | 0.15 | U | No | 0.89 | J | Yes | 0.56 | J | Yes | 2.5 | | Yes | 1.1 | U | No | 0.53 | U | No | 0.16 | U | No | 0.059 | U | No | 0.77 | U | No |
| Ribbed mussel | Soft tissue | na | LPRBG-GDST-Comp01 | 0.13 | U | No | 0.21 | U | No | 0.14 | U | No | 0.27 | U | No | 1.3 | U | No | 2.3 | U | No | 0.32 | U | No | 0.19 | U | No | 0.24 | U | No |
| Ribbed mussel | Soft tissue | 1 | LPR1-GDST-Comp01 | 0.15 | U | No | 0.62 | J | Yes | 0.42 | U | No | 1.8 | | Yes | 1.6 | U | No | 2.4 | U | No | 0.42 | U | No | 0.24 | U | No | 0.47 | U | No |
| Ribbed mussel | Soft tissue | 2 | LPR2-GDST-Comp02 | 0.16 | U | No | 0.34 | U | No | 0.63 | J | Yes | 1.3 | | Yes | 1.2 | U | No | 2.1 | U | No | 0.1 | U | No | 0.32 | U | No | 0.13 | U | No |
| Ribbed mussel | Soft tissue | 3 | LPR3-GDST-Comp03 | 0.18 | U | No | 0.26 | U | No | 0.2 | U | No | 0.64 | J | Yes | 1.7 | U | No | 2.5 | U | No | 0.33 | U | No | 0.24 | U | No | 0.64 | U | No |

## 2011 Caged Bivalve Study Data for the LPRSA
## Appendix L
### Table L-7. Sample results - organochlorine pesticide

| | | | | Endrin ketone | | | gamma-BHC (Lindane) | | | gamma-Chlordane | | | Heptachlor | | | Heptachlor epoxide | | | Hexachlorobenzene | | | Methoxychlor | | | Oxychlordane | | | Total 2,4' and 4,4' DDD | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | |
| Bivalve Type | Tissue Type | Reach | SampleID | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect |
| Eastern elliptio musse | Soft tissue | na | LPRBG-ECST-Comp01 | 0.29 | U | No | 0.24 | U | No | 0.17 | J | Yes | 0.059 | UJ | No | 0.11 | J | Yes | 0.042 | U | No | 0.46 | U | No | 0.32 | UJ | No | 2.4 | U | No |
| Eastern elliptio musse | Soft tissue | 6 | LPR6-ECST-Comp01 | 0.14 | U | No | 0.17 | U | No | 3 | | Yes | 0.039 | UJ | No | 0.99 | | Yes | 0.17 | J | Yes | 0.21 | U | No | 0.37 | J | Yes | 1.7 | | Yes |
| Eastern elliptio musse | Soft tissue | 6 | LPR6-ECST-Comp02 | 0.41 | U | No | 0.24 | U | No | 3.6 | | Yes | 0.06 | J | Yes | 0.96 | J | Yes | 0.2 | J | Yes | 0.63 | U | No | 0.35 | J | Yes | 2.1 | | Yes |
| Eastern elliptio musse | Soft tissue | 7 | LPR7-ECST-Comp03 | 0.44 | U | No | 0.25 | U | No | 2.7 | | Yes | 0.076 | UJ | No | 1.1 | | Yes | 0.24 | J | Yes | 0.64 | U | No | 0.36 | J | Yes | 2.8 | U | No |
| Eastern elliptio musse | Soft tissue | 7 | LPR7-ECST-Comp04 | 0.27 | U | No | 0.27 | U | No | 3 | | Yes | 0.074 | UJ | No | 1.3 | | Yes | 0.13 | J | Yes | 0.077 | U | No | 0.51 | J | Yes | 2.1 | U | No |
| Eastern elliptio musse | Soft tissue | 8 | LPR8-ECST-Comp05 | 0.33 | U | No | 0.25 | U | No | 2.9 | | Yes | 0.1 | UJ | No | 1 | | Yes | 0.17 | J | Yes | 0.54 | U | No | 0.4 | J | Yes | 1.5 | U | No |
| Ribbed mussel | Soft tissue | na | LPRBG-GDST-Comp01 | 0.29 | U | No | 0.21 | U | No | 0.14 | U | No | 0.0078 | UJ | No | 0.28 | U | No | 0.014 | U | No | 0.35 | U | No | 0.35 | UJ | No | 1.7 | U | No |
| Ribbed mussel | Soft tissue | 1 | LPR1-GDST-Comp01 | 0.34 | U | No | 0.25 | U | No | 2.3 | | Yes | 0.053 | UJ | No | 0.43 | J | Yes | 0.032 | U | No | 0.8 | U | No | 0.089 | J | Yes | 3 | | Yes |
| Ribbed mussel | Soft tissue | 2 | LPR2-GDST-Comp02 | 0.27 | U | No | 0.26 | U | No | 1.2 | | Yes | 0.07 | UJ | No | 0.43 | J | Yes | 0.019 | U | No | 0.58 | U | No | 0.13 | UJ | No | 1.7 | U | No |
| Ribbed mussel | Soft tissue | 3 | LPR3-GDST-Comp03 | 0.44 | U | No | 0.3 | U | No | 0.29 | J | Yes | 0.016 | UJ | No | 0.15 | J | Yes | 0.02 | U | No | 0.67 | U | No | 0.064 | J | Yes | 2.7 | U | No |

## 2011 Caged Bivalve Study Data for the LPRSA
## Appendix L
### Table L-7. Sample results - organochlorine pesticide

| Bivalve Type | Tissue Type | Reach | SampleID | Total 2,4' and 4,4' DDD (ND=0.5RL) µg/kg | | | Total 2,4' and 4,4' DDD (ND=RL) µg/kg | | | Total 2,4' and 4,4' DDE µg/kg | | | Total 2,4' and 4,4' DDE (ND=0.5RL) µg/kg | | | Total 2,4' and 4,4' DDE (ND=RL) µg/kg | | | Total 2,4' and 4,4' DDT µg/kg | | | Total 2,4' and 4,4' DDT (ND=0.5RL) µg/kg | | | Total 2,4' and 4,4' DDT (ND=RL) µg/kg | | | Total 4,4' DDT µg/kg | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect |
| Eastern elliptio musse | Soft tissue | na | LPRBG-ECST-Comp01 | 2.4 | U | No | 2.4 | U | No | 3.5 | UJ | No | 3.5 | UJ | No | 3.5 | UJ | No | 2.4 | UJ | No | 2.4 | UJ | No | 2.4 | UJ | No | 3.5 | UJ | No |
| Eastern elliptio musse | Soft tissue | 6 | LPR6-ECST-Comp01 | 2.4 | | Yes | 3 | | Yes | 4 | J | Yes | 4.6 | J | Yes | 5.1 | J | Yes | 0.97 | UJ | No | 0.97 | UJ | No | 0.97 | UJ | No | 5.7 | J | Yes |
| Eastern elliptio musse | Soft tissue | 6 | LPR6-ECST-Comp02 | 3.4 | | Yes | 4.6 | | Yes | 3.8 | J | Yes | 4.7 | J | Yes | 5.5 | J | Yes | 2 | UJ | No | 2 | UJ | No | 2 | UJ | No | 5.9 | J | Yes |
| Eastern elliptio musse | Soft tissue | 7 | LPR7-ECST-Comp03 | 2.8 | U | No | 2.8 | U | No | 3.4 | J | Yes | 4.2 | J | Yes | 4.9 | J | Yes | 2.7 | UJ | No | 2.7 | UJ | No | 2.7 | UJ | No | 3.4 | J | Yes |
| Eastern elliptio musse | Soft tissue | 7 | LPR7-ECST-Comp04 | 2.1 | U | No | 2.1 | U | No | 3.4 | J | Yes | 4.3 | J | Yes | 5.1 | J | Yes | 2 | UJ | No | 2 | UJ | No | 2 | UJ | No | 3.4 | J | Yes |
| Eastern elliptio musse | Soft tissue | 8 | LPR8-ECST-Comp05 | 1.5 | U | No | 1.5 | U | No | 2.6 | J | Yes | 3.3 | J | Yes | 3.9 | J | Yes | 1.4 | UJ | No | 1.4 | UJ | No | 1.4 | UJ | No | 2.6 | J | Yes |
| Ribbed mussel | Soft tissue | na | LPRBG-GDST-Comp01 | 1.7 | U | No | 1.7 | U | No | 2.2 | UJ | No | 2.2 | UJ | No | 2.2 | UJ | No | 1.7 | UJ | No | 1.7 | UJ | No | 1.7 | UJ | No | 2.2 | UJ | No |
| Ribbed mussel | Soft tissue | 1 | LPR1-GDST-Comp01 | 4.3 | | Yes | 5.6 | | Yes | 3.9 | J | Yes | 4.7 | J | Yes | 5.4 | J | Yes | 1.7 | UJ | No | 1.7 | UJ | No | 1.7 | UJ | No | 6.9 | J | Yes |
| Ribbed mussel | Soft tissue | 2 | LPR2-GDST-Comp02 | 1.7 | U | No | 1.7 | U | No | 2.3 | J | Yes | 2.9 | J | Yes | 3.5 | J | Yes | 1.7 | UJ | No | 1.7 | UJ | No | 1.7 | UJ | No | 2.3 | J | Yes |
| Ribbed mussel | Soft tissue | 3 | LPR3-GDST-Comp03 | 2.7 | U | No | 2.7 | U | No | 2.5 | UJ | No | 2.5 | UJ | No | 2.5 | UJ | No | 2.7 | UJ | No | 2.7 | UJ | No | 2.7 | UJ | No | 2.7 | UJ | No |

## 2011 Caged Bivalve Study Data for the LPRSA
## Appendix L
### Table L-7. Sample results - organochlorine pesticide

| | | | | Total 4,4' DDT (ND=0.5RL) | | | Total 4,4' DDT (ND=RL) | | | Total Chlordane | | | Total Chlordane (ND=0.5RL) | | | Total Chlordane (ND=RL) | | | Total DDx | | | Total DDx (ND=0.5RL) | | | Total DDx (ND=RL) | | | Total Endosulfan | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | | µg/kg | | |
| Bivalve Type | Tissue Type | Reach | SampleID | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect |
| Eastern elliptio musse | Soft tissue | na | LPRBG-ECST-Comp01 | 3.5 | UJ | No | 3.5 | UJ | No | 0.86 | J | Yes | 1.2 | J | Yes | 1.5 | J | Yes | 3.5 | UJ | No | 3.5 | UJ | No | 3.5 | UJ | No | 2.6 | U | No |
| Eastern elliptio musse | Soft tissue | 6 | LPR6-ECST-Comp01 | 6.2 | J | Yes | 6.6 | J | Yes | 11 | J | Yes | 11 | J | Yes | 11 | J | Yes | 5.7 | J | Yes | 7.9 | J | Yes | 10 | J | Yes | 0.17 | J | Yes |
| Eastern elliptio musse | Soft tissue | 6 | LPR6-ECST-Comp02 | 6.9 | J | Yes | 7.8 | J | Yes | 14 | J | Yes | 14 | J | Yes | 14 | J | Yes | 5.9 | J | Yes | 10 | J | Yes | 14 | J | Yes | 2.8 | U | No |
| Eastern elliptio musse | Soft tissue | 7 | LPR7-ECST-Comp03 | 6.2 | J | Yes | 8.9 | J | Yes | 12 | J | Yes | 12 | J | Yes | 12 | J | Yes | 3.4 | J | Yes | 9.5 | J | Yes | 16 | J | Yes | 3 | U | No |
| Eastern elliptio musse | Soft tissue | 7 | LPR7-ECST-Comp04 | 5.5 | J | Yes | 7.5 | J | Yes | 13 | J | Yes | 13 | J | Yes | 13 | J | Yes | 3.4 | J | Yes | 8.2 | J | Yes | 13 | J | Yes | 0.37 | J | Yes |
| Eastern elliptio musse | Soft tissue | 8 | LPR8-ECST-Comp05 | 4 | J | Yes | 5.4 | J | Yes | 11 | J | Yes | 11 | J | Yes | 11 | J | Yes | 2.6 | J | Yes | 6.1 | J | Yes | 9.6 | J | Yes | 1.1 | U | No |
| Ribbed mussel | Soft tissue | na | LPRBG-GDST-Comp01 | 2.2 | UJ | No | 2.2 | UJ | No | 0.35 | UJ | No | 0.35 | UJ | No | 0.35 | UJ | No | 2.2 | UJ | No | 2.2 | UJ | No | 2.2 | UJ | No | 2.3 | U | No |
| Ribbed mussel | Soft tissue | 1 | LPR1-GDST-Comp01 | 7.7 | J | Yes | 8.5 | J | Yes | 8.3 | J | Yes | 8.3 | J | Yes | 8.3 | J | Yes | 6.9 | J | Yes | 11 | J | Yes | 14 | J | Yes | 2.4 | U | No |
| Ribbed mussel | Soft tissue | 2 | LPR2-GDST-Comp02 | 4 | J | Yes | 5.6 | J | Yes | 3.8 | J | Yes | 4 | J | Yes | 4.3 | J | Yes | 2.3 | J | Yes | 6.1 | J | Yes | 9.9 | J | Yes | 2.1 | U | No |
| Ribbed mussel | Soft tissue | 3 | LPR3-GDST-Comp03 | 2.7 | UJ | No | 2.7 | UJ | No | 1.6 | J | Yes | 1.7 | J | Yes | 1.8 | J | Yes | 2.7 | UJ | No | 2.7 | UJ | No | 2.7 | UJ | No | 2.5 | U | No |

## 2011 Caged Bivalve Study Data for the LPRSA
## Appendix L
### Table L-7. Sample results - organochlorine pesticide

| Bivalve Type | Tissue Type | Reach | SampleID | Total Endosulfan (ND=0.5RL) µg/kg | | | Total Endosulfan (ND=RL) µg/kg | | | trans-Nonachlor µg/kg | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Value | Qual | Detect | Value | Qual | Detect | Value | Qual | Detect |
| Eastern elliptio musse | Soft tissue | na | LPRBG-ECST-Comp01 | 2.6 | U | No | 2.6 | U | No | 0.15 | J | Yes |
| Eastern elliptio musse | Soft tissue | 6 | LPR6-ECST-Comp01 | 2.2 | J | Yes | 4.2 | J | Yes | 3.3 | | Yes |
| Eastern elliptio musse | Soft tissue | 6 | LPR6-ECST-Comp02 | 2.8 | U | No | 2.8 | U | No | 4 | | Yes |
| Eastern elliptio musse | Soft tissue | 7 | LPR7-ECST-Comp03 | 3 | U | No | 3 | U | No | 3.5 | | Yes |
| Eastern elliptio musse | Soft tissue | 7 | LPR7-ECST-Comp04 | 2 | J | Yes | 3.6 | J | Yes | 3.6 | | Yes |
| Eastern elliptio musse | Soft tissue | 8 | LPR8-ECST-Comp05 | 1.1 | U | No | 1.1 | U | No | 3.3 | | Yes |
| Ribbed mussel | Soft tissue | na | LPRBG-GDST-Comp01 | 2.3 | U | No | 2.3 | U | No | 0.28 | U | No |
| Ribbed mussel | Soft tissue | 1 | LPR1-GDST-Comp01 | 2.4 | U | No | 2.4 | U | No | 2.4 | | Yes |
| Ribbed mussel | Soft tissue | 2 | LPR2-GDST-Comp02 | 2.1 | U | No | 2.1 | U | No | 1.2 | | Yes |
| Ribbed mussel | Soft tissue | 3 | LPR3-GDST-Comp03 | 2.5 | U | No | 2.5 | U | No | 0.43 | J | Yes |

## 2011 Caged Bivalve Study Data for the LPRSA
## Appendix L
### Table L-8. Sample results - lipids and percent moisture

| Bivalve Type | Tissue Type | Reach | SampleID | Lipids | | | Percent moisture | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | % | | | percent | | |
| | | | | Value | Qual | Detect | Value | Qual | Detect |
| Eastern elliptio mussel | Soft tissue | na | LPRBG-ECST-Comp01 | 0.76 | | Yes | 90.1 | | Yes |
| Eastern elliptio mussel | Soft tissue | 6 | LPR6-ECST-Comp01 | 0.36 | | Yes | 91 | | Yes |
| Eastern elliptio mussel | Soft tissue | 6 | LPR6-ECST-Comp02 | 0.53 | | Yes | 90.9 | | Yes |
| Eastern elliptio mussel | Soft tissue | 7 | LPR7-ECST-Comp03 | 0.44 | | Yes | 91.3 | | Yes |
| Eastern elliptio mussel | Soft tissue | 7 | LPR7-ECST-Comp04 | 0.59 | | Yes | 89.9 | | Yes |
| Eastern elliptio mussel | Soft tissue | 8 | LPR8-ECST-Comp05 | 0.77 | | Yes | 91 | | Yes |
| Ribbed mussel | Soft tissue | na | LPRBG-GDST-Comp01 | 0.96 | | Yes | 92.6 | | Yes |
| Ribbed mussel | Soft tissue | 1 | LPR1-GDST-Comp01 | 0.49 | | Yes | 94.1 | | Yes |
| Ribbed mussel | Soft tissue | 2 | LPR2-GDST-Comp02 | 0.24 | | Yes | 95.2 | | Yes |
| Ribbed mussel | Soft tissue | 3 | LPR3-GDST-Comp03 | 0.38 | | Yes | 94.1 | | Yes |

# APPENDIX M. LABORATORY FORM 1S

Alpha Analytical

**Project Name:** PASSAIC RI/FS CAGED BIVALVE
**Project Number:** TASK23.2.1

**Lab Number:** L1110328
**Report Date:** 10/19/11

| Alpha Sample ID | Client ID | Sample Location | Collection Date/Time |
|---|---|---|---|
| L1110328-01 | LPR6-ECST-COMP01 | Not Specified | 06/08/11 08:48 |
| L1110328-02 | LPRBG-ECST-COMP01 | Not Specified | 03/09/11 15:00 |
| L1110328-03 | LPR6-ECST-COMP02 | Not Specified | 06/08/11 09:03 |
| L1110328-04 | LPR7-ECST-COMP03 | Not Specified | 06/08/11 08:20 |
| L1110328-05 | LPR7-ECST-COMP04 | Not Specified | 06/08/11 07:55 |
| L1110328-06 | LPR8-ECST-COMP05 | Not Specified | 06/08/11 07:40 |
| L1110328-07 | LPR1-GDST-COMP01 | Not Specified | 05/09/11 10:20 |
| L1110328-08 | LPRBG-GDST-COMP01 | Not Specified | 03/08/11 18:30 |
| L1110328-09 | LPR2-GDST-COMP02 | Not Specified | 05/09/11 10:45 |
| L1110328-10 | LPR3-GDST-COMP03 | Not Specified | 05/09/11 11:20 |
| L1110328-11 | LPR-071811RB | Not Specified | 07/18/11 17:00 |

# SEMIVOLATILES

**Project Name:** PASSAIC RI/FS CAGED BIVALVE **Lab Number:** L1110328

**Project Number:** TASK23.2.1 **Report Date:** 10/19/11

## SAMPLE RESULTS

| | | | |
|---|---|---|---|
| Lab ID: | L1110328-01 | Date Collected: | 06/08/11 08:48 |
| Client ID: | LPR6-ECST-COMP01 | Date Received: | 07/26/11 |
| Sample Location: | Not Specified | Field Prep: | Not Specified |
| Matrix: | Tissue | Extraction Method: | EPA 3570 |
| Analytical Method: | 1,8270C | Extraction Date: | 07/28/11 16:25 |
| Analytical Date: | 08/15/11 18:46 | Cleanup Method1: | EPA 3640A |
| Analyst: | AW | Cleanup Date1: | 08/03/11 |
| Percent Solids: | Results reported on an 'AS RECEIVED' basis. | | |

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| Semivolatile Organics by GC/MS - Mansfield Lab | | | | | | |
| Bis(2-chloroethyl)ether | ND | | ug/kg | 929 | 465. | 5 |
| Phenol | ND | | ug/kg | 929 | 465. | 5 |
| 2-Chlorophenol | ND | | ug/kg | 929 | 465. | 5 |
| Bis(2-chloroisopropyl)ether | ND | | ug/kg | 929 | 465. | 5 |
| 2-Methylphenol | ND | | ug/kg | 929 | 465. | 5 |
| Acetophenone | ND | | ug/kg | 929 | 465. | 5 |
| Hexachloroethane | ND | | ug/kg | 929 | 465. | 5 |
| N-Nitroso-di-n-propylamine | ND | | ug/kg | 929 | 465. | 5 |
| 4-Methylphenol | ND | | ug/kg | 929 | 465. | 5 |
| Nitrobenzene | ND | | ug/kg | 929 | 465. | 5 |
| Isophorone | ND | | ug/kg | 929 | 465. | 5 |
| 2-Nitrophenol | ND | | ug/kg | 929 | 465. | 5 |
| 2,4-Dimethylphenol | ND | | ug/kg | 929 | 465. | 5 |
| Bis(2-chloroethoxy)methane | ND | | ug/kg | 929 | 465. | 5 |
| 2,4-Dichlorophenol | ND | | ug/kg | 929 | 465. | 5 |
| Naphthalene | ND | | ug/kg | 929 | 465. | 5 |
| 4-Chloroaniline | ND | | ug/kg | 929 | 465. | 5 |
| Hexachlorobutadiene | ND | | ug/kg | 929 | 465. | 5 |
| Caprolactam | ND | | ug/kg | 929 | 465. | 5 |
| P-Chloro-M-Cresol | ND | | ug/kg | 929 | 465. | 5 |
| 2-Methylnaphthalene | ND | | ug/kg | 929 | 465. | 5 |
| Hexachlorocyclopentadiene | ND | | ug/kg | 929 | 465. | 5 |
| 2,4,6-Trichlorophenol | ND | | ug/kg | 929 | 465. | 5 |
| 2,4,5-Trichlorophenol | ND | | ug/kg | 929 | 465. | 5 |
| Biphenyl | ND | | ug/kg | 929 | 465. | 5 |
| 2-Chloronaphthalene | ND | | ug/kg | 929 | 465. | 5 |
| 2-Nitroaniline | ND | | ug/kg | 929 | 465. | 5 |
| Acenaphthylene | ND | | ug/kg | 929 | 465. | 5 |
| Dimethylphthalate | ND | | ug/kg | 929 | 465. | 5 |
| 2,6-Dinitrotoluene | ND | | ug/kg | 929 | 465. | 5 |
| Acenaphthene | ND | | ug/kg | 929 | 465. | 5 |

**Project Name:** PASSAIC RI/FS CAGED BIVALVE **Lab Number:** L1110328

**Project Number:** TASK23.2.1 **Report Date:** 10/19/11

## SAMPLE RESULTS

Lab ID: L1110328-01 Date Collected: 06/08/11 08:48

Client ID: LPR6-ECST-COMP01 Date Received: 07/26/11

Sample Location: Not Specified Field Prep: Not Specified

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| Semivolatile Organics by GC/MS - Mansfield Lab | | | | | | |
| 3-Nitroaniline | ND | | ug/kg | 929 | 465. | 5 |
| 2,4-Dinitrophenol | ND | | ug/kg | 3720 | 1860 | 5 |
| Dibenzofuran | ND | | ug/kg | 929 | 465. | 5 |
| 2,4-Dinitrotoluene | ND | | ug/kg | 929 | 465. | 5 |
| 4-Nitrophenol | ND | | ug/kg | 1860 | 929. | 5 |
| Fluorene | ND | | ug/kg | 929 | 465. | 5 |
| 4-Chlorophenyl-phenylether | ND | | ug/kg | 929 | 465. | 5 |
| Diethylphthalate | ND | | ug/kg | 929 | 465. | 5 |
| 4-Nitroaniline | ND | | ug/kg | 929 | 465. | 5 |
| 4,6-Dinitro-2-Methylphenol | ND | | ug/kg | 3720 | 1860 | 5 |
| NitrosoDiPhenylAmine(NDPA)/DPA | ND | | ug/kg | 929 | 465. | 5 |
| 4-Bromophenyl-phenylether | ND | | ug/kg | 929 | 465. | 5 |
| Hexachlorobenzene | ND | | ug/kg | 929 | 465. | 5 |
| Atrazine | ND | | ug/kg | 929 | 465. | 5 |
| Pentachlorophenol | ND | | ug/kg | 3720 | 1860 | 5 |
| Phenanthrene | ND | | ug/kg | 929 | 465. | 5 |
| Anthracene | ND | | ug/kg | 929 | 465. | 5 |
| Carbazole | ND | | ug/kg | 929 | 465. | 5 |
| Di-n-butylphthalate | ND | | ug/kg | 929 | 465. | 5 |
| Fluoranthene | ND | | ug/kg | 929 | 465. | 5 |
| Pyrene | ND | | ug/kg | 929 | 465. | 5 |
| Butylbenzylphthalate | ND | | ug/kg | 929 | 465. | 5 |
| 3,3'-Dichlorobenzidine | ND | | ug/kg | 929 | 465. | 5 |
| Benz(a)anthracene | ND | | ug/kg | 929 | 465. | 5 |
| Chrysene | ND | | ug/kg | 929 | 465. | 5 |
| Bis(2-Ethylhexyl)phthalate | 1570 | | ug/kg | 929 | 465. | 5 |
| Di-n-octylphthalate | ND | | ug/kg | 929 | 465. | 5 |
| Benzo(b)fluoranthene | ND | | ug/kg | 929 | 465. | 5 |
| Benzo(k)fluoranthene | ND | | ug/kg | 929 | 465. | 5 |
| Benzo(a)pyrene | ND | | ug/kg | 929 | 465. | 5 |
| Indeno(1,2,3-cd)Pyrene | ND | | ug/kg | 929 | 465. | 5 |
| Dibenz(a,h)anthracene | ND | | ug/kg | 929 | 465. | 5 |
| Benzo(ghi)perylene | ND | | ug/kg | 929 | 465. | 5 |

**Project Name:** PASSAIC RI/FS CAGED BIVALVE **Lab Number:** L1110328

**Project Number:** TASK23.2.1 **Report Date:** 10/19/11

## SAMPLE RESULTS

| | | | |
|---|---|---|---|
| Lab ID: | L1110328-01 | Date Collected: | 06/08/11 08:48 |
| Client ID: | LPR6-ECST-COMP01 | Date Received: | 07/26/11 |
| Sample Location: | Not Specified | Field Prep: | Not Specified |

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| Semivolatile Organics by GC/MS - Mansfield Lab | | | | | | |

| Surrogate | % Recovery | Qualifier | Acceptance Criteria |
|---|---|---|---|
| 2-Fluorobiphenyl | 78 | | 30-130 |
| Phenol-d5 | 86 | | 30-130 |
| Nitrobenzene-d5 | 87 | | 30-130 |
| 2-Fluorophenol | 85 | | 30-130 |
| 2,4,6-Tribromophenol | 82 | | 30-130 |
| Terphenyl-d14 | 82 | | 30-130 |

**Project Name:** PASSAIC RI/FS CAGED BIVALVE **Lab Number:** L1110328

**Project Number:** TASK23.2.1 **Report Date:** 10/19/11

## SAMPLE RESULTS

| | | | |
|---|---|---|---|
| Lab ID: | L1110328-01 | Date Collected: | 06/08/11 08:48 |
| Client ID: | LPR6-ECST-COMP01 | Date Received: | 07/26/11 |
| Sample Location: | Not Specified | Field Prep: | Not Specified |
| Matrix: | Tissue | Extraction Method: | EPA 3570 |
| Analytical Method: | 1,8270C | Extraction Date: | 09/12/11 09:03 |
| Analytical Date: | 09/15/11 15:49 | Cleanup Method1: | EPA 3640A |
| Analyst: | AW | Cleanup Date1: | 09/14/11 |
| Percent Solids: | Results reported on an 'AS RECEIVED' basis. | | |

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| Semivolatile Organics by GC/MS - Mansfield Lab | | | | | | |
| Benzaldehyde | 10500 | | ug/kg | 1880 | 942. | 5 |

| Surrogate | % Recovery | Qualifier | Acceptance Criteria |
|---|---|---|---|
| 2-Fluorobiphenyl | 73 | | 30-130 |
| Nitrobenzene-d5 | 81 | | 30-130 |
| Terphenyl-d14 | 77 | | 30-130 |

**Project Name:** PASSAIC RI/FS CAGED BIVALVE **Lab Number:** L1110328

**Project Number:** TASK23.2.1 **Report Date:** 10/19/11

## SAMPLE RESULTS

| | | | |
|---|---|---|---|
| Lab ID: | L1110328-01 | Date Collected: | 06/08/11 08:48 |
| Client ID: | LPR6-ECST-COMP01 | Date Received: | 07/26/11 |
| Sample Location: | Not Specified | Field Prep: | Not Specified |
| Matrix: | Tissue | Extraction Method: | ALPHA OP-018 |
| Analytical Method: | 1,8270C-SIM(M) | Extraction Date: | 09/22/11 05:18 |
| Analytical Date: | 09/23/11 16:51 | Cleanup Method1: | EPA 3611B |
| Analyst: | AC | Cleanup Date1: | 09/22/11 |
| Percent Solids: | Results reported on an 'AS RECEIVED' basis. | Cleanup Method2: | EPA 3640A |
| | | Cleanup Date2: | 09/22/11 |

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| PAHs - Mansfield Lab | | | | | | |
| Naphthalene | 0.491 | J | ug/kg | 0.936 | 0.468 | 1 |
| C2-Naphthalenes | 2.28 | | ug/kg | 0.936 | 0.468 | 1 |
| C3-Naphthalenes | 4.37 | | ug/kg | 0.936 | 0.468 | 1 |
| C4-Naphthalenes | 6.82 | | ug/kg | 0.936 | 0.468 | 1 |
| 2-Methylnaphthalene | ND | | ug/kg | 0.936 | 0.468 | 1 |
| 1-Methylnaphthalene | ND | | ug/kg | 0.936 | 0.468 | 1 |
| 2,6-Dimethylnaphthalene | 0.624 | J | ug/kg | 0.936 | 0.468 | 1 |
| Acenaphthylene | 0.491 | J | ug/kg | 0.936 | 0.468 | 1 |
| Acenaphthene | 1.40 | | ug/kg | 0.936 | 0.468 | 1 |
| 2,3,5-Trimethylnaphthalene | 0.547 | J | ug/kg | 0.936 | 0.468 | 1 |
| Fluorene | 1.06 | | ug/kg | 0.936 | 0.468 | 1 |
| C1-Fluorenes | 2.77 | | ug/kg | 0.936 | 0.468 | 1 |
| C2-Fluorenes | 7.04 | | ug/kg | 0.936 | 0.468 | 1 |
| C3-Fluorenes | 11.3 | | ug/kg | 0.936 | 0.468 | 1 |
| Dibenzothiophene | 0.945 | | ug/kg | 0.936 | 0.468 | 1 |
| C1-Dibenzothiophenes | 2.94 | | ug/kg | 0.936 | 0.468 | 1 |
| C2-Dibenzothiophenes | 10.2 | | ug/kg | 0.936 | 0.468 | 1 |
| C3-Dibenzothiophenes | 10.2 | | ug/kg | 0.936 | 0.468 | 1 |
| C4-Dibenzothiophenes | 6.02 | | ug/kg | 0.936 | 0.468 | 1 |
| Phenanthrene | 8.44 | | ug/kg | 0.936 | 0.468 | 1 |
| C1-Phenanthrenes/Anthracenes | 15.7 | | ug/kg | 0.936 | 0.468 | 1 |
| C2-Phenanthrenes/Anthracenes | 26.3 | | ug/kg | 0.936 | 0.468 | 1 |
| C3-Phenanthrenes/Anthracenes | 16.3 | | ug/kg | 0.936 | 0.468 | 1 |
| C4-Phenanthrenes/Anthracenes | 6.95 | | ug/kg | 0.936 | 0.468 | 1 |
| Anthracene | 1.81 | | ug/kg | 0.936 | 0.468 | 1 |
| 1-Methylphenanthrene | 4.29 | | ug/kg | 0.936 | 0.468 | 1 |
| Fluoranthene | 40.9 | | ug/kg | 0.936 | 0.468 | 1 |
| Pyrene | 63.8 | | ug/kg | 0.936 | 0.468 | 1 |
| C1-Fluoranthenes/Pyrenes | 49.0 | | ug/kg | 0.936 | 0.468 | 1 |
| Benz(a)anthracene | 9.16 | | ug/kg | 0.936 | 0.468 | 1 |
| Chrysene | 44.3 | | ug/kg | 0.936 | 0.468 | 1 |

**Project Name:** PASSAIC RI/FS CAGED BIVALVE **Lab Number:** L1110328

**Project Number:** TASK23.2.1 **Report Date:** 10/19/11

## SAMPLE RESULTS

| | | | |
|---|---|---|---|
| Lab ID: | L1110328-01 | Date Collected: | 06/08/11 08:48 |
| Client ID: | LPR6-ECST-COMP01 | Date Received: | 07/26/11 |
| Sample Location: | Not Specified | Field Prep: | Not Specified |

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| PAHs - Mansfield Lab | | | | | | |
| C1-Benzanthracene/chrysenes | 14.1 | | ug/kg | 0.936 | 0.468 | 1 |
| C2-Benzanthracene/chrysenes | 5.61 | | ug/kg | 0.936 | 0.468 | 1 |
| C3-Benzanthracene/chrysenes | 7.72 | | ug/kg | 0.936 | 0.468 | 1 |
| C4-Benzanthracene/chrysenes | ND | | ug/kg | 0.936 | 0.468 | 1 |
| Benzo(b)fluoranthene | 14.2 | | ug/kg | 0.936 | 0.468 | 1 |
| Benzo(j,k)fluoranthene | 7.13 | | ug/kg | 0.936 | 0.468 | 1 |
| Benzo(e)pyrene | 23.9 | | ug/kg | 0.936 | 0.468 | 1 |
| Benzo(a)pyrene | 5.47 | | ug/kg | 0.936 | 0.468 | 1 |
| Perylene | 2.30 | | ug/kg | 0.936 | 0.468 | 1 |
| Indeno(1,2,3-cd)pyrene | 2.42 | | ug/kg | 0.936 | 0.468 | 1 |
| Dibenz(a,c+a,h)anthracene | 0.962 | | ug/kg | 0.936 | 0.468 | 1 |
| Benzo(g,h,i)perylene | 7.55 | | ug/kg | 0.936 | 0.468 | 1 |

| Surrogate | % Recovery | Qualifier | Acceptance Criteria |
|---|---|---|---|
| Naphthalene-d8 | 74 | | 50-130 |
| Phenanthrene-d10 | 90 | | 50-130 |
| Benzo(a)pyrene-d12 | 82 | | 50-130 |

**Project Name:** PASSAIC RI/FS CAGED BIVALVE **Lab Number:** L1110328

**Project Number:** TASK23.2.1 **Report Date:** 10/19/11

## SAMPLE RESULTS

| | | | |
|---|---|---|---|
| Lab ID: | L1110328-02 | Date Collected: | 03/09/11 15:00 |
| Client ID: | LPRBG-ECST-COMP01 | Date Received: | 07/26/11 |
| Sample Location: | Not Specified | Field Prep: | Not Specified |
| Matrix: | Tissue | Extraction Method: | EPA 3570 |
| Analytical Method: | 1,8270C | Extraction Date: | 07/28/11 16:25 |
| Analytical Date: | 08/16/11 13:57 | Cleanup Method1: | EPA 3640A |
| Analyst: | AW | Cleanup Date1: | 08/03/11 |
| Percent Solids: | Results reported on an 'AS RECEIVED' basis. | | |

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| Semivolatile Organics by GC/MS - Mansfield Lab | | | | | | |
| Bis(2-chloroethyl)ether | ND | | ug/kg | 917 | 459. | 5 |
| Phenol | ND | | ug/kg | 917 | 459. | 5 |
| 2-Chlorophenol | ND | | ug/kg | 917 | 459. | 5 |
| Bis(2-chloroisopropyl)ether | ND | | ug/kg | 917 | 459. | 5 |
| 2-Methylphenol | ND | | ug/kg | 917 | 459. | 5 |
| Acetophenone | ND | | ug/kg | 917 | 459. | 5 |
| Hexachloroethane | ND | | ug/kg | 917 | 459. | 5 |
| N-Nitroso-di-n-propylamine | ND | | ug/kg | 917 | 459. | 5 |
| 4-Methylphenol | ND | | ug/kg | 917 | 459. | 5 |
| Nitrobenzene | ND | | ug/kg | 917 | 459. | 5 |
| Isophorone | ND | | ug/kg | 917 | 459. | 5 |
| 2-Nitrophenol | ND | | ug/kg | 917 | 459. | 5 |
| 2,4-Dimethylphenol | ND | | ug/kg | 917 | 459. | 5 |
| Bis(2-chloroethoxy)methane | ND | | ug/kg | 917 | 459. | 5 |
| 2,4-Dichlorophenol | ND | | ug/kg | 917 | 459. | 5 |
| Naphthalene | ND | | ug/kg | 917 | 459. | 5 |
| 4-Chloroaniline | ND | | ug/kg | 917 | 459. | 5 |
| Hexachlorobutadiene | ND | | ug/kg | 917 | 459. | 5 |
| Caprolactam | ND | | ug/kg | 917 | 459. | 5 |
| P-Chloro-M-Cresol | ND | | ug/kg | 917 | 459. | 5 |
| 2-Methylnaphthalene | ND | | ug/kg | 917 | 459. | 5 |
| Hexachlorocyclopentadiene | ND | | ug/kg | 917 | 459. | 5 |
| 2,4,6-Trichlorophenol | ND | | ug/kg | 917 | 459. | 5 |
| 2,4,5-Trichlorophenol | ND | | ug/kg | 917 | 459. | 5 |
| Biphenyl | ND | | ug/kg | 917 | 459. | 5 |
| 2-Chloronaphthalene | ND | | ug/kg | 917 | 459. | 5 |
| 2-Nitroaniline | ND | | ug/kg | 917 | 459. | 5 |
| Acenaphthylene | ND | | ug/kg | 917 | 459. | 5 |
| Dimethylphthalate | ND | | ug/kg | 917 | 459. | 5 |
| 2,6-Dinitrotoluene | ND | | ug/kg | 917 | 459. | 5 |
| Acenaphthene | ND | | ug/kg | 917 | 459. | 5 |

**Project Name:** PASSAIC RI/FS CAGED BIVALVE **Lab Number:** L1110328

**Project Number:** TASK23.2.1 **Report Date:** 10/19/11

## SAMPLE RESULTS

Lab ID: L1110328-02 Date Collected: 03/09/11 15:00

Client ID: LPRBG-ECST-COMP01 Date Received: 07/26/11

Sample Location: Not Specified Field Prep: Not Specified

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| Semivolatile Organics by GC/MS - Mansfield Lab | | | | | | |
| 3-Nitroaniline | ND | | ug/kg | 917 | 459. | 5 |
| 2,4-Dinitrophenol | ND | | ug/kg | 3670 | 1830 | 5 |
| Dibenzofuran | ND | | ug/kg | 917 | 459. | 5 |
| 2,4-Dinitrotoluene | ND | | ug/kg | 917 | 459. | 5 |
| 4-Nitrophenol | ND | | ug/kg | 1830 | 917. | 5 |
| Fluorene | ND | | ug/kg | 917 | 459. | 5 |
| 4-Chlorophenyl-phenylether | ND | | ug/kg | 917 | 459. | 5 |
| Diethylphthalate | ND | | ug/kg | 917 | 459. | 5 |
| 4-Nitroaniline | ND | | ug/kg | 917 | 459. | 5 |
| 4,6-Dinitro-2-Methylphenol | ND | | ug/kg | 3670 | 1830 | 5 |
| NitrosoDiPhenylAmine(NDPA)/DPA | ND | | ug/kg | 917 | 459. | 5 |
| 4-Bromophenyl-phenylether | ND | | ug/kg | 917 | 459. | 5 |
| Hexachlorobenzene | ND | | ug/kg | 917 | 459. | 5 |
| Atrazine | ND | | ug/kg | 917 | 459. | 5 |
| Pentachlorophenol | ND | | ug/kg | 3670 | 1830 | 5 |
| Phenanthrene | ND | | ug/kg | 917 | 459. | 5 |
| Anthracene | ND | | ug/kg | 917 | 459. | 5 |
| Carbazole | ND | | ug/kg | 917 | 459. | 5 |
| Di-n-butylphthalate | ND | | ug/kg | 917 | 459. | 5 |
| Fluoranthene | ND | | ug/kg | 917 | 459. | 5 |
| Pyrene | ND | | ug/kg | 917 | 459. | 5 |
| Butylbenzylphthalate | ND | | ug/kg | 917 | 459. | 5 |
| 3,3'-Dichlorobenzidine | ND | | ug/kg | 917 | 459. | 5 |
| Benz(a)anthracene | ND | | ug/kg | 917 | 459. | 5 |
| Chrysene | ND | | ug/kg | 917 | 459. | 5 |
| Bis(2-Ethylhexyl)phthalate | ND | | ug/kg | 917 | 459. | 5 |
| Di-n-octylphthalate | ND | | ug/kg | 917 | 459. | 5 |
| Benzo(b)fluoranthene | ND | | ug/kg | 917 | 459. | 5 |
| Benzo(k)fluoranthene | ND | | ug/kg | 917 | 459. | 5 |
| Benzo(a)pyrene | ND | | ug/kg | 917 | 459. | 5 |
| Indeno(1,2,3-cd)Pyrene | ND | | ug/kg | 917 | 459. | 5 |
| Dibenz(a,h)anthracene | ND | | ug/kg | 917 | 459. | 5 |
| Benzo(ghi)perylene | ND | | ug/kg | 917 | 459. | 5 |

**Project Name:** PASSAIC RI/FS CAGED BIVALVE **Lab Number:** L1110328

**Project Number:** TASK23.2.1 **Report Date:** 10/19/11

## SAMPLE RESULTS

| | | | |
|---|---|---|---|
| Lab ID: | L1110328-02 | Date Collected: | 03/09/11 15:00 |
| Client ID: | LPRBG-ECST-COMP01 | Date Received: | 07/26/11 |
| Sample Location: | Not Specified | Field Prep: | Not Specified |

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| Semivolatile Organics by GC/MS - Mansfield Lab | | | | | | |

| Surrogate | % Recovery | Qualifier | Acceptance Criteria |
|---|---|---|---|
| 2-Fluorobiphenyl | 76 | | 30-130 |
| Phenol-d5 | 77 | | 30-130 |
| Nitrobenzene-d5 | 90 | | 30-130 |
| 2-Fluorophenol | 73 | | 30-130 |
| 2,4,6-Tribromophenol | 78 | | 30-130 |
| Terphenyl-d14 | 81 | | 30-130 |

**Project Name:** PASSAIC RI/FS CAGED BIVALVE **Lab Number:** L1110328

**Project Number:** TASK23.2.1 **Report Date:** 10/19/11

## SAMPLE RESULTS

| | | | |
|---|---|---|---|
| Lab ID: | L1110328-02 | Date Collected: | 03/09/11 15:00 |
| Client ID: | LPRBG-ECST-COMP01 | Date Received: | 07/26/11 |
| Sample Location: | Not Specified | Field Prep: | Not Specified |
| Matrix: | Tissue | Extraction Method: | EPA 3570 |
| Analytical Method: | 1,8270C | Extraction Date: | 09/12/11 09:03 |
| Analytical Date: | 09/15/11 14:59 | Cleanup Method1: | EPA 3640A |
| Analyst: | AW | Cleanup Date1: | 09/14/11 |
| Percent Solids: | Results reported on an 'AS RECEIVED' basis. | | |

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| Semivolatile Organics by GC/MS - Mansfield Lab | | | | | | |
| Benzaldehyde | 14000 | | ug/kg | 1810 | 904. | 5 |

| Surrogate | % Recovery | Qualifier | Acceptance Criteria |
|---|---|---|---|
| 2-Fluorobiphenyl | 74 | | 30-130 |
| Nitrobenzene-d5 | 82 | | 30-130 |
| Terphenyl-d14 | 76 | | 30-130 |

**Project Name:** PASSAIC RI/FS CAGED BIVALVE **Lab Number:** L1110328

**Project Number:** TASK23.2.1 **Report Date:** 10/19/11

## SAMPLE RESULTS

| | | | |
|---|---|---|---|
| Lab ID: | L1110328-02 | Date Collected: | 03/09/11 15:00 |
| Client ID: | LPRBG-ECST-COMP01 | Date Received: | 07/26/11 |
| Sample Location: | Not Specified | Field Prep: | Not Specified |
| Matrix: | Tissue | Extraction Method: | ALPHA OP-018 |
| Analytical Method: | 1,8270C-SIM(M) | Extraction Date: | 09/12/11 13:12 |
| Analytical Date: | 09/17/11 00:50 | Cleanup Method1: | EPA 3611B |
| Analyst: | AC | Cleanup Date1: | 09/13/11 |
| Percent Solids: | Results reported on an 'AS RECEIVED' basis. | Cleanup Method2: | EPA 3640A |
| | | Cleanup Date2: | 09/15/11 |

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| PAHs - Mansfield Lab | | | | | | |
| Naphthalene | 0.591 | J | ug/kg | 0.902 | 0.451 | 1 |
| C2-Naphthalenes | 0.490 | J | ug/kg | 0.902 | 0.451 | 1 |
| C3-Naphthalenes | 0.462 | J | ug/kg | 0.902 | 0.451 | 1 |
| C4-Naphthalenes | ND | | ug/kg | 0.902 | 0.451 | 1 |
| 2-Methylnaphthalene | ND | | ug/kg | 0.902 | 0.451 | 1 |
| 1-Methylnaphthalene | ND | | ug/kg | 0.902 | 0.451 | 1 |
| 2,6-Dimethylnaphthalene | ND | | ug/kg | 0.902 | 0.451 | 1 |
| Acenaphthylene | ND | | ug/kg | 0.902 | 0.451 | 1 |
| Acenaphthene | ND | | ug/kg | 0.902 | 0.451 | 1 |
| 2,3,5-Trimethylnaphthalene | ND | | ug/kg | 0.902 | 0.451 | 1 |
| Fluorene | ND | | ug/kg | 0.902 | 0.451 | 1 |
| C1-Fluorenes | ND | | ug/kg | 0.902 | 0.451 | 1 |
| C2-Fluorenes | ND | | ug/kg | 0.902 | 0.451 | 1 |
| C3-Fluorenes | ND | | ug/kg | 0.902 | 0.451 | 1 |
| Dibenzothiophene | ND | | ug/kg | 0.902 | 0.451 | 1 |
| C1-Dibenzothiophenes | ND | | ug/kg | 0.902 | 0.451 | 1 |
| C2-Dibenzothiophenes | ND | | ug/kg | 0.902 | 0.451 | 1 |
| C3-Dibenzothiophenes | ND | | ug/kg | 0.902 | 0.451 | 1 |
| C4-Dibenzothiophenes | ND | | ug/kg | 0.902 | 0.451 | 1 |
| Phenanthrene | 0.491 | J | ug/kg | 0.902 | 0.451 | 1 |
| C1-Phenanthrenes/Anthracenes | ND | | ug/kg | 0.902 | 0.451 | 1 |
| C2-Phenanthrenes/Anthracenes | ND | | ug/kg | 0.902 | 0.451 | 1 |
| C3-Phenanthrenes/Anthracenes | ND | | ug/kg | 0.902 | 0.451 | 1 |
| C4-Phenanthrenes/Anthracenes | ND | | ug/kg | 0.902 | 0.451 | 1 |
| Anthracene | ND | | ug/kg | 0.902 | 0.451 | 1 |
| 1-Methylphenanthrene | ND | | ug/kg | 0.902 | 0.451 | 1 |
| Fluoranthene | 0.839 | J | ug/kg | 0.902 | 0.451 | 1 |
| Pyrene | 0.929 | | ug/kg | 0.902 | 0.451 | 1 |
| C1-Fluoranthenes/Pyrenes | ND | | ug/kg | 0.902 | 0.451 | 1 |
| Benz(a)anthracene | ND | | ug/kg | 0.902 | 0.451 | 1 |
| Chrysene | ND | | ug/kg | 0.902 | 0.451 | 1 |

**Project Name:** PASSAIC RI/FS CAGED BIVALVE **Lab Number:** L1110328

**Project Number:** TASK23.2.1 **Report Date:** 10/19/11

## SAMPLE RESULTS

Lab ID: L1110328-02 Date Collected: 03/09/11 15:00

Client ID: LPRBG-ECST-COMP01 Date Received: 07/26/11

Sample Location: Not Specified Field Prep: Not Specified

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| PAHs - Mansfield Lab | | | | | | |
| C1-Benzanthracene/chrysenes | ND | | ug/kg | 0.902 | 0.451 | 1 |
| C2-Benzanthracene/chrysenes | ND | | ug/kg | 0.902 | 0.451 | 1 |
| C3-Benzanthracene/chrysenes | ND | | ug/kg | 0.902 | 0.451 | 1 |
| C4-Benzanthracene/chrysenes | ND | | ug/kg | 0.902 | 0.451 | 1 |
| Benzo(b)fluoranthene | ND | | ug/kg | 0.902 | 0.451 | 1 |
| Benzo(j,k)fluoranthene | ND | | ug/kg | 0.902 | 0.451 | 1 |
| Benzo(e)pyrene | ND | | ug/kg | 0.902 | 0.451 | 1 |
| Benzo(a)pyrene | ND | | ug/kg | 0.902 | 0.451 | 1 |
| Perylene | 0.653 | J | ug/kg | 0.902 | 0.451 | 1 |
| Indeno(1,2,3-cd)pyrene | ND | | ug/kg | 0.902 | 0.451 | 1 |
| Dibenz(a,c+a,h)anthracene | ND | | ug/kg | 0.902 | 0.451 | 1 |
| Benzo(g,h,i)perylene | ND | | ug/kg | 0.902 | 0.451 | 1 |

| Surrogate | % Recovery | Qualifier | Acceptance Criteria |
|---|---|---|---|
| Naphthalene-d8 | 83 | | 50-130 |
| Phenanthrene-d10 | 84 | | 50-130 |
| Benzo(a)pyrene-d12 | 78 | | 50-130 |

**Project Name:** PASSAIC RI/FS CAGED BIVALVE **Lab Number:** L1110328

**Project Number:** TASK23.2.1 **Report Date:** 10/19/11

## SAMPLE RESULTS

| | | | |
|---|---|---|---|
| Lab ID: | L1110328-03 | Date Collected: | 06/08/11 09:03 |
| Client ID: | LPR6-ECST-COMP02 | Date Received: | 07/26/11 |
| Sample Location: | Not Specified | Field Prep: | Not Specified |
| Matrix: | Tissue | Extraction Method: | EPA 3570 |
| Analytical Method: | 1,8270C | Extraction Date: | 07/28/11 16:25 |
| Analytical Date: | 08/15/11 22:05 | Cleanup Method1: | EPA 3640A |
| Analyst: | AW | Cleanup Date1: | 08/03/11 |
| Percent Solids: | Results reported on an 'AS RECEIVED' basis. | | |

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| Semivolatile Organics by GC/MS - Mansfield Lab | | | | | | |
| Bis(2-chloroethyl)ether | ND | | ug/kg | 945 | 472. | 5 |
| Phenol | ND | | ug/kg | 945 | 472. | 5 |
| 2-Chlorophenol | ND | | ug/kg | 945 | 472. | 5 |
| Bis(2-chloroisopropyl)ether | ND | | ug/kg | 945 | 472. | 5 |
| 2-Methylphenol | ND | | ug/kg | 945 | 472. | 5 |
| Acetophenone | ND | | ug/kg | 945 | 472. | 5 |
| Hexachloroethane | ND | | ug/kg | 945 | 472. | 5 |
| N-Nitroso-di-n-propylamine | ND | | ug/kg | 945 | 472. | 5 |
| 4-Methylphenol | ND | | ug/kg | 945 | 472. | 5 |
| Nitrobenzene | ND | | ug/kg | 945 | 472. | 5 |
| Isophorone | ND | | ug/kg | 945 | 472. | 5 |
| 2-Nitrophenol | ND | | ug/kg | 945 | 472. | 5 |
| 2,4-Dimethylphenol | ND | | ug/kg | 945 | 472. | 5 |
| Bis(2-chloroethoxy)methane | ND | | ug/kg | 945 | 472. | 5 |
| 2,4-Dichlorophenol | ND | | ug/kg | 945 | 472. | 5 |
| Naphthalene | ND | | ug/kg | 945 | 472. | 5 |
| 4-Chloroaniline | ND | | ug/kg | 945 | 472. | 5 |
| Hexachlorobutadiene | ND | | ug/kg | 945 | 472. | 5 |
| Caprolactam | ND | | ug/kg | 945 | 472. | 5 |
| P-Chloro-M-Cresol | ND | | ug/kg | 945 | 472. | 5 |
| 2-Methylnaphthalene | ND | | ug/kg | 945 | 472. | 5 |
| Hexachlorocyclopentadiene | ND | | ug/kg | 945 | 472. | 5 |
| 2,4,6-Trichlorophenol | ND | | ug/kg | 945 | 472. | 5 |
| 2,4,5-Trichlorophenol | ND | | ug/kg | 945 | 472. | 5 |
| Biphenyl | ND | | ug/kg | 945 | 472. | 5 |
| 2-Chloronaphthalene | ND | | ug/kg | 945 | 472. | 5 |
| 2-Nitroaniline | ND | | ug/kg | 945 | 472. | 5 |
| Acenaphthylene | ND | | ug/kg | 945 | 472. | 5 |
| Dimethylphthalate | ND | | ug/kg | 945 | 472. | 5 |
| 2,6-Dinitrotoluene | ND | | ug/kg | 945 | 472. | 5 |
| Acenaphthene | ND | | ug/kg | 945 | 472. | 5 |

**Project Name:** PASSAIC RI/FS CAGED BIVALVE **Lab Number:** L1110328

**Project Number:** TASK23.2.1 **Report Date:** 10/19/11

## SAMPLE RESULTS

Lab ID: L1110328-03 Date Collected: 06/08/11 09:03

Client ID: LPR6-ECST-COMP02 Date Received: 07/26/11

Sample Location: Not Specified Field Prep: Not Specified

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| Semivolatile Organics by GC/MS - Mansfield Lab | | | | | | |
| 3-Nitroaniline | ND | | ug/kg | 945 | 472. | 5 |
| 2,4-Dinitrophenol | ND | | ug/kg | 3780 | 1890 | 5 |
| Dibenzofuran | ND | | ug/kg | 945 | 472. | 5 |
| 2,4-Dinitrotoluene | ND | | ug/kg | 945 | 472. | 5 |
| 4-Nitrophenol | ND | | ug/kg | 1890 | 945. | 5 |
| Fluorene | ND | | ug/kg | 945 | 472. | 5 |
| 4-Chlorophenyl-phenylether | ND | | ug/kg | 945 | 472. | 5 |
| Diethylphthalate | ND | | ug/kg | 945 | 472. | 5 |
| 4-Nitroaniline | ND | | ug/kg | 945 | 472. | 5 |
| 4,6-Dinitro-2-Methylphenol | ND | | ug/kg | 3780 | 1890 | 5 |
| NitrosoDiPhenylAmine(NDPA)/DPA | ND | | ug/kg | 945 | 472. | 5 |
| 4-Bromophenyl-phenylether | ND | | ug/kg | 945 | 472. | 5 |
| Hexachlorobenzene | ND | | ug/kg | 945 | 472. | 5 |
| Atrazine | ND | | ug/kg | 945 | 472. | 5 |
| Pentachlorophenol | ND | | ug/kg | 3780 | 1890 | 5 |
| Phenanthrene | ND | | ug/kg | 945 | 472. | 5 |
| Anthracene | ND | | ug/kg | 945 | 472. | 5 |
| Carbazole | ND | | ug/kg | 945 | 472. | 5 |
| Di-n-butylphthalate | ND | | ug/kg | 945 | 472. | 5 |
| Fluoranthene | ND | | ug/kg | 945 | 472. | 5 |
| Pyrene | ND | | ug/kg | 945 | 472. | 5 |
| Butylbenzylphthalate | ND | | ug/kg | 945 | 472. | 5 |
| 3,3'-Dichlorobenzidine | ND | | ug/kg | 945 | 472. | 5 |
| Benz(a)anthracene | ND | | ug/kg | 945 | 472. | 5 |
| Chrysene | ND | | ug/kg | 945 | 472. | 5 |
| Bis(2-Ethylhexyl)phthalate | ND | | ug/kg | 945 | 472. | 5 |
| Di-n-octylphthalate | ND | | ug/kg | 945 | 472. | 5 |
| Benzo(b)fluoranthene | ND | | ug/kg | 945 | 472. | 5 |
| Benzo(k)fluoranthene | ND | | ug/kg | 945 | 472. | 5 |
| Benzo(a)pyrene | ND | | ug/kg | 945 | 472. | 5 |
| Indeno(1,2,3-cd)Pyrene | ND | | ug/kg | 945 | 472. | 5 |
| Dibenz(a,h)anthracene | ND | | ug/kg | 945 | 472. | 5 |
| Benzo(ghi)perylene | ND | | ug/kg | 945 | 472. | 5 |

**Project Name:** PASSAIC RI/FS CAGED BIVALVE **Lab Number:** L1110328

**Project Number:** TASK23.2.1 **Report Date:** 10/19/11

## SAMPLE RESULTS

| | | | |
|---|---|---|---|
| Lab ID: | L1110328-03 | Date Collected: | 06/08/11 09:03 |
| Client ID: | LPR6-ECST-COMP02 | Date Received: | 07/26/11 |
| Sample Location: | Not Specified | Field Prep: | Not Specified |

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| Semivolatile Organics by GC/MS - Mansfield Lab | | | | | | |

| Surrogate | % Recovery | Qualifier | Acceptance Criteria |
|---|---|---|---|
| 2-Fluorobiphenyl | 73 | | 30-130 |
| Phenol-d5 | 80 | | 30-130 |
| Nitrobenzene-d5 | 85 | | 30-130 |
| 2-Fluorophenol | 77 | | 30-130 |
| 2,4,6-Tribromophenol | 71 | | 30-130 |
| Terphenyl-d14 | 76 | | 30-130 |

**Project Name:** PASSAIC RI/FS CAGED BIVALVE **Lab Number:** L1110328

**Project Number:** TASK23.2.1 **Report Date:** 10/19/11

## SAMPLE RESULTS

| | | | |
|---|---|---|---|
| Lab ID: | L1110328-03 | Date Collected: | 06/08/11 09:03 |
| Client ID: | LPR6-ECST-COMP02 | Date Received: | 07/26/11 |
| Sample Location: | Not Specified | Field Prep: | Not Specified |
| Matrix: | Tissue | Extraction Method: | EPA 3570 |
| Analytical Method: | 1,8270C | Extraction Date: | 09/12/11 09:03 |
| Analytical Date: | 09/15/11 23:01 | Cleanup Method1: | EPA 3640A |
| Analyst: | AW | Cleanup Date1: | 09/14/11 |
| Percent Solids: | Results reported on an 'AS RECEIVED' basis. | | |

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| Semivolatile Organics by GC/MS - Mansfield Lab | | | | | | |
| Benzaldehyde | 12400 | | ug/kg | 1930 | 967. | 5 |

| Surrogate | % Recovery | Qualifier | Acceptance Criteria |
|---|---|---|---|
| 2-Fluorobiphenyl | 78 | | 30-130 |
| Nitrobenzene-d5 | 86 | | 30-130 |
| Terphenyl-d14 | 84 | | 30-130 |

**Project Name:** PASSAIC RI/FS CAGED BIVALVE **Lab Number:** L1110328

**Project Number:** TASK23.2.1 **Report Date:** 10/19/11

## SAMPLE RESULTS

| | | | |
|---|---|---|---|
| Lab ID: | L1110328-03 | Date Collected: | 06/08/11 09:03 |
| Client ID: | LPR6-ECST-COMP02 | Date Received: | 07/26/11 |
| Sample Location: | Not Specified | Field Prep: | Not Specified |
| Matrix: | Tissue | Extraction Method: | ALPHA OP-018 |
| Analytical Method: | 1,8270C-SIM(M) | Extraction Date: | 07/28/11 12:19 |
| Analytical Date: | 08/06/11 14:05 | Cleanup Method1: | EPA 3611B |
| Analyst: | AC | Cleanup Date1: | 08/02/11 |
| Percent Solids: | Results reported on an 'AS RECEIVED' basis. | Cleanup Method2: | EPA 3640A |
| | | Cleanup Date2: | 08/02/11 |

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| PAHs - Mansfield Lab | | | | | | |
| Naphthalene | 0.910 | J | ug/kg | 0.940 | 0.470 | 1 |
| C2-Naphthalenes | 2.24 | | ug/kg | 0.940 | 0.470 | 1 |
| C3-Naphthalenes | 3.87 | | ug/kg | 0.940 | 0.470 | 1 |
| C4-Naphthalenes | 6.88 | | ug/kg | 0.940 | 0.470 | 1 |
| 2-Methylnaphthalene | 0.580 | J | ug/kg | 0.940 | 0.470 | 1 |
| 1-Methylnaphthalene | ND | | ug/kg | 0.940 | 0.470 | 1 |
| 2,6-Dimethylnaphthalene | 0.570 | J | ug/kg | 0.940 | 0.470 | 1 |
| Acenaphthylene | ND | | ug/kg | 0.940 | 0.470 | 1 |
| Acenaphthene | 1.12 | | ug/kg | 0.940 | 0.470 | 1 |
| 2,3,5-Trimethylnaphthalene | ND | | ug/kg | 0.940 | 0.470 | 1 |
| Fluorene | 0.905 | J | ug/kg | 0.940 | 0.470 | 1 |
| C1-Fluorenes | 2.04 | | ug/kg | 0.940 | 0.470 | 1 |
| C2-Fluorenes | 6.24 | | ug/kg | 0.940 | 0.470 | 1 |
| C3-Fluorenes | 10.2 | | ug/kg | 0.940 | 0.470 | 1 |
| Dibenzothiophene | 0.668 | J | ug/kg | 0.940 | 0.470 | 1 |
| C1-Dibenzothiophenes | 2.27 | | ug/kg | 0.940 | 0.470 | 1 |
| C2-Dibenzothiophenes | 9.42 | | ug/kg | 0.940 | 0.470 | 1 |
| C3-Dibenzothiophenes | 9.99 | | ug/kg | 0.940 | 0.470 | 1 |
| C4-Dibenzothiophenes | 5.81 | | ug/kg | 0.940 | 0.470 | 1 |
| Phenanthrene | 8.22 | | ug/kg | 0.940 | 0.470 | 1 |
| C1-Phenanthrenes/Anthracenes | 15.6 | | ug/kg | 0.940 | 0.470 | 1 |
| C2-Phenanthrenes/Anthracenes | 24.6 | | ug/kg | 0.940 | 0.470 | 1 |
| C3-Phenanthrenes/Anthracenes | 18.4 | | ug/kg | 0.940 | 0.470 | 1 |
| C4-Phenanthrenes/Anthracenes | 7.79 | | ug/kg | 0.940 | 0.470 | 1 |
| Anthracene | 1.38 | | ug/kg | 0.940 | 0.470 | 1 |
| 1-Methylphenanthrene | 4.35 | | ug/kg | 0.940 | 0.470 | 1 |
| Fluoranthene | 43.4 | | ug/kg | 0.940 | 0.470 | 1 |
| Pyrene | 69.9 | | ug/kg | 0.940 | 0.470 | 1 |
| C1-Fluoranthenes/Pyrenes | 53.6 | | ug/kg | 0.940 | 0.470 | 1 |
| Benz(a)anthracene | 9.89 | | ug/kg | 0.940 | 0.470 | 1 |
| Chrysene | 47.2 | | ug/kg | 0.940 | 0.470 | 1 |

**Project Name:** PASSAIC RI/FS CAGED BIVALVE **Lab Number:** L1110328

**Project Number:** TASK23.2.1 **Report Date:** 10/19/11

## SAMPLE RESULTS

| | | | |
|---|---|---|---|
| Lab ID: | L1110328-03 | Date Collected: | 06/08/11 09:03 |
| Client ID: | LPR6-ECST-COMP02 | Date Received: | 07/26/11 |
| Sample Location: | Not Specified | Field Prep: | Not Specified |

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| PAHs - Mansfield Lab | | | | | | |
| C1-Benzanthracene/chrysenes | 14.6 | | ug/kg | 0.940 | 0.470 | 1 |
| C2-Benzanthracene/chrysenes | 5.89 | | ug/kg | 0.940 | 0.470 | 1 |
| C3-Benzanthracene/chrysenes | 5.69 | | ug/kg | 0.940 | 0.470 | 1 |
| C4-Benzanthracene/chrysenes | ND | | ug/kg | 0.940 | 0.470 | 1 |
| Benzo(b)fluoranthene | 18.2 | | ug/kg | 0.940 | 0.470 | 1 |
| Benzo(j,k)fluoranthene | 8.22 | | ug/kg | 0.940 | 0.470 | 1 |
| Benzo(e)pyrene | 23.6 | | ug/kg | 0.940 | 0.470 | 1 |
| Benzo(a)pyrene | 7.56 | | ug/kg | 0.940 | 0.470 | 1 |
| Perylene | 2.38 | | ug/kg | 0.940 | 0.470 | 1 |
| Indeno(1,2,3-cd)pyrene | 2.32 | | ug/kg | 0.940 | 0.470 | 1 |
| Dibenz(a,c+a,h)anthracene | 1.18 | | ug/kg | 0.940 | 0.470 | 1 |
| Benzo(g,h,i)perylene | 7.68 | | ug/kg | 0.940 | 0.470 | 1 |

| Surrogate | % Recovery | Qualifier | Acceptance Criteria |
|---|---|---|---|
| Naphthalene-d8 | 86 | | 50-130 |
| Phenanthrene-d10 | 104 | | 50-130 |
| Benzo(a)pyrene-d12 | 90 | | 50-130 |

**Project Name:** PASSAIC RI/FS CAGED BIVALVE **Lab Number:** L1110328

**Project Number:** TASK23.2.1 **Report Date:** 10/19/11

## SAMPLE RESULTS

| | | | |
|---|---|---|---|
| Lab ID: | L1110328-04 | Date Collected: | 06/08/11 08:20 |
| Client ID: | LPR7-ECST-COMP03 | Date Received: | 07/26/11 |
| Sample Location: | Not Specified | Field Prep: | Not Specified |
| Matrix: | Tissue | Extraction Method: | EPA 3570 |
| Analytical Method: | 1,8270C | Extraction Date: | 07/28/11 16:25 |
| Analytical Date: | 08/15/11 22:54 | Cleanup Method1: | EPA 3640A |
| Analyst: | AW | Cleanup Date1: | 08/03/11 |
| Percent Solids: | Results reported on an 'AS RECEIVED' basis. | | |

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| Semivolatile Organics by GC/MS - Mansfield Lab | | | | | | |
| Bis(2-chloroethyl)ether | ND | | ug/kg | 934 | 467. | 5 |
| Phenol | ND | | ug/kg | 934 | 467. | 5 |
| 2-Chlorophenol | ND | | ug/kg | 934 | 467. | 5 |
| Bis(2-chloroisopropyl)ether | ND | | ug/kg | 934 | 467. | 5 |
| 2-Methylphenol | ND | | ug/kg | 934 | 467. | 5 |
| Acetophenone | ND | | ug/kg | 934 | 467. | 5 |
| Hexachloroethane | ND | | ug/kg | 934 | 467. | 5 |
| N-Nitroso-di-n-propylamine | ND | | ug/kg | 934 | 467. | 5 |
| 4-Methylphenol | ND | | ug/kg | 934 | 467. | 5 |
| Nitrobenzene | ND | | ug/kg | 934 | 467. | 5 |
| Isophorone | ND | | ug/kg | 934 | 467. | 5 |
| 2-Nitrophenol | ND | | ug/kg | 934 | 467. | 5 |
| 2,4-Dimethylphenol | ND | | ug/kg | 934 | 467. | 5 |
| Bis(2-chloroethoxy)methane | ND | | ug/kg | 934 | 467. | 5 |
| 2,4-Dichlorophenol | ND | | ug/kg | 934 | 467. | 5 |
| Naphthalene | ND | | ug/kg | 934 | 467. | 5 |
| 4-Chloroaniline | ND | | ug/kg | 934 | 467. | 5 |
| Hexachlorobutadiene | ND | | ug/kg | 934 | 467. | 5 |
| Caprolactam | ND | | ug/kg | 934 | 467. | 5 |
| P-Chloro-M-Cresol | ND | | ug/kg | 934 | 467. | 5 |
| 2-Methylnaphthalene | ND | | ug/kg | 934 | 467. | 5 |
| Hexachlorocyclopentadiene | ND | | ug/kg | 934 | 467. | 5 |
| 2,4,6-Trichlorophenol | ND | | ug/kg | 934 | 467. | 5 |
| 2,4,5-Trichlorophenol | ND | | ug/kg | 934 | 467. | 5 |
| Biphenyl | ND | | ug/kg | 934 | 467. | 5 |
| 2-Chloronaphthalene | ND | | ug/kg | 934 | 467. | 5 |
| 2-Nitroaniline | ND | | ug/kg | 934 | 467. | 5 |
| Acenaphthylene | ND | | ug/kg | 934 | 467. | 5 |
| Dimethylphthalate | ND | | ug/kg | 934 | 467. | 5 |
| 2,6-Dinitrotoluene | ND | | ug/kg | 934 | 467. | 5 |
| Acenaphthene | ND | | ug/kg | 934 | 467. | 5 |

**Project Name:** PASSAIC RI/FS CAGED BIVALVE **Lab Number:** L1110328

**Project Number:** TASK23.2.1 **Report Date:** 10/19/11

## SAMPLE RESULTS

Lab ID: L1110328-04 Date Collected: 06/08/11 08:20

Client ID: LPR7-ECST-COMP03 Date Received: 07/26/11

Sample Location: Not Specified Field Prep: Not Specified

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| Semivolatile Organics by GC/MS - Mansfield Lab | | | | | | |
| 3-Nitroaniline | ND | | ug/kg | 934 | 467. | 5 |
| 2,4-Dinitrophenol | ND | | ug/kg | 3740 | 1870 | 5 |
| Dibenzofuran | ND | | ug/kg | 934 | 467. | 5 |
| 2,4-Dinitrotoluene | ND | | ug/kg | 934 | 467. | 5 |
| 4-Nitrophenol | ND | | ug/kg | 1870 | 934. | 5 |
| Fluorene | ND | | ug/kg | 934 | 467. | 5 |
| 4-Chlorophenyl-phenylether | ND | | ug/kg | 934 | 467. | 5 |
| Diethylphthalate | ND | | ug/kg | 934 | 467. | 5 |
| 4-Nitroaniline | ND | | ug/kg | 934 | 467. | 5 |
| 4,6-Dinitro-2-Methylphenol | ND | | ug/kg | 3740 | 1870 | 5 |
| NitrosoDiPhenylAmine(NDPA)/DPA | ND | | ug/kg | 934 | 467. | 5 |
| 4-Bromophenyl-phenylether | ND | | ug/kg | 934 | 467. | 5 |
| Hexachlorobenzene | ND | | ug/kg | 934 | 467. | 5 |
| Atrazine | ND | | ug/kg | 934 | 467. | 5 |
| Pentachlorophenol | ND | | ug/kg | 3740 | 1870 | 5 |
| Phenanthrene | ND | | ug/kg | 934 | 467. | 5 |
| Anthracene | ND | | ug/kg | 934 | 467. | 5 |
| Carbazole | ND | | ug/kg | 934 | 467. | 5 |
| Di-n-butylphthalate | ND | | ug/kg | 934 | 467. | 5 |
| Fluoranthene | ND | | ug/kg | 934 | 467. | 5 |
| Pyrene | ND | | ug/kg | 934 | 467. | 5 |
| Butylbenzylphthalate | ND | | ug/kg | 934 | 467. | 5 |
| 3,3'-Dichlorobenzidine | ND | | ug/kg | 934 | 467. | 5 |
| Benz(a)anthracene | ND | | ug/kg | 934 | 467. | 5 |
| Chrysene | ND | | ug/kg | 934 | 467. | 5 |
| Bis(2-Ethylhexyl)phthalate | ND | | ug/kg | 934 | 467. | 5 |
| Di-n-octylphthalate | ND | | ug/kg | 934 | 467. | 5 |
| Benzo(b)fluoranthene | ND | | ug/kg | 934 | 467. | 5 |
| Benzo(k)fluoranthene | ND | | ug/kg | 934 | 467. | 5 |
| Benzo(a)pyrene | ND | | ug/kg | 934 | 467. | 5 |
| Indeno(1,2,3-cd)Pyrene | ND | | ug/kg | 934 | 467. | 5 |
| Dibenz(a,h)anthracene | ND | | ug/kg | 934 | 467. | 5 |
| Benzo(ghi)perylene | ND | | ug/kg | 934 | 467. | 5 |

**Project Name:** PASSAIC RI/FS CAGED BIVALVE **Lab Number:** L1110328

**Project Number:** TASK23.2.1 **Report Date:** 10/19/11

## SAMPLE RESULTS

| | | | |
|---|---|---|---|
| Lab ID: | L1110328-04 | Date Collected: | 06/08/11 08:20 |
| Client ID: | LPR7-ECST-COMP03 | Date Received: | 07/26/11 |
| Sample Location: | Not Specified | Field Prep: | Not Specified |

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| Semivolatile Organics by GC/MS - Mansfield Lab | | | | | | |

| Surrogate | % Recovery | Qualifier | Acceptance Criteria |
|---|---|---|---|
| 2-Fluorobiphenyl | 70 | | 30-130 |
| Phenol-d5 | 82 | | 30-130 |
| Nitrobenzene-d5 | 85 | | 30-130 |
| 2-Fluorophenol | 79 | | 30-130 |
| 2,4,6-Tribromophenol | 72 | | 30-130 |
| Terphenyl-d14 | 73 | | 30-130 |

**Project Name:** PASSAIC RI/FS CAGED BIVALVE **Lab Number:** L1110328

**Project Number:** TASK23.2.1 **Report Date:** 10/19/11

## SAMPLE RESULTS

| | | | |
|---|---|---|---|
| Lab ID: | L1110328-04 | Date Collected: | 06/08/11 08:20 |
| Client ID: | LPR7-ECST-COMP03 | Date Received: | 07/26/11 |
| Sample Location: | Not Specified | Field Prep: | Not Specified |
| Matrix: | Tissue | Extraction Method: | EPA 3570 |
| Analytical Method: | 1,8270C | Extraction Date: | 09/12/11 09:03 |
| Analytical Date: | 09/15/11 23:51 | Cleanup Method1: | EPA 3640A |
| Analyst: | AW | Cleanup Date1: | 09/14/11 |
| Percent Solids: | Results reported on an 'AS RECEIVED' basis. | | |

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| Semivolatile Organics by GC/MS - Mansfield Lab | | | | | | |
| Benzaldehyde | 16100 | | ug/kg | 1890 | 945. | 5 |

| Surrogate | % Recovery | Qualifier | Acceptance Criteria |
|---|---|---|---|
| 2-Fluorobiphenyl | 81 | | 30-130 |
| Nitrobenzene-d5 | 90 | | 30-130 |
| Terphenyl-d14 | 83 | | 30-130 |

**Project Name:** PASSAIC RI/FS CAGED BIVALVE **Lab Number:** L1110328

**Project Number:** TASK23.2.1 **Report Date:** 10/19/11

## SAMPLE RESULTS

| | | | |
|---|---|---|---|
| Lab ID: | L1110328-04 | Date Collected: | 06/08/11 08:20 |
| Client ID: | LPR7-ECST-COMP03 | Date Received: | 07/26/11 |
| Sample Location: | Not Specified | Field Prep: | Not Specified |
| Matrix: | Tissue | Extraction Method: | ALPHA OP-018 |
| Analytical Method: | 1,8270C-SIM(M) | Extraction Date: | 07/28/11 12:19 |
| Analytical Date: | 08/06/11 15:35 | Cleanup Method1: | EPA 3611B |
| Analyst: | AC | Cleanup Date1: | 08/02/11 |
| Percent Solids: | Results reported on an 'AS RECEIVED' basis. | Cleanup Method2: | EPA 3640A |
| | | Cleanup Date2: | 08/02/11 |

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| PAHs - Mansfield Lab | | | | | | |
| Naphthalene | 0.937 | | ug/kg | 0.934 | 0.467 | 1 |
| C2-Naphthalenes | 2.24 | | ug/kg | 0.934 | 0.467 | 1 |
| C3-Naphthalenes | 4.68 | | ug/kg | 0.934 | 0.467 | 1 |
| C4-Naphthalenes | 7.42 | | ug/kg | 0.934 | 0.467 | 1 |
| 2-Methylnaphthalene | 0.494 | J | ug/kg | 0.934 | 0.467 | 1 |
| 1-Methylnaphthalene | 0.525 | J | ug/kg | 0.934 | 0.467 | 1 |
| 2,6-Dimethylnaphthalene | 0.530 | J | ug/kg | 0.934 | 0.467 | 1 |
| Acenaphthylene | ND | | ug/kg | 0.934 | 0.467 | 1 |
| Acenaphthene | 1.36 | | ug/kg | 0.934 | 0.467 | 1 |
| 2,3,5-Trimethylnaphthalene | ND | | ug/kg | 0.934 | 0.467 | 1 |
| Fluorene | 0.838 | J | ug/kg | 0.934 | 0.467 | 1 |
| C1-Fluorenes | 2.59 | | ug/kg | 0.934 | 0.467 | 1 |
| C2-Fluorenes | 7.04 | | ug/kg | 0.934 | 0.467 | 1 |
| C3-Fluorenes | 10.6 | | ug/kg | 0.934 | 0.467 | 1 |
| Dibenzothiophene | 0.543 | J | ug/kg | 0.934 | 0.467 | 1 |
| C1-Dibenzothiophenes | 2.33 | | ug/kg | 0.934 | 0.467 | 1 |
| C2-Dibenzothiophenes | 10.2 | | ug/kg | 0.934 | 0.467 | 1 |
| C3-Dibenzothiophenes | 10.9 | | ug/kg | 0.934 | 0.467 | 1 |
| C4-Dibenzothiophenes | 5.49 | | ug/kg | 0.934 | 0.467 | 1 |
| Phenanthrene | 6.71 | | ug/kg | 0.934 | 0.467 | 1 |
| C1-Phenanthrenes/Anthracenes | 16.3 | | ug/kg | 0.934 | 0.467 | 1 |
| C2-Phenanthrenes/Anthracenes | 27.5 | | ug/kg | 0.934 | 0.467 | 1 |
| C3-Phenanthrenes/Anthracenes | 19.2 | | ug/kg | 0.934 | 0.467 | 1 |
| C4-Phenanthrenes/Anthracenes | 8.81 | | ug/kg | 0.934 | 0.467 | 1 |
| Anthracene | 1.54 | | ug/kg | 0.934 | 0.467 | 1 |
| 1-Methylphenanthrene | 5.06 | | ug/kg | 0.934 | 0.467 | 1 |
| Fluoranthene | 35.4 | | ug/kg | 0.934 | 0.467 | 1 |
| Pyrene | 62.5 | | ug/kg | 0.934 | 0.467 | 1 |
| C1-Fluoranthenes/Pyrenes | 52.0 | | ug/kg | 0.934 | 0.467 | 1 |
| Benz(a)anthracene | 9.06 | | ug/kg | 0.934 | 0.467 | 1 |
| Chrysene | 43.9 | | ug/kg | 0.934 | 0.467 | 1 |

**Project Name:** PASSAIC RI/FS CAGED BIVALVE **Lab Number:** L1110328

**Project Number:** TASK23.2.1 **Report Date:** 10/19/11

## SAMPLE RESULTS

| | | | |
|---|---|---|---|
| Lab ID: | L1110328-04 | Date Collected: | 06/08/11 08:20 |
| Client ID: | LPR7-ECST-COMP03 | Date Received: | 07/26/11 |
| Sample Location: | Not Specified | Field Prep: | Not Specified |

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| PAHs - Mansfield Lab | | | | | | |
| C1-Benzanthracene/chrysenes | 15.4 | | ug/kg | 0.934 | 0.467 | 1 |
| C2-Benzanthracene/chrysenes | 6.06 | | ug/kg | 0.934 | 0.467 | 1 |
| C3-Benzanthracene/chrysenes | ND | | ug/kg | 0.934 | 0.467 | 1 |
| C4-Benzanthracene/chrysenes | ND | | ug/kg | 0.934 | 0.467 | 1 |
| Benzo(b)fluoranthene | 16.6 | | ug/kg | 0.934 | 0.467 | 1 |
| Benzo(j,k)fluoranthene | 7.62 | | ug/kg | 0.934 | 0.467 | 1 |
| Benzo(e)pyrene | 22.0 | | ug/kg | 0.934 | 0.467 | 1 |
| Benzo(a)pyrene | 6.96 | | ug/kg | 0.934 | 0.467 | 1 |
| Perylene | 1.78 | | ug/kg | 0.934 | 0.467 | 1 |
| Indeno(1,2,3-cd)pyrene | 1.69 | | ug/kg | 0.934 | 0.467 | 1 |
| Dibenz(a,c+a,h)anthracene | 0.916 | J | ug/kg | 0.934 | 0.467 | 1 |
| Benzo(g,h,i)perylene | 6.49 | | ug/kg | 0.934 | 0.467 | 1 |

| Surrogate | % Recovery | Qualifier | Acceptance Criteria |
|---|---|---|---|
| Naphthalene-d8 | 98 | | 50-130 |
| Phenanthrene-d10 | 105 | | 50-130 |
| Benzo(a)pyrene-d12 | 91 | | 50-130 |

**Project Name:** PASSAIC RI/FS CAGED BIVALVE **Lab Number:** L1110328

**Project Number:** TASK23.2.1 **Report Date:** 10/19/11

## SAMPLE RESULTS

| | | | |
|---|---|---|---|
| Lab ID: | L1110328-05 | Date Collected: | 06/08/11 07:55 |
| Client ID: | LPR7-ECST-COMP04 | Date Received: | 07/26/11 |
| Sample Location: | Not Specified | Field Prep: | Not Specified |
| Matrix: | Tissue | Extraction Method: | EPA 3570 |
| Analytical Method: | 1,8270C | Extraction Date: | 07/28/11 16:25 |
| Analytical Date: | 08/15/11 23:43 | Cleanup Method1: | EPA 3640A |
| Analyst: | AW | Cleanup Date1: | 08/03/11 |
| Percent Solids: | Results reported on an 'AS RECEIVED' basis. | | |

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| Semivolatile Organics by GC/MS - Mansfield Lab | | | | | | |
| Bis(2-chloroethyl)ether | ND | | ug/kg | 921 | 460. | 5 |
| Phenol | ND | | ug/kg | 921 | 460. | 5 |
| 2-Chlorophenol | ND | | ug/kg | 921 | 460. | 5 |
| Bis(2-chloroisopropyl)ether | ND | | ug/kg | 921 | 460. | 5 |
| 2-Methylphenol | ND | | ug/kg | 921 | 460. | 5 |
| Acetophenone | ND | | ug/kg | 921 | 460. | 5 |
| Hexachloroethane | ND | | ug/kg | 921 | 460. | 5 |
| N-Nitroso-di-n-propylamine | ND | | ug/kg | 921 | 460. | 5 |
| 4-Methylphenol | ND | | ug/kg | 921 | 460. | 5 |
| Nitrobenzene | ND | | ug/kg | 921 | 460. | 5 |
| Isophorone | ND | | ug/kg | 921 | 460. | 5 |
| 2-Nitrophenol | ND | | ug/kg | 921 | 460. | 5 |
| 2,4-Dimethylphenol | ND | | ug/kg | 921 | 460. | 5 |
| Bis(2-chloroethoxy)methane | ND | | ug/kg | 921 | 460. | 5 |
| 2,4-Dichlorophenol | ND | | ug/kg | 921 | 460. | 5 |
| Naphthalene | ND | | ug/kg | 921 | 460. | 5 |
| 4-Chloroaniline | ND | | ug/kg | 921 | 460. | 5 |
| Hexachlorobutadiene | ND | | ug/kg | 921 | 460. | 5 |
| Caprolactam | ND | | ug/kg | 921 | 460. | 5 |
| P-Chloro-M-Cresol | ND | | ug/kg | 921 | 460. | 5 |
| 2-Methylnaphthalene | ND | | ug/kg | 921 | 460. | 5 |
| Hexachlorocyclopentadiene | ND | | ug/kg | 921 | 460. | 5 |
| 2,4,6-Trichlorophenol | ND | | ug/kg | 921 | 460. | 5 |
| 2,4,5-Trichlorophenol | ND | | ug/kg | 921 | 460. | 5 |
| Biphenyl | ND | | ug/kg | 921 | 460. | 5 |
| 2-Chloronaphthalene | ND | | ug/kg | 921 | 460. | 5 |
| 2-Nitroaniline | ND | | ug/kg | 921 | 460. | 5 |
| Acenaphthylene | ND | | ug/kg | 921 | 460. | 5 |
| Dimethylphthalate | ND | | ug/kg | 921 | 460. | 5 |
| 2,6-Dinitrotoluene | ND | | ug/kg | 921 | 460. | 5 |
| Acenaphthene | ND | | ug/kg | 921 | 460. | 5 |

**Project Name:** PASSAIC RI/FS CAGED BIVALVE **Lab Number:** L1110328

**Project Number:** TASK23.2.1 **Report Date:** 10/19/11

## SAMPLE RESULTS

Lab ID: L1110328-05 Date Collected: 06/08/11 07:55

Client ID: LPR7-ECST-COMP04 Date Received: 07/26/11

Sample Location: Not Specified Field Prep: Not Specified

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| Semivolatile Organics by GC/MS - Mansfield Lab | | | | | | |
| 3-Nitroaniline | ND | | ug/kg | 921 | 460. | 5 |
| 2,4-Dinitrophenol | ND | | ug/kg | 3680 | 1840 | 5 |
| Dibenzofuran | ND | | ug/kg | 921 | 460. | 5 |
| 2,4-Dinitrotoluene | ND | | ug/kg | 921 | 460. | 5 |
| 4-Nitrophenol | ND | | ug/kg | 1840 | 921. | 5 |
| Fluorene | ND | | ug/kg | 921 | 460. | 5 |
| 4-Chlorophenyl-phenylether | ND | | ug/kg | 921 | 460. | 5 |
| Diethylphthalate | ND | | ug/kg | 921 | 460. | 5 |
| 4-Nitroaniline | ND | | ug/kg | 921 | 460. | 5 |
| 4,6-Dinitro-2-Methylphenol | ND | | ug/kg | 3680 | 1840 | 5 |
| NitrosoDiPhenylAmine(NDPA)/DPA | ND | | ug/kg | 921 | 460. | 5 |
| 4-Bromophenyl-phenylether | ND | | ug/kg | 921 | 460. | 5 |
| Hexachlorobenzene | ND | | ug/kg | 921 | 460. | 5 |
| Atrazine | ND | | ug/kg | 921 | 460. | 5 |
| Pentachlorophenol | ND | | ug/kg | 3680 | 1840 | 5 |
| Phenanthrene | ND | | ug/kg | 921 | 460. | 5 |
| Anthracene | ND | | ug/kg | 921 | 460. | 5 |
| Carbazole | ND | | ug/kg | 921 | 460. | 5 |
| Di-n-butylphthalate | ND | | ug/kg | 921 | 460. | 5 |
| Fluoranthene | ND | | ug/kg | 921 | 460. | 5 |
| Pyrene | ND | | ug/kg | 921 | 460. | 5 |
| Butylbenzylphthalate | ND | | ug/kg | 921 | 460. | 5 |
| 3,3'-Dichlorobenzidine | ND | | ug/kg | 921 | 460. | 5 |
| Benz(a)anthracene | ND | | ug/kg | 921 | 460. | 5 |
| Chrysene | ND | | ug/kg | 921 | 460. | 5 |
| Bis(2-Ethylhexyl)phthalate | ND | | ug/kg | 921 | 460. | 5 |
| Di-n-octylphthalate | ND | | ug/kg | 921 | 460. | 5 |
| Benzo(b)fluoranthene | ND | | ug/kg | 921 | 460. | 5 |
| Benzo(k)fluoranthene | ND | | ug/kg | 921 | 460. | 5 |
| Benzo(a)pyrene | ND | | ug/kg | 921 | 460. | 5 |
| Indeno(1,2,3-cd)Pyrene | ND | | ug/kg | 921 | 460. | 5 |
| Dibenz(a,h)anthracene | ND | | ug/kg | 921 | 460. | 5 |
| Benzo(ghi)perylene | ND | | ug/kg | 921 | 460. | 5 |

**Project Name:** PASSAIC RI/FS CAGED BIVALVE **Lab Number:** L1110328

**Project Number:** TASK23.2.1 **Report Date:** 10/19/11

## SAMPLE RESULTS

| | | | |
|---|---|---|---|
| Lab ID: | L1110328-05 | Date Collected: | 06/08/11 07:55 |
| Client ID: | LPR7-ECST-COMP04 | Date Received: | 07/26/11 |
| Sample Location: | Not Specified | Field Prep: | Not Specified |

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| Semivolatile Organics by GC/MS - Mansfield Lab | | | | | | |

| Surrogate | % Recovery | Qualifier | Acceptance Criteria |
|---|---|---|---|
| 2-Fluorobiphenyl | 70 | | 30-130 |
| Phenol-d5 | 79 | | 30-130 |
| Nitrobenzene-d5 | 84 | | 30-130 |
| 2-Fluorophenol | 74 | | 30-130 |
| 2,4,6-Tribromophenol | 71 | | 30-130 |
| Terphenyl-d14 | 73 | | 30-130 |

**Project Name:** PASSAIC RI/FS CAGED BIVALVE **Lab Number:** L1110328

**Project Number:** TASK23.2.1 **Report Date:** 10/19/11

## SAMPLE RESULTS

| | | | |
|---|---|---|---|
| Lab ID: | L1110328-05 | Date Collected: | 06/08/11 07:55 |
| Client ID: | LPR7-ECST-COMP04 | Date Received: | 07/26/11 |
| Sample Location: | Not Specified | Field Prep: | Not Specified |
| Matrix: | Tissue | Extraction Method: | EPA 3570 |
| Analytical Method: | 1,8270C | Extraction Date: | 09/12/11 09:03 |
| Analytical Date: | 09/16/11 00:40 | Cleanup Method1: | EPA 3640A |
| Analyst: | AW | Cleanup Date1: | 09/14/11 |
| Percent Solids: | Results reported on an 'AS RECEIVED' basis. | | |

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| Semivolatile Organics by GC/MS - Mansfield Lab | | | | | | |
| Benzaldehyde | 14700 | | ug/kg | 2000 | 1000 | 5 |

| Surrogate | % Recovery | Qualifier | Acceptance Criteria |
|---|---|---|---|
| 2-Fluorobiphenyl | 73 | | 30-130 |
| Nitrobenzene-d5 | 81 | | 30-130 |
| Terphenyl-d14 | 78 | | 30-130 |

**Project Name:** PASSAIC RI/FS CAGED BIVALVE **Lab Number:** L1110328

**Project Number:** TASK23.2.1 **Report Date:** 10/19/11

## SAMPLE RESULTS

| | | | |
|---|---|---|---|
| Lab ID: | L1110328-05 | Date Collected: | 06/08/11 07:55 |
| Client ID: | LPR7-ECST-COMP04 | Date Received: | 07/26/11 |
| Sample Location: | Not Specified | Field Prep: | Not Specified |
| Matrix: | Tissue | Extraction Method: | ALPHA OP-018 |
| Analytical Method: | 1,8270C-SIM(M) | Extraction Date: | 07/28/11 12:19 |
| Analytical Date: | 08/06/11 17:03 | Cleanup Method1: | EPA 3611B |
| Analyst: | AC | Cleanup Date1: | 08/02/11 |
| Percent Solids: | Results reported on an 'AS RECEIVED' basis. | Cleanup Method2: | EPA 3640A |
| | | Cleanup Date2: | 08/02/11 |

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| PAHs - Mansfield Lab | | | | | | |
| Naphthalene | 0.995 | | ug/kg | 0.929 | 0.465 | 1 |
| C2-Naphthalenes | 2.60 | | ug/kg | 0.929 | 0.465 | 1 |
| C3-Naphthalenes | 5.10 | | ug/kg | 0.929 | 0.465 | 1 |
| C4-Naphthalenes | 7.26 | | ug/kg | 0.929 | 0.465 | 1 |
| 2-Methylnaphthalene | 0.491 | J | ug/kg | 0.929 | 0.465 | 1 |
| 1-Methylnaphthalene | 0.600 | J | ug/kg | 0.929 | 0.465 | 1 |
| 2,6-Dimethylnaphthalene | 0.641 | J | ug/kg | 0.929 | 0.465 | 1 |
| Acenaphthylene | ND | | ug/kg | 0.929 | 0.465 | 1 |
| Acenaphthene | 1.44 | | ug/kg | 0.929 | 0.465 | 1 |
| 2,3,5-Trimethylnaphthalene | 0.516 | J | ug/kg | 0.929 | 0.465 | 1 |
| Fluorene | 0.872 | J | ug/kg | 0.929 | 0.465 | 1 |
| C1-Fluorenes | 2.56 | | ug/kg | 0.929 | 0.465 | 1 |
| C2-Fluorenes | 6.85 | | ug/kg | 0.929 | 0.465 | 1 |
| C3-Fluorenes | 10.2 | | ug/kg | 0.929 | 0.465 | 1 |
| Dibenzothiophene | 0.590 | J | ug/kg | 0.929 | 0.465 | 1 |
| C1-Dibenzothiophenes | 2.96 | | ug/kg | 0.929 | 0.465 | 1 |
| C2-Dibenzothiophenes | 10.8 | | ug/kg | 0.929 | 0.465 | 1 |
| C3-Dibenzothiophenes | 11.6 | | ug/kg | 0.929 | 0.465 | 1 |
| C4-Dibenzothiophenes | 5.90 | | ug/kg | 0.929 | 0.465 | 1 |
| Phenanthrene | 8.00 | | ug/kg | 0.929 | 0.465 | 1 |
| C1-Phenanthrenes/Anthracenes | 19.6 | | ug/kg | 0.929 | 0.465 | 1 |
| C2-Phenanthrenes/Anthracenes | 30.3 | | ug/kg | 0.929 | 0.465 | 1 |
| C3-Phenanthrenes/Anthracenes | 20.4 | | ug/kg | 0.929 | 0.465 | 1 |
| C4-Phenanthrenes/Anthracenes | 8.28 | | ug/kg | 0.929 | 0.465 | 1 |
| Anthracene | 1.51 | | ug/kg | 0.929 | 0.465 | 1 |
| 1-Methylphenanthrene | 5.48 | | ug/kg | 0.929 | 0.465 | 1 |
| Fluoranthene | 39.3 | | ug/kg | 0.929 | 0.465 | 1 |
| Pyrene | 69.4 | | ug/kg | 0.929 | 0.465 | 1 |
| C1-Fluoranthenes/Pyrenes | 60.3 | | ug/kg | 0.929 | 0.465 | 1 |
| Benz(a)anthracene | 10.5 | | ug/kg | 0.929 | 0.465 | 1 |
| Chrysene | 49.3 | | ug/kg | 0.929 | 0.465 | 1 |

**Project Name:** PASSAIC RI/FS CAGED BIVALVE **Lab Number:** L1110328

**Project Number:** TASK23.2.1 **Report Date:** 10/19/11

## SAMPLE RESULTS

| | | | |
|---|---|---|---|
| Lab ID: | L1110328-05 | Date Collected: | 06/08/11 07:55 |
| Client ID: | LPR7-ECST-COMP04 | Date Received: | 07/26/11 |
| Sample Location: | Not Specified | Field Prep: | Not Specified |

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| PAHs - Mansfield Lab | | | | | | |
| C1-Benzanthracene/chrysenes | 17.9 | | ug/kg | 0.929 | 0.465 | 1 |
| C2-Benzanthracene/chrysenes | 6.54 | | ug/kg | 0.929 | 0.465 | 1 |
| C3-Benzanthracene/chrysenes | 6.02 | | ug/kg | 0.929 | 0.465 | 1 |
| C4-Benzanthracene/chrysenes | ND | | ug/kg | 0.929 | 0.465 | 1 |
| Benzo(b)fluoranthene | 18.3 | | ug/kg | 0.929 | 0.465 | 1 |
| Benzo(j,k)fluoranthene | 8.22 | | ug/kg | 0.929 | 0.465 | 1 |
| Benzo(e)pyrene | 24.1 | | ug/kg | 0.929 | 0.465 | 1 |
| Benzo(a)pyrene | 7.96 | | ug/kg | 0.929 | 0.465 | 1 |
| Perylene | 2.10 | | ug/kg | 0.929 | 0.465 | 1 |
| Indeno(1,2,3-cd)pyrene | 1.82 | | ug/kg | 0.929 | 0.465 | 1 |
| Dibenz(a,c+a,h)anthracene | 0.783 | J | ug/kg | 0.929 | 0.465 | 1 |
| Benzo(g,h,i)perylene | 6.85 | | ug/kg | 0.929 | 0.465 | 1 |

| Surrogate | % Recovery | Qualifier | Acceptance Criteria |
|---|---|---|---|
| Naphthalene-d8 | 87 | | 50-130 |
| Phenanthrene-d10 | 99 | | 50-130 |
| Benzo(a)pyrene-d12 | 87 | | 50-130 |

**Project Name:** PASSAIC RI/FS CAGED BIVALVE **Lab Number:** L1110328

**Project Number:** TASK23.2.1 **Report Date:** 10/19/11

## SAMPLE RESULTS

| | | | |
|---|---|---|---|
| Lab ID: | L1110328-06 | Date Collected: | 06/08/11 07:40 |
| Client ID: | LPR8-ECST-COMP05 | Date Received: | 07/26/11 |
| Sample Location: | Not Specified | Field Prep: | Not Specified |
| Matrix: | Tissue | Extraction Method: | EPA 3570 |
| Analytical Method: | 1,8270C | Extraction Date: | 07/28/11 16:25 |
| Analytical Date: | 08/16/11 00:33 | Cleanup Method1: | EPA 3640A |
| Analyst: | AW | Cleanup Date1: | 08/03/11 |
| Percent Solids: | Results reported on an 'AS RECEIVED' basis. | | |

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| Semivolatile Organics by GC/MS - Mansfield Lab | | | | | | |
| Bis(2-chloroethyl)ether | ND | | ug/kg | 947 | 473. | 5 |
| Phenol | ND | | ug/kg | 947 | 473. | 5 |
| 2-Chlorophenol | ND | | ug/kg | 947 | 473. | 5 |
| Bis(2-chloroisopropyl)ether | ND | | ug/kg | 947 | 473. | 5 |
| 2-Methylphenol | ND | | ug/kg | 947 | 473. | 5 |
| Acetophenone | ND | | ug/kg | 947 | 473. | 5 |
| Hexachloroethane | ND | | ug/kg | 947 | 473. | 5 |
| N-Nitroso-di-n-propylamine | ND | | ug/kg | 947 | 473. | 5 |
| 4-Methylphenol | ND | | ug/kg | 947 | 473. | 5 |
| Nitrobenzene | ND | | ug/kg | 947 | 473. | 5 |
| Isophorone | ND | | ug/kg | 947 | 473. | 5 |
| 2-Nitrophenol | ND | | ug/kg | 947 | 473. | 5 |
| 2,4-Dimethylphenol | ND | | ug/kg | 947 | 473. | 5 |
| Bis(2-chloroethoxy)methane | ND | | ug/kg | 947 | 473. | 5 |
| 2,4-Dichlorophenol | ND | | ug/kg | 947 | 473. | 5 |
| Naphthalene | ND | | ug/kg | 947 | 473. | 5 |
| 4-Chloroaniline | ND | | ug/kg | 947 | 473. | 5 |
| Hexachlorobutadiene | ND | | ug/kg | 947 | 473. | 5 |
| Caprolactam | ND | | ug/kg | 947 | 473. | 5 |
| P-Chloro-M-Cresol | ND | | ug/kg | 947 | 473. | 5 |
| 2-Methylnaphthalene | ND | | ug/kg | 947 | 473. | 5 |
| Hexachlorocyclopentadiene | ND | | ug/kg | 947 | 473. | 5 |
| 2,4,6-Trichlorophenol | ND | | ug/kg | 947 | 473. | 5 |
| 2,4,5-Trichlorophenol | ND | | ug/kg | 947 | 473. | 5 |
| Biphenyl | ND | | ug/kg | 947 | 473. | 5 |
| 2-Chloronaphthalene | ND | | ug/kg | 947 | 473. | 5 |
| 2-Nitroaniline | ND | | ug/kg | 947 | 473. | 5 |
| Acenaphthylene | ND | | ug/kg | 947 | 473. | 5 |
| Dimethylphthalate | ND | | ug/kg | 947 | 473. | 5 |
| 2,6-Dinitrotoluene | ND | | ug/kg | 947 | 473. | 5 |
| Acenaphthene | ND | | ug/kg | 947 | 473. | 5 |

**Project Name:** PASSAIC RI/FS CAGED BIVALVE **Lab Number:** L1110328

**Project Number:** TASK23.2.1 **Report Date:** 10/19/11

## SAMPLE RESULTS

Lab ID: L1110328-06 Date Collected: 06/08/11 07:40

Client ID: LPR8-ECST-COMP05 Date Received: 07/26/11

Sample Location: Not Specified Field Prep: Not Specified

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| Semivolatile Organics by GC/MS - Mansfield Lab | | | | | | |
| 3-Nitroaniline | ND | | ug/kg | 947 | 473. | 5 |
| 2,4-Dinitrophenol | ND | | ug/kg | 3790 | 1890 | 5 |
| Dibenzofuran | ND | | ug/kg | 947 | 473. | 5 |
| 2,4-Dinitrotoluene | ND | | ug/kg | 947 | 473. | 5 |
| 4-Nitrophenol | ND | | ug/kg | 1890 | 947. | 5 |
| Fluorene | ND | | ug/kg | 947 | 473. | 5 |
| 4-Chlorophenyl-phenylether | ND | | ug/kg | 947 | 473. | 5 |
| Diethylphthalate | ND | | ug/kg | 947 | 473. | 5 |
| 4-Nitroaniline | ND | | ug/kg | 947 | 473. | 5 |
| 4,6-Dinitro-2-Methylphenol | ND | | ug/kg | 3790 | 1890 | 5 |
| NitrosoDiPhenylAmine(NDPA)/DPA | ND | | ug/kg | 947 | 473. | 5 |
| 4-Bromophenyl-phenylether | ND | | ug/kg | 947 | 473. | 5 |
| Hexachlorobenzene | ND | | ug/kg | 947 | 473. | 5 |
| Atrazine | ND | | ug/kg | 947 | 473. | 5 |
| Pentachlorophenol | ND | | ug/kg | 3790 | 1890 | 5 |
| Phenanthrene | ND | | ug/kg | 947 | 473. | 5 |
| Anthracene | ND | | ug/kg | 947 | 473. | 5 |
| Carbazole | ND | | ug/kg | 947 | 473. | 5 |
| Di-n-butylphthalate | ND | | ug/kg | 947 | 473. | 5 |
| Fluoranthene | ND | | ug/kg | 947 | 473. | 5 |
| Pyrene | ND | | ug/kg | 947 | 473. | 5 |
| Butylbenzylphthalate | ND | | ug/kg | 947 | 473. | 5 |
| 3,3'-Dichlorobenzidine | ND | | ug/kg | 947 | 473. | 5 |
| Benz(a)anthracene | ND | | ug/kg | 947 | 473. | 5 |
| Chrysene | ND | | ug/kg | 947 | 473. | 5 |
| Bis(2-Ethylhexyl)phthalate | ND | | ug/kg | 947 | 473. | 5 |
| Di-n-octylphthalate | ND | | ug/kg | 947 | 473. | 5 |
| Benzo(b)fluoranthene | ND | | ug/kg | 947 | 473. | 5 |
| Benzo(k)fluoranthene | ND | | ug/kg | 947 | 473. | 5 |
| Benzo(a)pyrene | ND | | ug/kg | 947 | 473. | 5 |
| Indeno(1,2,3-cd)Pyrene | ND | | ug/kg | 947 | 473. | 5 |
| Dibenz(a,h)anthracene | ND | | ug/kg | 947 | 473. | 5 |
| Benzo(ghi)perylene | ND | | ug/kg | 947 | 473. | 5 |

**Project Name:** PASSAIC RI/FS CAGED BIVALVE **Lab Number:** L1110328

**Project Number:** TASK23.2.1 **Report Date:** 10/19/11

## SAMPLE RESULTS

| | | | |
|---|---|---|---|
| Lab ID: | L1110328-06 | Date Collected: | 06/08/11 07:40 |
| Client ID: | LPR8-ECST-COMP05 | Date Received: | 07/26/11 |
| Sample Location: | Not Specified | Field Prep: | Not Specified |

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|

Semivolatile Organics by GC/MS - Mansfield Lab

| Surrogate | % Recovery | Qualifier | Acceptance Criteria |
|---|---|---|---|
| 2-Fluorobiphenyl | 71 | | 30-130 |
| Phenol-d5 | 81 | | 30-130 |
| Nitrobenzene-d5 | 86 | | 30-130 |
| 2-Fluorophenol | 77 | | 30-130 |
| 2,4,6-Tribromophenol | 78 | | 30-130 |
| Terphenyl-d14 | 73 | | 30-130 |

**Project Name:** PASSAIC RI/FS CAGED BIVALVE **Lab Number:** L1110328

**Project Number:** TASK23.2.1 **Report Date:** 10/19/11

## SAMPLE RESULTS

| | | | |
|---|---|---|---|
| Lab ID: | L1110328-06 | Date Collected: | 06/08/11 07:40 |
| Client ID: | LPR8-ECST-COMP05 | Date Received: | 07/26/11 |
| Sample Location: | Not Specified | Field Prep: | Not Specified |
| Matrix: | Tissue | Extraction Method: | EPA 3570 |
| Analytical Method: | 1,8270C | Extraction Date: | 09/12/11 13:00 |
| Analytical Date: | 09/16/11 01:30 | Cleanup Method1: | EPA 3640A |
| Analyst: | AW | Cleanup Date1: | 09/14/11 |
| Percent Solids: | Results reported on an 'AS RECEIVED' basis. | | |

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| Semivolatile Organics by GC/MS - Mansfield Lab | | | | | | |
| Benzaldehyde | 8980 | | ug/kg | 1850 | 924. | 5 |

| Surrogate | % Recovery | Qualifier | Acceptance Criteria |
|---|---|---|---|
| 2-Fluorobiphenyl | 72 | | 30-130 |
| Nitrobenzene-d5 | 80 | | 30-130 |
| Terphenyl-d14 | 78 | | 30-130 |

**Project Name:** PASSAIC RI/FS CAGED BIVALVE **Lab Number:** L1110328

**Project Number:** TASK23.2.1 **Report Date:** 10/19/11

## SAMPLE RESULTS

| | | | |
|---|---|---|---|
| Lab ID: | L1110328-06 | Date Collected: | 06/08/11 07:40 |
| Client ID: | LPR8-ECST-COMP05 | Date Received: | 07/26/11 |
| Sample Location: | Not Specified | Field Prep: | Not Specified |
| Matrix: | Tissue | Extraction Method: | ALPHA OP-018 |
| Analytical Method: | 1,8270C-SIM(M) | Extraction Date: | 07/28/11 12:19 |
| Analytical Date: | 08/06/11 18:32 | Cleanup Method1: | EPA 3611B |
| Analyst: | AC | Cleanup Date1: | 08/02/11 |
| Percent Solids: | Results reported on an 'AS RECEIVED' basis. | Cleanup Method2: | EPA 3640A |
| | | Cleanup Date2: | 08/02/11 |

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| PAHs - Mansfield Lab | | | | | | |
| Naphthalene | 1.75 | | ug/kg | 0.947 | 0.473 | 1 |
| C2-Naphthalenes | 3.05 | | ug/kg | 0.947 | 0.473 | 1 |
| C3-Naphthalenes | 5.70 | | ug/kg | 0.947 | 0.473 | 1 |
| C4-Naphthalenes | 6.90 | | ug/kg | 0.947 | 0.473 | 1 |
| 2-Methylnaphthalene | 0.902 | J | ug/kg | 0.947 | 0.473 | 1 |
| 1-Methylnaphthalene | 1.05 | | ug/kg | 0.947 | 0.473 | 1 |
| 2,6-Dimethylnaphthalene | 0.856 | J | ug/kg | 0.947 | 0.473 | 1 |
| Acenaphthylene | ND | | ug/kg | 0.947 | 0.473 | 1 |
| Acenaphthene | 2.26 | | ug/kg | 0.947 | 0.473 | 1 |
| 2,3,5-Trimethylnaphthalene | 0.569 | J | ug/kg | 0.947 | 0.473 | 1 |
| Fluorene | 1.20 | | ug/kg | 0.947 | 0.473 | 1 |
| C1-Fluorenes | 2.93 | | ug/kg | 0.947 | 0.473 | 1 |
| C2-Fluorenes | 8.06 | | ug/kg | 0.947 | 0.473 | 1 |
| C3-Fluorenes | 11.7 | | ug/kg | 0.947 | 0.473 | 1 |
| Dibenzothiophene | 0.735 | J | ug/kg | 0.947 | 0.473 | 1 |
| C1-Dibenzothiophenes | 2.70 | | ug/kg | 0.947 | 0.473 | 1 |
| C2-Dibenzothiophenes | 11.4 | | ug/kg | 0.947 | 0.473 | 1 |
| C3-Dibenzothiophenes | 12.1 | | ug/kg | 0.947 | 0.473 | 1 |
| C4-Dibenzothiophenes | 5.39 | | ug/kg | 0.947 | 0.473 | 1 |
| Phenanthrene | 9.59 | | ug/kg | 0.947 | 0.473 | 1 |
| C1-Phenanthrenes/Anthracenes | 21.6 | | ug/kg | 0.947 | 0.473 | 1 |
| C2-Phenanthrenes/Anthracenes | 29.8 | | ug/kg | 0.947 | 0.473 | 1 |
| C3-Phenanthrenes/Anthracenes | 18.5 | | ug/kg | 0.947 | 0.473 | 1 |
| C4-Phenanthrenes/Anthracenes | 7.50 | | ug/kg | 0.947 | 0.473 | 1 |
| Anthracene | 1.79 | | ug/kg | 0.947 | 0.473 | 1 |
| 1-Methylphenanthrene | 6.97 | | ug/kg | 0.947 | 0.473 | 1 |
| Fluoranthene | 40.2 | | ug/kg | 0.947 | 0.473 | 1 |
| Pyrene | 68.6 | | ug/kg | 0.947 | 0.473 | 1 |
| C1-Fluoranthenes/Pyrenes | 60.3 | | ug/kg | 0.947 | 0.473 | 1 |
| Benz(a)anthracene | 9.24 | | ug/kg | 0.947 | 0.473 | 1 |
| Chrysene | 47.2 | | ug/kg | 0.947 | 0.473 | 1 |

**Project Name:** PASSAIC RI/FS CAGED BIVALVE **Lab Number:** L1110328

**Project Number:** TASK23.2.1 **Report Date:** 10/19/11

## SAMPLE RESULTS

| | | | |
|---|---|---|---|
| Lab ID: | L1110328-06 | Date Collected: | 06/08/11 07:40 |
| Client ID: | LPR8-ECST-COMP05 | Date Received: | 07/26/11 |
| Sample Location: | Not Specified | Field Prep: | Not Specified |

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| PAHs - Mansfield Lab | | | | | | |
| C1-Benzanthracene/chrysenes | 17.6 | | ug/kg | 0.947 | 0.473 | 1 |
| C2-Benzanthracene/chrysenes | 6.71 | | ug/kg | 0.947 | 0.473 | 1 |
| C3-Benzanthracene/chrysenes | 5.81 | | ug/kg | 0.947 | 0.473 | 1 |
| C4-Benzanthracene/chrysenes | ND | | ug/kg | 0.947 | 0.473 | 1 |
| Benzo(b)fluoranthene | 17.7 | | ug/kg | 0.947 | 0.473 | 1 |
| Benzo(j,k)fluoranthene | 6.73 | | ug/kg | 0.947 | 0.473 | 1 |
| Benzo(e)pyrene | 22.4 | | ug/kg | 0.947 | 0.473 | 1 |
| Benzo(a)pyrene | 6.58 | | ug/kg | 0.947 | 0.473 | 1 |
| Perylene | 1.98 | | ug/kg | 0.947 | 0.473 | 1 |
| Indeno(1,2,3-cd)pyrene | 1.91 | | ug/kg | 0.947 | 0.473 | 1 |
| Dibenz(a,c+a,h)anthracene | 0.885 | J | ug/kg | 0.947 | 0.473 | 1 |
| Benzo(g,h,i)perylene | 6.22 | | ug/kg | 0.947 | 0.473 | 1 |

| Surrogate | % Recovery | Qualifier | Acceptance Criteria |
|---|---|---|---|
| Naphthalene-d8 | 87 | | 50-130 |
| Phenanthrene-d10 | 99 | | 50-130 |
| Benzo(a)pyrene-d12 | 90 | | 50-130 |

**Project Name:** PASSAIC RI/FS CAGED BIVALVE **Lab Number:** L1110328

**Project Number:** TASK23.2.1 **Report Date:** 10/19/11

## SAMPLE RESULTS

| | | | |
|---|---|---|---|
| Lab ID: | L1110328-07 | Date Collected: | 05/09/11 10:20 |
| Client ID: | LPR1-GDST-COMP01 | Date Received: | 07/26/11 |
| Sample Location: | Not Specified | Field Prep: | Not Specified |
| Matrix: | Tissue | Extraction Method: | EPA 3570 |
| Analytical Method: | 1,8270C | Extraction Date: | 07/28/11 16:25 |
| Analytical Date: | 08/16/11 01:22 | Cleanup Method1: | EPA 3640A |
| Analyst: | AW | Cleanup Date1: | 08/03/11 |
| Percent Solids: | Results reported on an 'AS RECEIVED' basis. | | |

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| Semivolatile Organics by GC/MS - Mansfield Lab | | | | | | |
| Bis(2-chloroethyl)ether | ND | | ug/kg | 902 | 451. | 5 |
| Phenol | ND | | ug/kg | 902 | 451. | 5 |
| 2-Chlorophenol | ND | | ug/kg | 902 | 451. | 5 |
| Bis(2-chloroisopropyl)ether | ND | | ug/kg | 902 | 451. | 5 |
| 2-Methylphenol | ND | | ug/kg | 902 | 451. | 5 |
| Acetophenone | ND | | ug/kg | 902 | 451. | 5 |
| Hexachloroethane | ND | | ug/kg | 902 | 451. | 5 |
| N-Nitroso-di-n-propylamine | ND | | ug/kg | 902 | 451. | 5 |
| 4-Methylphenol | ND | | ug/kg | 902 | 451. | 5 |
| Nitrobenzene | ND | | ug/kg | 902 | 451. | 5 |
| Isophorone | ND | | ug/kg | 902 | 451. | 5 |
| 2-Nitrophenol | ND | | ug/kg | 902 | 451. | 5 |
| 2,4-Dimethylphenol | ND | | ug/kg | 902 | 451. | 5 |
| Bis(2-chloroethoxy)methane | ND | | ug/kg | 902 | 451. | 5 |
| 2,4-Dichlorophenol | ND | | ug/kg | 902 | 451. | 5 |
| Naphthalene | ND | | ug/kg | 902 | 451. | 5 |
| 4-Chloroaniline | ND | | ug/kg | 902 | 451. | 5 |
| Hexachlorobutadiene | ND | | ug/kg | 902 | 451. | 5 |
| Caprolactam | ND | | ug/kg | 902 | 451. | 5 |
| P-Chloro-M-Cresol | ND | | ug/kg | 902 | 451. | 5 |
| 2-Methylnaphthalene | ND | | ug/kg | 902 | 451. | 5 |
| Hexachlorocyclopentadiene | ND | | ug/kg | 902 | 451. | 5 |
| 2,4,6-Trichlorophenol | ND | | ug/kg | 902 | 451. | 5 |
| 2,4,5-Trichlorophenol | ND | | ug/kg | 902 | 451. | 5 |
| Biphenyl | ND | | ug/kg | 902 | 451. | 5 |
| 2-Chloronaphthalene | ND | | ug/kg | 902 | 451. | 5 |
| 2-Nitroaniline | ND | | ug/kg | 902 | 451. | 5 |
| Acenaphthylene | ND | | ug/kg | 902 | 451. | 5 |
| Dimethylphthalate | ND | | ug/kg | 902 | 451. | 5 |
| 2,6-Dinitrotoluene | ND | | ug/kg | 902 | 451. | 5 |
| Acenaphthene | ND | | ug/kg | 902 | 451. | 5 |

**Project Name:** PASSAIC RI/FS CAGED BIVALVE **Lab Number:** L1110328

**Project Number:** TASK23.2.1 **Report Date:** 10/19/11

## SAMPLE RESULTS

Lab ID: L1110328-07 Date Collected: 05/09/11 10:20

Client ID: LPR1-GDST-COMP01 Date Received: 07/26/11

Sample Location: Not Specified Field Prep: Not Specified

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| Semivolatile Organics by GC/MS - Mansfield Lab | | | | | | |
| 3-Nitroaniline | ND | | ug/kg | 902 | 451. | 5 |
| 2,4-Dinitrophenol | ND | | ug/kg | 3610 | 1800 | 5 |
| Dibenzofuran | ND | | ug/kg | 902 | 451. | 5 |
| 2,4-Dinitrotoluene | ND | | ug/kg | 902 | 451. | 5 |
| 4-Nitrophenol | ND | | ug/kg | 1800 | 902. | 5 |
| Fluorene | ND | | ug/kg | 902 | 451. | 5 |
| 4-Chlorophenyl-phenylether | ND | | ug/kg | 902 | 451. | 5 |
| Diethylphthalate | ND | | ug/kg | 902 | 451. | 5 |
| 4-Nitroaniline | ND | | ug/kg | 902 | 451. | 5 |
| 4,6-Dinitro-2-Methylphenol | ND | | ug/kg | 3610 | 1800 | 5 |
| NitrosoDiPhenylAmine(NDPA)/DPA | ND | | ug/kg | 902 | 451. | 5 |
| 4-Bromophenyl-phenylether | ND | | ug/kg | 902 | 451. | 5 |
| Hexachlorobenzene | ND | | ug/kg | 902 | 451. | 5 |
| Atrazine | ND | | ug/kg | 902 | 451. | 5 |
| Pentachlorophenol | ND | | ug/kg | 3610 | 1800 | 5 |
| Phenanthrene | ND | | ug/kg | 902 | 451. | 5 |
| Anthracene | ND | | ug/kg | 902 | 451. | 5 |
| Carbazole | ND | | ug/kg | 902 | 451. | 5 |
| Di-n-butylphthalate | ND | | ug/kg | 902 | 451. | 5 |
| Fluoranthene | ND | | ug/kg | 902 | 451. | 5 |
| Pyrene | ND | | ug/kg | 902 | 451. | 5 |
| Butylbenzylphthalate | ND | | ug/kg | 902 | 451. | 5 |
| 3,3'-Dichlorobenzidine | ND | | ug/kg | 902 | 451. | 5 |
| Benz(a)anthracene | ND | | ug/kg | 902 | 451. | 5 |
| Chrysene | ND | | ug/kg | 902 | 451. | 5 |
| Bis(2-Ethylhexyl)phthalate | ND | | ug/kg | 902 | 451. | 5 |
| Di-n-octylphthalate | ND | | ug/kg | 902 | 451. | 5 |
| Benzo(b)fluoranthene | ND | | ug/kg | 902 | 451. | 5 |
| Benzo(k)fluoranthene | ND | | ug/kg | 902 | 451. | 5 |
| Benzo(a)pyrene | ND | | ug/kg | 902 | 451. | 5 |
| Indeno(1,2,3-cd)Pyrene | ND | | ug/kg | 902 | 451. | 5 |
| Dibenz(a,h)anthracene | ND | | ug/kg | 902 | 451. | 5 |
| Benzo(ghi)perylene | ND | | ug/kg | 902 | 451. | 5 |

**Project Name:** PASSAIC RI/FS CAGED BIVALVE **Lab Number:** L1110328

**Project Number:** TASK23.2.1 **Report Date:** 10/19/11

## SAMPLE RESULTS

| | | | |
|---|---|---|---|
| Lab ID: | L1110328-07 | Date Collected: | 05/09/11 10:20 |
| Client ID: | LPR1-GDST-COMP01 | Date Received: | 07/26/11 |
| Sample Location: | Not Specified | Field Prep: | Not Specified |

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| Semivolatile Organics by GC/MS - Mansfield Lab | | | | | | |

| Surrogate | % Recovery | Qualifier | Acceptance Criteria |
|---|---|---|---|
| 2-Fluorobiphenyl | 67 | | 30-130 |
| Phenol-d5 | 83 | | 30-130 |
| Nitrobenzene-d5 | 82 | | 30-130 |
| 2-Fluorophenol | 81 | | 30-130 |
| 2,4,6-Tribromophenol | 77 | | 30-130 |
| Terphenyl-d14 | 72 | | 30-130 |

**Project Name:** PASSAIC RI/FS CAGED BIVALVE **Lab Number:** L1110328

**Project Number:** TASK23.2.1 **Report Date:** 10/19/11

## SAMPLE RESULTS

| | | | |
|---|---|---|---|
| Lab ID: | L1110328-07 | Date Collected: | 05/09/11 10:20 |
| Client ID: | LPR1-GDST-COMP01 | Date Received: | 07/26/11 |
| Sample Location: | Not Specified | Field Prep: | Not Specified |
| Matrix: | Tissue | Extraction Method: | EPA 3570 |
| Analytical Method: | 1,8270C | Extraction Date: | 09/12/11 13:00 |
| Analytical Date: | 09/16/11 02:20 | Cleanup Method1: | EPA 3640A |
| Analyst: | AW | Cleanup Date1: | 09/14/11 |
| Percent Solids: | Results reported on an 'AS RECEIVED' basis. | | |

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| Semivolatile Organics by GC/MS - Mansfield Lab | | | | | | |
| Benzaldehyde | ND | | ug/kg | 1750 | 877. | 5 |

| Surrogate | % Recovery | Qualifier | Acceptance Criteria |
|---|---|---|---|
| 2-Fluorobiphenyl | 75 | | 30-130 |
| Nitrobenzene-d5 | 85 | | 30-130 |
| Terphenyl-d14 | 82 | | 30-130 |

**Project Name:** PASSAIC RI/FS CAGED BIVALVE **Lab Number:** L1110328

**Project Number:** TASK23.2.1 **Report Date:** 10/19/11

## SAMPLE RESULTS

| | | | |
|---|---|---|---|
| Lab ID: | L1110328-07 | Date Collected: | 05/09/11 10:20 |
| Client ID: | LPR1-GDST-COMP01 | Date Received: | 07/26/11 |
| Sample Location: | Not Specified | Field Prep: | Not Specified |
| Matrix: | Tissue | Extraction Method: | ALPHA OP-018 |
| Analytical Method: | 1,8270C-SIM(M) | Extraction Date: | 07/28/11 12:19 |
| Analytical Date: | 08/06/11 20:01 | Cleanup Method1: | EPA 3611B |
| Analyst: | AC | Cleanup Date1: | 08/02/11 |
| Percent Solids: | Results reported on an 'AS RECEIVED' basis. | Cleanup Method2: | EPA 3640A |
| | | Cleanup Date2: | 08/02/11 |

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| PAHs - Mansfield Lab | | | | | | |
| Naphthalene | 59.7 | | ug/kg | 0.943 | 0.472 | 1 |
| C2-Naphthalenes | 17.4 | | ug/kg | 0.943 | 0.472 | 1 |
| C3-Naphthalenes | 14.7 | | ug/kg | 0.943 | 0.472 | 1 |
| C4-Naphthalenes | 12.2 | | ug/kg | 0.943 | 0.472 | 1 |
| 2-Methylnaphthalene | 14.5 | | ug/kg | 0.943 | 0.472 | 1 |
| 1-Methylnaphthalene | 21.3 | | ug/kg | 0.943 | 0.472 | 1 |
| 2,6-Dimethylnaphthalene | 1.85 | | ug/kg | 0.943 | 0.472 | 1 |
| Acenaphthylene | 2.08 | | ug/kg | 0.943 | 0.472 | 1 |
| Acenaphthene | 28.3 | | ug/kg | 0.943 | 0.472 | 1 |
| 2,3,5-Trimethylnaphthalene | 1.46 | | ug/kg | 0.943 | 0.472 | 1 |
| Fluorene | 10.4 | | ug/kg | 0.943 | 0.472 | 1 |
| C1-Fluorenes | 4.05 | | ug/kg | 0.943 | 0.472 | 1 |
| C2-Fluorenes | 8.78 | | ug/kg | 0.943 | 0.472 | 1 |
| C3-Fluorenes | 12.6 | | ug/kg | 0.943 | 0.472 | 1 |
| Dibenzothiophene | 3.40 | | ug/kg | 0.943 | 0.472 | 1 |
| C1-Dibenzothiophenes | 3.14 | | ug/kg | 0.943 | 0.472 | 1 |
| C2-Dibenzothiophenes | 10.5 | | ug/kg | 0.943 | 0.472 | 1 |
| C3-Dibenzothiophenes | 12.8 | | ug/kg | 0.943 | 0.472 | 1 |
| C4-Dibenzothiophenes | 8.78 | | ug/kg | 0.943 | 0.472 | 1 |
| Phenanthrene | 35.7 | | ug/kg | 0.943 | 0.472 | 1 |
| C1-Phenanthrenes/Anthracenes | 21.8 | | ug/kg | 0.943 | 0.472 | 1 |
| C2-Phenanthrenes/Anthracenes | 27.0 | | ug/kg | 0.943 | 0.472 | 1 |
| C3-Phenanthrenes/Anthracenes | 23.1 | | ug/kg | 0.943 | 0.472 | 1 |
| C4-Phenanthrenes/Anthracenes | 11.2 | | ug/kg | 0.943 | 0.472 | 1 |
| Anthracene | 3.40 | | ug/kg | 0.943 | 0.472 | 1 |
| 1-Methylphenanthrene | 6.30 | | ug/kg | 0.943 | 0.472 | 1 |
| Fluoranthene | 53.9 | | ug/kg | 0.943 | 0.472 | 1 |
| Pyrene | 81.5 | | ug/kg | 0.943 | 0.472 | 1 |
| C1-Fluoranthenes/Pyrenes | 47.3 | | ug/kg | 0.943 | 0.472 | 1 |
| Benz(a)anthracene | 18.5 | | ug/kg | 0.943 | 0.472 | 1 |
| Chrysene | 31.4 | | ug/kg | 0.943 | 0.472 | 1 |

**Project Name:** PASSAIC RI/FS CAGED BIVALVE **Lab Number:** L1110328

**Project Number:** TASK23.2.1 **Report Date:** 10/19/11

## SAMPLE RESULTS

| | | | |
|---|---|---|---|
| Lab ID: | L1110328-07 | Date Collected: | 05/09/11 10:20 |
| Client ID: | LPR1-GDST-COMP01 | Date Received: | 07/26/11 |
| Sample Location: | Not Specified | Field Prep: | Not Specified |

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| PAHs - Mansfield Lab | | | | | | |
| C1-Benzanthracene/chrysenes | 16.0 | | ug/kg | 0.943 | 0.472 | 1 |
| C2-Benzanthracene/chrysenes | 8.12 | | ug/kg | 0.943 | 0.472 | 1 |
| C3-Benzanthracene/chrysenes | 6.49 | | ug/kg | 0.943 | 0.472 | 1 |
| C4-Benzanthracene/chrysenes | ND | | ug/kg | 0.943 | 0.472 | 1 |
| Benzo(b)fluoranthene | 21.4 | | ug/kg | 0.943 | 0.472 | 1 |
| Benzo(j,k)fluoranthene | 9.24 | | ug/kg | 0.943 | 0.472 | 1 |
| Benzo(e)pyrene | 14.5 | | ug/kg | 0.943 | 0.472 | 1 |
| Benzo(a)pyrene | 9.48 | | ug/kg | 0.943 | 0.472 | 1 |
| Perylene | 2.68 | | ug/kg | 0.943 | 0.472 | 1 |
| Indeno(1,2,3-cd)pyrene | 2.92 | | ug/kg | 0.943 | 0.472 | 1 |
| Dibenz(a,c+a,h)anthracene | 0.879 | J | ug/kg | 0.943 | 0.472 | 1 |
| Benzo(g,h,i)perylene | 5.03 | | ug/kg | 0.943 | 0.472 | 1 |

| Surrogate | % Recovery | Qualifier | Acceptance Criteria |
|---|---|---|---|
| Naphthalene-d8 | 95 | | 50-130 |
| Phenanthrene-d10 | 104 | | 50-130 |
| Benzo(a)pyrene-d12 | 92 | | 50-130 |

**Project Name:** PASSAIC RI/FS CAGED BIVALVE **Lab Number:** L1110328

**Project Number:** TASK23.2.1 **Report Date:** 10/19/11

## SAMPLE RESULTS

| | | | |
|---|---|---|---|
| Lab ID: | L1110328-08 | Date Collected: | 03/08/11 18:30 |
| Client ID: | LPRBG-GDST-COMP01 | Date Received: | 07/26/11 |
| Sample Location: | Not Specified | Field Prep: | Not Specified |
| Matrix: | Tissue | Extraction Method: | EPA 3570 |
| Analytical Method: | 1,8270C | Extraction Date: | 07/28/11 16:25 |
| Analytical Date: | 08/16/11 02:11 | Cleanup Method1: | EPA 3640A |
| Analyst: | AW | Cleanup Date1: | 08/03/11 |
| Percent Solids: | Results reported on an 'AS RECEIVED' basis. | | |

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| Semivolatile Organics by GC/MS - Mansfield Lab | | | | | | |
| Bis(2-chloroethyl)ether | ND | | ug/kg | 928 | 464. | 5 |
| Phenol | ND | | ug/kg | 928 | 464. | 5 |
| 2-Chlorophenol | ND | | ug/kg | 928 | 464. | 5 |
| Bis(2-chloroisopropyl)ether | ND | | ug/kg | 928 | 464. | 5 |
| 2-Methylphenol | ND | | ug/kg | 928 | 464. | 5 |
| Acetophenone | ND | | ug/kg | 928 | 464. | 5 |
| Hexachloroethane | ND | | ug/kg | 928 | 464. | 5 |
| N-Nitroso-di-n-propylamine | ND | | ug/kg | 928 | 464. | 5 |
| 4-Methylphenol | ND | | ug/kg | 928 | 464. | 5 |
| Nitrobenzene | ND | | ug/kg | 928 | 464. | 5 |
| Isophorone | ND | | ug/kg | 928 | 464. | 5 |
| 2-Nitrophenol | ND | | ug/kg | 928 | 464. | 5 |
| 2,4-Dimethylphenol | ND | | ug/kg | 928 | 464. | 5 |
| Bis(2-chloroethoxy)methane | ND | | ug/kg | 928 | 464. | 5 |
| 2,4-Dichlorophenol | ND | | ug/kg | 928 | 464. | 5 |
| Naphthalene | ND | | ug/kg | 928 | 464. | 5 |
| 4-Chloroaniline | ND | | ug/kg | 928 | 464. | 5 |
| Hexachlorobutadiene | ND | | ug/kg | 928 | 464. | 5 |
| Caprolactam | ND | | ug/kg | 928 | 464. | 5 |
| P-Chloro-M-Cresol | ND | | ug/kg | 928 | 464. | 5 |
| 2-Methylnaphthalene | ND | | ug/kg | 928 | 464. | 5 |
| Hexachlorocyclopentadiene | ND | | ug/kg | 928 | 464. | 5 |
| 2,4,6-Trichlorophenol | ND | | ug/kg | 928 | 464. | 5 |
| 2,4,5-Trichlorophenol | ND | | ug/kg | 928 | 464. | 5 |
| Biphenyl | ND | | ug/kg | 928 | 464. | 5 |
| 2-Chloronaphthalene | ND | | ug/kg | 928 | 464. | 5 |
| 2-Nitroaniline | ND | | ug/kg | 928 | 464. | 5 |
| Acenaphthylene | ND | | ug/kg | 928 | 464. | 5 |
| Dimethylphthalate | ND | | ug/kg | 928 | 464. | 5 |
| 2,6-Dinitrotoluene | ND | | ug/kg | 928 | 464. | 5 |
| Acenaphthene | ND | | ug/kg | 928 | 464. | 5 |

**Project Name:** PASSAIC RI/FS CAGED BIVALVE **Lab Number:** L1110328

**Project Number:** TASK23.2.1 **Report Date:** 10/19/11

## SAMPLE RESULTS

Lab ID: L1110328-08 Date Collected: 03/08/11 18:30

Client ID: LPRBG-GDST-COMP01 Date Received: 07/26/11

Sample Location: Not Specified Field Prep: Not Specified

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| Semivolatile Organics by GC/MS - Mansfield Lab | | | | | | |
| 3-Nitroaniline | ND | | ug/kg | 928 | 464. | 5 |
| 2,4-Dinitrophenol | ND | | ug/kg | 3710 | 1860 | 5 |
| Dibenzofuran | ND | | ug/kg | 928 | 464. | 5 |
| 2,4-Dinitrotoluene | ND | | ug/kg | 928 | 464. | 5 |
| 4-Nitrophenol | ND | | ug/kg | 1860 | 928. | 5 |
| Fluorene | ND | | ug/kg | 928 | 464. | 5 |
| 4-Chlorophenyl-phenylether | ND | | ug/kg | 928 | 464. | 5 |
| Diethylphthalate | ND | | ug/kg | 928 | 464. | 5 |
| 4-Nitroaniline | ND | | ug/kg | 928 | 464. | 5 |
| 4,6-Dinitro-2-Methylphenol | ND | | ug/kg | 3710 | 1860 | 5 |
| NitrosoDiPhenylAmine(NDPA)/DPA | ND | | ug/kg | 928 | 464. | 5 |
| 4-Bromophenyl-phenylether | ND | | ug/kg | 928 | 464. | 5 |
| Hexachlorobenzene | ND | | ug/kg | 928 | 464. | 5 |
| Atrazine | ND | | ug/kg | 928 | 464. | 5 |
| Pentachlorophenol | ND | | ug/kg | 3710 | 1860 | 5 |
| Phenanthrene | ND | | ug/kg | 928 | 464. | 5 |
| Anthracene | ND | | ug/kg | 928 | 464. | 5 |
| Carbazole | ND | | ug/kg | 928 | 464. | 5 |
| Di-n-butylphthalate | ND | | ug/kg | 928 | 464. | 5 |
| Fluoranthene | ND | | ug/kg | 928 | 464. | 5 |
| Pyrene | ND | | ug/kg | 928 | 464. | 5 |
| Butylbenzylphthalate | ND | | ug/kg | 928 | 464. | 5 |
| 3,3'-Dichlorobenzidine | ND | | ug/kg | 928 | 464. | 5 |
| Benz(a)anthracene | ND | | ug/kg | 928 | 464. | 5 |
| Chrysene | ND | | ug/kg | 928 | 464. | 5 |
| Bis(2-Ethylhexyl)phthalate | ND | | ug/kg | 928 | 464. | 5 |
| Di-n-octylphthalate | ND | | ug/kg | 928 | 464. | 5 |
| Benzo(b)fluoranthene | ND | | ug/kg | 928 | 464. | 5 |
| Benzo(k)fluoranthene | ND | | ug/kg | 928 | 464. | 5 |
| Benzo(a)pyrene | ND | | ug/kg | 928 | 464. | 5 |
| Indeno(1,2,3-cd)Pyrene | ND | | ug/kg | 928 | 464. | 5 |
| Dibenz(a,h)anthracene | ND | | ug/kg | 928 | 464. | 5 |
| Benzo(ghi)perylene | ND | | ug/kg | 928 | 464. | 5 |

**Project Name:** PASSAIC RI/FS CAGED BIVALVE **Lab Number:** L1110328

**Project Number:** TASK23.2.1 **Report Date:** 10/19/11

## SAMPLE RESULTS

| | | | |
|---|---|---|---|
| Lab ID: | L1110328-08 | Date Collected: | 03/08/11 18:30 |
| Client ID: | LPRBG-GDST-COMP01 | Date Received: | 07/26/11 |
| Sample Location: | Not Specified | Field Prep: | Not Specified |

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| Semivolatile Organics by GC/MS - Mansfield Lab | | | | | | |

| Surrogate | % Recovery | Qualifier | Acceptance Criteria |
|---|---|---|---|
| 2-Fluorobiphenyl | 76 | | 30-130 |
| Phenol-d5 | 93 | | 30-130 |
| Nitrobenzene-d5 | 92 | | 30-130 |
| 2-Fluorophenol | 88 | | 30-130 |
| 2,4,6-Tribromophenol | 89 | | 30-130 |
| Terphenyl-d14 | 79 | | 30-130 |

**Project Name:** PASSAIC RI/FS CAGED BIVALVE **Lab Number:** L1110328

**Project Number:** TASK23.2.1 **Report Date:** 10/19/11

## SAMPLE RESULTS

| | | | |
|---|---|---|---|
| Lab ID: | L1110328-08 | Date Collected: | 03/08/11 18:30 |
| Client ID: | LPRBG-GDST-COMP01 | Date Received: | 07/26/11 |
| Sample Location: | Not Specified | Field Prep: | Not Specified |
| Matrix: | Tissue | Extraction Method: | EPA 3570 |
| Analytical Method: | 1,8270C | Extraction Date: | 09/12/11 13:00 |
| Analytical Date: | 09/16/11 03:09 | Cleanup Method1: | EPA 3640A |
| Analyst: | AW | Cleanup Date1: | 09/14/11 |
| Percent Solids: | Results reported on an 'AS RECEIVED' basis. | | |

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| Semivolatile Organics by GC/MS - Mansfield Lab | | | | | | |
| Benzaldehyde | ND | | ug/kg | 1910 | 954. | 5 |

| Surrogate | % Recovery | Qualifier | Acceptance Criteria |
|---|---|---|---|
| 2-Fluorobiphenyl | 79 | | 30-130 |
| Nitrobenzene-d5 | 87 | | 30-130 |
| Terphenyl-d14 | 84 | | 30-130 |

**Project Name:** PASSAIC RI/FS CAGED BIVALVE **Lab Number:** L1110328

**Project Number:** TASK23.2.1 **Report Date:** 10/19/11

## SAMPLE RESULTS

| | | | |
|---|---|---|---|
| Lab ID: | L1110328-08 | Date Collected: | 03/08/11 18:30 |
| Client ID: | LPRBG-GDST-COMP01 | Date Received: | 07/26/11 |
| Sample Location: | Not Specified | Field Prep: | Not Specified |
| Matrix: | Tissue | Extraction Method: | ALPHA OP-018 |
| Analytical Method: | 1,8270C-SIM(M) | Extraction Date: | 09/12/11 13:12 |
| Analytical Date: | 09/17/11 02:17 | Cleanup Method1: | EPA 3611B |
| Analyst: | AC | Cleanup Date1: | 09/13/11 |
| Percent Solids: | Results reported on an 'AS RECEIVED' basis. | Cleanup Method2: | EPA 3640A |
| | | Cleanup Date2: | 09/15/11 |

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| PAHs - Mansfield Lab | | | | | | |
| Naphthalene | 16.0 | | ug/kg | 0.940 | 0.470 | 1 |
| C2-Naphthalenes | 5.09 | | ug/kg | 0.940 | 0.470 | 1 |
| C3-Naphthalenes | 3.88 | | ug/kg | 0.940 | 0.470 | 1 |
| C4-Naphthalenes | 1.63 | | ug/kg | 0.940 | 0.470 | 1 |
| 2-Methylnaphthalene | 6.21 | | ug/kg | 0.940 | 0.470 | 1 |
| 1-Methylnaphthalene | 7.50 | | ug/kg | 0.940 | 0.470 | 1 |
| 2,6-Dimethylnaphthalene | 0.583 | J | ug/kg | 0.940 | 0.470 | 1 |
| Acenaphthylene | 0.855 | J | ug/kg | 0.940 | 0.470 | 1 |
| Acenaphthene | 3.41 | | ug/kg | 0.940 | 0.470 | 1 |
| 2,3,5-Trimethylnaphthalene | ND | | ug/kg | 0.940 | 0.470 | 1 |
| Fluorene | 2.73 | | ug/kg | 0.940 | 0.470 | 1 |
| C1-Fluorenes | 0.567 | J | ug/kg | 0.940 | 0.470 | 1 |
| C2-Fluorenes | 0.889 | J | ug/kg | 0.940 | 0.470 | 1 |
| C3-Fluorenes | ND | | ug/kg | 0.940 | 0.470 | 1 |
| Dibenzothiophene | 0.805 | J | ug/kg | 0.940 | 0.470 | 1 |
| C1-Dibenzothiophenes | ND | | ug/kg | 0.940 | 0.470 | 1 |
| C2-Dibenzothiophenes | ND | | ug/kg | 0.940 | 0.470 | 1 |
| C3-Dibenzothiophenes | ND | | ug/kg | 0.940 | 0.470 | 1 |
| C4-Dibenzothiophenes | ND | | ug/kg | 0.940 | 0.470 | 1 |
| Phenanthrene | 10.7 | | ug/kg | 0.940 | 0.470 | 1 |
| C1-Phenanthrenes/Anthracenes | 2.11 | | ug/kg | 0.940 | 0.470 | 1 |
| C2-Phenanthrenes/Anthracenes | 1.62 | | ug/kg | 0.940 | 0.470 | 1 |
| C3-Phenanthrenes/Anthracenes | 0.920 | J | ug/kg | 0.940 | 0.470 | 1 |
| C4-Phenanthrenes/Anthracenes | ND | | ug/kg | 0.940 | 0.470 | 1 |
| Anthracene | 0.488 | J | ug/kg | 0.940 | 0.470 | 1 |
| 1-Methylphenanthrene | 0.757 | J | ug/kg | 0.940 | 0.470 | 1 |
| Fluoranthene | 3.60 | | ug/kg | 0.940 | 0.470 | 1 |
| Pyrene | 5.25 | | ug/kg | 0.940 | 0.470 | 1 |
| C1-Fluoranthenes/Pyrenes | 1.45 | | ug/kg | 0.940 | 0.470 | 1 |
| Benz(a)anthracene | ND | | ug/kg | 0.940 | 0.470 | 1 |
| Chrysene | 0.573 | J | ug/kg | 0.940 | 0.470 | 1 |

**Project Name:** PASSAIC RI/FS CAGED BIVALVE **Lab Number:** L1110328

**Project Number:** TASK23.2.1 **Report Date:** 10/19/11

## SAMPLE RESULTS

| | | | |
|---|---|---|---|
| Lab ID: | L1110328-08 | Date Collected: | 03/08/11 18:30 |
| Client ID: | LPRBG-GDST-COMP01 | Date Received: | 07/26/11 |
| Sample Location: | Not Specified | Field Prep: | Not Specified |

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| PAHs - Mansfield Lab | | | | | | |
| C1-Benzanthracene/chrysenes | ND | | ug/kg | 0.940 | 0.470 | 1 |
| C2-Benzanthracene/chrysenes | ND | | ug/kg | 0.940 | 0.470 | 1 |
| C3-Benzanthracene/chrysenes | ND | | ug/kg | 0.940 | 0.470 | 1 |
| C4-Benzanthracene/chrysenes | ND | | ug/kg | 0.940 | 0.470 | 1 |
| Benzo(b)fluoranthene | ND | | ug/kg | 0.940 | 0.470 | 1 |
| Benzo(j,k)fluoranthene | ND | | ug/kg | 0.940 | 0.470 | 1 |
| Benzo(e)pyrene | ND | | ug/kg | 0.940 | 0.470 | 1 |
| Benzo(a)pyrene | ND | | ug/kg | 0.940 | 0.470 | 1 |
| Perylene | ND | | ug/kg | 0.940 | 0.470 | 1 |
| Indeno(1,2,3-cd)pyrene | ND | | ug/kg | 0.940 | 0.470 | 1 |
| Dibenz(a,c+a,h)anthracene | ND | | ug/kg | 0.940 | 0.470 | 1 |
| Benzo(g,h,i)perylene | ND | | ug/kg | 0.940 | 0.470 | 1 |

| Surrogate | % Recovery | Qualifier | Acceptance Criteria |
|---|---|---|---|
| Naphthalene-d8 | 77 | | 50-130 |
| Phenanthrene-d10 | 81 | | 50-130 |
| Benzo(a)pyrene-d12 | 72 | | 50-130 |

**Project Name:** PASSAIC RI/FS CAGED BIVALVE **Lab Number:** L1110328

**Project Number:** TASK23.2.1 **Report Date:** 10/19/11

## SAMPLE RESULTS

| | | | |
|---|---|---|---|
| Lab ID: | L1110328-09 | Date Collected: | 05/09/11 10:45 |
| Client ID: | LPR2-GDST-COMP02 | Date Received: | 07/26/11 |
| Sample Location: | Not Specified | Field Prep: | Not Specified |
| Matrix: | Tissue | Extraction Method: | EPA 3570 |
| Analytical Method: | 1,8270C | Extraction Date: | 07/28/11 16:25 |
| Analytical Date: | 08/16/11 03:01 | Cleanup Method1: | EPA 3640A |
| Analyst: | AW | Cleanup Date1: | 08/03/11 |
| Percent Solids: | Results reported on an 'AS RECEIVED' basis. | | |

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| Semivolatile Organics by GC/MS - Mansfield Lab | | | | | | |
| Bis(2-chloroethyl)ether | ND | | ug/kg | 942 | 471. | 5 |
| Phenol | ND | | ug/kg | 942 | 471. | 5 |
| 2-Chlorophenol | ND | | ug/kg | 942 | 471. | 5 |
| Bis(2-chloroisopropyl)ether | ND | | ug/kg | 942 | 471. | 5 |
| 2-Methylphenol | ND | | ug/kg | 942 | 471. | 5 |
| Acetophenone | ND | | ug/kg | 942 | 471. | 5 |
| Hexachloroethane | ND | | ug/kg | 942 | 471. | 5 |
| N-Nitroso-di-n-propylamine | ND | | ug/kg | 942 | 471. | 5 |
| 4-Methylphenol | ND | | ug/kg | 942 | 471. | 5 |
| Nitrobenzene | ND | | ug/kg | 942 | 471. | 5 |
| Isophorone | ND | | ug/kg | 942 | 471. | 5 |
| 2-Nitrophenol | ND | | ug/kg | 942 | 471. | 5 |
| 2,4-Dimethylphenol | ND | | ug/kg | 942 | 471. | 5 |
| Bis(2-chloroethoxy)methane | ND | | ug/kg | 942 | 471. | 5 |
| 2,4-Dichlorophenol | ND | | ug/kg | 942 | 471. | 5 |
| Naphthalene | ND | | ug/kg | 942 | 471. | 5 |
| 4-Chloroaniline | ND | | ug/kg | 942 | 471. | 5 |
| Hexachlorobutadiene | ND | | ug/kg | 942 | 471. | 5 |
| Caprolactam | ND | | ug/kg | 942 | 471. | 5 |
| P-Chloro-M-Cresol | ND | | ug/kg | 942 | 471. | 5 |
| 2-Methylnaphthalene | ND | | ug/kg | 942 | 471. | 5 |
| Hexachlorocyclopentadiene | ND | | ug/kg | 942 | 471. | 5 |
| 2,4,6-Trichlorophenol | ND | | ug/kg | 942 | 471. | 5 |
| 2,4,5-Trichlorophenol | ND | | ug/kg | 942 | 471. | 5 |
| Biphenyl | ND | | ug/kg | 942 | 471. | 5 |
| 2-Chloronaphthalene | ND | | ug/kg | 942 | 471. | 5 |
| 2-Nitroaniline | ND | | ug/kg | 942 | 471. | 5 |
| Acenaphthylene | ND | | ug/kg | 942 | 471. | 5 |
| Dimethylphthalate | ND | | ug/kg | 942 | 471. | 5 |
| 2,6-Dinitrotoluene | ND | | ug/kg | 942 | 471. | 5 |
| Acenaphthene | ND | | ug/kg | 942 | 471. | 5 |

**Project Name:** PASSAIC RI/FS CAGED BIVALVE **Lab Number:** L1110328

**Project Number:** TASK23.2.1 **Report Date:** 10/19/11

## SAMPLE RESULTS

Lab ID: L1110328-09 Date Collected: 05/09/11 10:45

Client ID: LPR2-GDST-COMP02 Date Received: 07/26/11

Sample Location: Not Specified Field Prep: Not Specified

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| Semivolatile Organics by GC/MS - Mansfield Lab | | | | | | |
| 3-Nitroaniline | ND | | ug/kg | 942 | 471. | 5 |
| 2,4-Dinitrophenol | ND | | ug/kg | 3770 | 1880 | 5 |
| Dibenzofuran | ND | | ug/kg | 942 | 471. | 5 |
| 2,4-Dinitrotoluene | ND | | ug/kg | 942 | 471. | 5 |
| 4-Nitrophenol | ND | | ug/kg | 1880 | 942. | 5 |
| Fluorene | ND | | ug/kg | 942 | 471. | 5 |
| 4-Chlorophenyl-phenylether | ND | | ug/kg | 942 | 471. | 5 |
| Diethylphthalate | ND | | ug/kg | 942 | 471. | 5 |
| 4-Nitroaniline | ND | | ug/kg | 942 | 471. | 5 |
| 4,6-Dinitro-2-Methylphenol | ND | | ug/kg | 3770 | 1880 | 5 |
| NitrosoDiPhenylAmine(NDPA)/DPA | ND | | ug/kg | 942 | 471. | 5 |
| 4-Bromophenyl-phenylether | ND | | ug/kg | 942 | 471. | 5 |
| Hexachlorobenzene | ND | | ug/kg | 942 | 471. | 5 |
| Atrazine | ND | | ug/kg | 942 | 471. | 5 |
| Pentachlorophenol | ND | | ug/kg | 3770 | 1880 | 5 |
| Phenanthrene | ND | | ug/kg | 942 | 471. | 5 |
| Anthracene | ND | | ug/kg | 942 | 471. | 5 |
| Carbazole | ND | | ug/kg | 942 | 471. | 5 |
| Di-n-butylphthalate | ND | | ug/kg | 942 | 471. | 5 |
| Fluoranthene | ND | | ug/kg | 942 | 471. | 5 |
| Pyrene | ND | | ug/kg | 942 | 471. | 5 |
| Butylbenzylphthalate | ND | | ug/kg | 942 | 471. | 5 |
| 3,3'-Dichlorobenzidine | ND | | ug/kg | 942 | 471. | 5 |
| Benz(a)anthracene | ND | | ug/kg | 942 | 471. | 5 |
| Chrysene | ND | | ug/kg | 942 | 471. | 5 |
| Bis(2-Ethylhexyl)phthalate | ND | | ug/kg | 942 | 471. | 5 |
| Di-n-octylphthalate | ND | | ug/kg | 942 | 471. | 5 |
| Benzo(b)fluoranthene | ND | | ug/kg | 942 | 471. | 5 |
| Benzo(k)fluoranthene | ND | | ug/kg | 942 | 471. | 5 |
| Benzo(a)pyrene | ND | | ug/kg | 942 | 471. | 5 |
| Indeno(1,2,3-cd)Pyrene | ND | | ug/kg | 942 | 471. | 5 |
| Dibenz(a,h)anthracene | ND | | ug/kg | 942 | 471. | 5 |
| Benzo(ghi)perylene | ND | | ug/kg | 942 | 471. | 5 |

**Project Name:** PASSAIC RI/FS CAGED BIVALVE **Lab Number:** L1110328

**Project Number:** TASK23.2.1 **Report Date:** 10/19/11

## SAMPLE RESULTS

| | | | |
|---|---|---|---|
| Lab ID: | L1110328-09 | Date Collected: | 05/09/11 10:45 |
| Client ID: | LPR2-GDST-COMP02 | Date Received: | 07/26/11 |
| Sample Location: | Not Specified | Field Prep: | Not Specified |

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| Semivolatile Organics by GC/MS - Mansfield Lab | | | | | | |

| Surrogate | % Recovery | Qualifier | Acceptance Criteria |
|---|---|---|---|
| 2-Fluorobiphenyl | 65 | | 30-130 |
| Phenol-d5 | 78 | | 30-130 |
| Nitrobenzene-d5 | 77 | | 30-130 |
| 2-Fluorophenol | 73 | | 30-130 |
| 2,4,6-Tribromophenol | 72 | | 30-130 |
| Terphenyl-d14 | 68 | | 30-130 |

**Project Name:** PASSAIC RI/FS CAGED BIVALVE **Lab Number:** L1110328

**Project Number:** TASK23.2.1 **Report Date:** 10/19/11

## SAMPLE RESULTS

| | | | |
|---|---|---|---|
| Lab ID: | L1110328-09 | Date Collected: | 05/09/11 10:45 |
| Client ID: | LPR2-GDST-COMP02 | Date Received: | 07/26/11 |
| Sample Location: | Not Specified | Field Prep: | Not Specified |
| Matrix: | Tissue | Extraction Method: | EPA 3570 |
| Analytical Method: | 1,8270C | Extraction Date: | 09/12/11 13:00 |
| Analytical Date: | 09/16/11 03:58 | Cleanup Method1: | EPA 3640A |
| Analyst: | AW | Cleanup Date1: | 09/14/11 |
| Percent Solids: | Results reported on an 'AS RECEIVED' basis. | | |

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| Semivolatile Organics by GC/MS - Mansfield Lab | | | | | | |
| Benzaldehyde | ND | | ug/kg | 1940 | 973. | 5 |

| Surrogate | % Recovery | Qualifier | Acceptance Criteria |
|---|---|---|---|
| 2-Fluorobiphenyl | 78 | | 30-130 |
| Nitrobenzene-d5 | 89 | | 30-130 |
| Terphenyl-d14 | 84 | | 30-130 |

**Project Name:** PASSAIC RI/FS CAGED BIVALVE **Lab Number:** L1110328

**Project Number:** TASK23.2.1 **Report Date:** 10/19/11

## SAMPLE RESULTS

| | | | |
|---|---|---|---|
| Lab ID: | L1110328-09 | Date Collected: | 05/09/11 10:45 |
| Client ID: | LPR2-GDST-COMP02 | Date Received: | 07/26/11 |
| Sample Location: | Not Specified | Field Prep: | Not Specified |
| Matrix: | Tissue | Extraction Method: | ALPHA OP-018 |
| Analytical Method: | 1,8270C-SIM(M) | Extraction Date: | 09/12/11 13:12 |
| Analytical Date: | 09/17/11 03:43 | Cleanup Method1: | EPA 3611B |
| Analyst: | AC | Cleanup Date1: | 09/13/11 |
| Percent Solids: | Results reported on an 'AS RECEIVED' basis. | Cleanup Method2: | EPA 3640A |
| | | Cleanup Date2: | 09/15/11 |

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| PAHs - Mansfield Lab | | | | | | |
| Naphthalene | 33.2 | | ug/kg | 0.843 | 0.422 | 1 |
| C2-Naphthalenes | 11.0 | | ug/kg | 0.843 | 0.422 | 1 |
| C3-Naphthalenes | 8.69 | | ug/kg | 0.843 | 0.422 | 1 |
| C4-Naphthalenes | 5.96 | | ug/kg | 0.843 | 0.422 | 1 |
| 2-Methylnaphthalene | 10.0 | | ug/kg | 0.843 | 0.422 | 1 |
| 1-Methylnaphthalene | 13.3 | | ug/kg | 0.843 | 0.422 | 1 |
| 2,6-Dimethylnaphthalene | 2.28 | | ug/kg | 0.843 | 0.422 | 1 |
| Acenaphthylene | 1.16 | | ug/kg | 0.843 | 0.422 | 1 |
| Acenaphthene | 14.3 | | ug/kg | 0.843 | 0.422 | 1 |
| 2,3,5-Trimethylnaphthalene | 1.32 | | ug/kg | 0.843 | 0.422 | 1 |
| Fluorene | 5.98 | | ug/kg | 0.843 | 0.422 | 1 |
| C1-Fluorenes | 3.09 | | ug/kg | 0.843 | 0.422 | 1 |
| C2-Fluorenes | 4.86 | | ug/kg | 0.843 | 0.422 | 1 |
| C3-Fluorenes | 6.32 | | ug/kg | 0.843 | 0.422 | 1 |
| Dibenzothiophene | 2.25 | | ug/kg | 0.843 | 0.422 | 1 |
| C1-Dibenzothiophenes | 2.00 | | ug/kg | 0.843 | 0.422 | 1 |
| C2-Dibenzothiophenes | 5.01 | | ug/kg | 0.843 | 0.422 | 1 |
| C3-Dibenzothiophenes | 4.47 | | ug/kg | 0.843 | 0.422 | 1 |
| C4-Dibenzothiophenes | 2.13 | | ug/kg | 0.843 | 0.422 | 1 |
| Phenanthrene | 21.9 | | ug/kg | 0.843 | 0.422 | 1 |
| C1-Phenanthrenes/Anthracenes | 11.9 | | ug/kg | 0.843 | 0.422 | 1 |
| C2-Phenanthrenes/Anthracenes | 13.3 | | ug/kg | 0.843 | 0.422 | 1 |
| C3-Phenanthrenes/Anthracenes | 7.21 | | ug/kg | 0.843 | 0.422 | 1 |
| C4-Phenanthrenes/Anthracenes | 2.69 | | ug/kg | 0.843 | 0.422 | 1 |
| Anthracene | 2.37 | | ug/kg | 0.843 | 0.422 | 1 |
| 1-Methylphenanthrene | 3.34 | | ug/kg | 0.843 | 0.422 | 1 |
| Fluoranthene | 27.6 | | ug/kg | 0.843 | 0.422 | 1 |
| Pyrene | 42.0 | | ug/kg | 0.843 | 0.422 | 1 |
| C1-Fluoranthenes/Pyrenes | 18.1 | | ug/kg | 0.843 | 0.422 | 1 |
| Benz(a)anthracene | 7.95 | | ug/kg | 0.843 | 0.422 | 1 |
| Chrysene | 15.4 | | ug/kg | 0.843 | 0.422 | 1 |

**Project Name:** PASSAIC RI/FS CAGED BIVALVE **Lab Number:** L1110328

**Project Number:** TASK23.2.1 **Report Date:** 10/19/11

## SAMPLE RESULTS

Lab ID: L1110328-09 Date Collected: 05/09/11 10:45

Client ID: LPR2-GDST-COMP02 Date Received: 07/26/11

Sample Location: Not Specified Field Prep: Not Specified

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| PAHs - Mansfield Lab | | | | | | |
| C1-Benzanthracene/chrysenes | 5.16 | | ug/kg | 0.843 | 0.422 | 1 |
| C2-Benzanthracene/chrysenes | 2.24 | | ug/kg | 0.843 | 0.422 | 1 |
| C3-Benzanthracene/chrysenes | ND | | ug/kg | 0.843 | 0.422 | 1 |
| C4-Benzanthracene/chrysenes | ND | | ug/kg | 0.843 | 0.422 | 1 |
| Benzo(b)fluoranthene | 4.45 | | ug/kg | 0.843 | 0.422 | 1 |
| Benzo(j,k)fluoranthene | 4.73 | | ug/kg | 0.843 | 0.422 | 1 |
| Benzo(e)pyrene | 4.63 | | ug/kg | 0.843 | 0.422 | 1 |
| Benzo(a)pyrene | 2.87 | | ug/kg | 0.843 | 0.422 | 1 |
| Perylene | 0.647 | J | ug/kg | 0.843 | 0.422 | 1 |
| Indeno(1,2,3-cd)pyrene | 0.886 | | ug/kg | 0.843 | 0.422 | 1 |
| Dibenz(a,c+a,h)anthracene | ND | | ug/kg | 0.843 | 0.422 | 1 |
| Benzo(g,h,i)perylene | 1.46 | | ug/kg | 0.843 | 0.422 | 1 |

| Surrogate | % Recovery | Qualifier | Acceptance Criteria |
|---|---|---|---|
| Naphthalene-d8 | 71 | | 50-130 |
| Phenanthrene-d10 | 78 | | 50-130 |
| Benzo(a)pyrene-d12 | 67 | | 50-130 |

**Project Name:** PASSAIC RI/FS CAGED BIVALVE **Lab Number:** L1110328

**Project Number:** TASK23.2.1 **Report Date:** 10/19/11

## SAMPLE RESULTS

| | | | |
|---|---|---|---|
| Lab ID: | L1110328-10 | Date Collected: | 05/09/11 11:20 |
| Client ID: | LPR3-GDST-COMP03 | Date Received: | 07/26/11 |
| Sample Location: | Not Specified | Field Prep: | Not Specified |
| Matrix: | Tissue | Extraction Method: | EPA 3570 |
| Analytical Method: | 1,8270C | Extraction Date: | 07/28/11 16:25 |
| Analytical Date: | 08/16/11 03:50 | Cleanup Method1: | EPA 3640A |
| Analyst: | AW | Cleanup Date1: | 08/03/11 |
| Percent Solids: | Results reported on an 'AS RECEIVED' basis. | | |

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| Semivolatile Organics by GC/MS - Mansfield Lab | | | | | | |
| Bis(2-chloroethyl)ether | ND | | ug/kg | 931 | 466. | 5 |
| Phenol | ND | | ug/kg | 931 | 466. | 5 |
| 2-Chlorophenol | ND | | ug/kg | 931 | 466. | 5 |
| Bis(2-chloroisopropyl)ether | ND | | ug/kg | 931 | 466. | 5 |
| 2-Methylphenol | ND | | ug/kg | 931 | 466. | 5 |
| Acetophenone | ND | | ug/kg | 931 | 466. | 5 |
| Hexachloroethane | ND | | ug/kg | 931 | 466. | 5 |
| N-Nitroso-di-n-propylamine | ND | | ug/kg | 931 | 466. | 5 |
| 4-Methylphenol | ND | | ug/kg | 931 | 466. | 5 |
| Nitrobenzene | ND | | ug/kg | 931 | 466. | 5 |
| Isophorone | ND | | ug/kg | 931 | 466. | 5 |
| 2-Nitrophenol | ND | | ug/kg | 931 | 466. | 5 |
| 2,4-Dimethylphenol | ND | | ug/kg | 931 | 466. | 5 |
| Bis(2-chloroethoxy)methane | ND | | ug/kg | 931 | 466. | 5 |
| 2,4-Dichlorophenol | ND | | ug/kg | 931 | 466. | 5 |
| Naphthalene | ND | | ug/kg | 931 | 466. | 5 |
| 4-Chloroaniline | ND | | ug/kg | 931 | 466. | 5 |
| Hexachlorobutadiene | ND | | ug/kg | 931 | 466. | 5 |
| Caprolactam | ND | | ug/kg | 931 | 466. | 5 |
| P-Chloro-M-Cresol | ND | | ug/kg | 931 | 466. | 5 |
| 2-Methylnaphthalene | ND | | ug/kg | 931 | 466. | 5 |
| Hexachlorocyclopentadiene | ND | | ug/kg | 931 | 466. | 5 |
| 2,4,6-Trichlorophenol | ND | | ug/kg | 931 | 466. | 5 |
| 2,4,5-Trichlorophenol | ND | | ug/kg | 931 | 466. | 5 |
| Biphenyl | ND | | ug/kg | 931 | 466. | 5 |
| 2-Chloronaphthalene | ND | | ug/kg | 931 | 466. | 5 |
| 2-Nitroaniline | ND | | ug/kg | 931 | 466. | 5 |
| Acenaphthylene | ND | | ug/kg | 931 | 466. | 5 |
| Dimethylphthalate | ND | | ug/kg | 931 | 466. | 5 |
| 2,6-Dinitrotoluene | ND | | ug/kg | 931 | 466. | 5 |
| Acenaphthene | ND | | ug/kg | 931 | 466. | 5 |

**Project Name:** PASSAIC RI/FS CAGED BIVALVE **Lab Number:** L1110328

**Project Number:** TASK23.2.1 **Report Date:** 10/19/11

## SAMPLE RESULTS

Lab ID: L1110328-10 Date Collected: 05/09/11 11:20

Client ID: LPR3-GDST-COMP03 Date Received: 07/26/11

Sample Location: Not Specified Field Prep: Not Specified

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| Semivolatile Organics by GC/MS - Mansfield Lab | | | | | | |
| 3-Nitroaniline | ND | | ug/kg | 931 | 466. | 5 |
| 2,4-Dinitrophenol | ND | | ug/kg | 3720 | 1860 | 5 |
| Dibenzofuran | ND | | ug/kg | 931 | 466. | 5 |
| 2,4-Dinitrotoluene | ND | | ug/kg | 931 | 466. | 5 |
| 4-Nitrophenol | ND | | ug/kg | 1860 | 931. | 5 |
| Fluorene | ND | | ug/kg | 931 | 466. | 5 |
| 4-Chlorophenyl-phenylether | ND | | ug/kg | 931 | 466. | 5 |
| Diethylphthalate | ND | | ug/kg | 931 | 466. | 5 |
| 4-Nitroaniline | ND | | ug/kg | 931 | 466. | 5 |
| 4,6-Dinitro-2-Methylphenol | ND | | ug/kg | 3720 | 1860 | 5 |
| NitrosoDiPhenylAmine(NDPA)/DPA | ND | | ug/kg | 931 | 466. | 5 |
| 4-Bromophenyl-phenylether | ND | | ug/kg | 931 | 466. | 5 |
| Hexachlorobenzene | ND | | ug/kg | 931 | 466. | 5 |
| Atrazine | ND | | ug/kg | 931 | 466. | 5 |
| Pentachlorophenol | ND | | ug/kg | 3720 | 1860 | 5 |
| Phenanthrene | ND | | ug/kg | 931 | 466. | 5 |
| Anthracene | ND | | ug/kg | 931 | 466. | 5 |
| Carbazole | ND | | ug/kg | 931 | 466. | 5 |
| Di-n-butylphthalate | ND | | ug/kg | 931 | 466. | 5 |
| Fluoranthene | ND | | ug/kg | 931 | 466. | 5 |
| Pyrene | ND | | ug/kg | 931 | 466. | 5 |
| Butylbenzylphthalate | ND | | ug/kg | 931 | 466. | 5 |
| 3,3'-Dichlorobenzidine | ND | | ug/kg | 931 | 466. | 5 |
| Benz(a)anthracene | ND | | ug/kg | 931 | 466. | 5 |
| Chrysene | ND | | ug/kg | 931 | 466. | 5 |
| Bis(2-Ethylhexyl)phthalate | ND | | ug/kg | 931 | 466. | 5 |
| Di-n-octylphthalate | ND | | ug/kg | 931 | 466. | 5 |
| Benzo(b)fluoranthene | ND | | ug/kg | 931 | 466. | 5 |
| Benzo(k)fluoranthene | ND | | ug/kg | 931 | 466. | 5 |
| Benzo(a)pyrene | ND | | ug/kg | 931 | 466. | 5 |
| Indeno(1,2,3-cd)Pyrene | ND | | ug/kg | 931 | 466. | 5 |
| Dibenz(a,h)anthracene | ND | | ug/kg | 931 | 466. | 5 |
| Benzo(ghi)perylene | ND | | ug/kg | 931 | 466. | 5 |

**Project Name:** PASSAIC RI/FS CAGED BIVALVE **Lab Number:** L1110328

**Project Number:** TASK23.2.1 **Report Date:** 10/19/11

## SAMPLE RESULTS

| | | | |
|---|---|---|---|
| Lab ID: | L1110328-10 | Date Collected: | 05/09/11 11:20 |
| Client ID: | LPR3-GDST-COMP03 | Date Received: | 07/26/11 |
| Sample Location: | Not Specified | Field Prep: | Not Specified |

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|

Semivolatile Organics by GC/MS - Mansfield Lab

| Surrogate | % Recovery | Qualifier | Acceptance Criteria |
|---|---|---|---|
| 2-Fluorobiphenyl | 64 | | 30-130 |
| Phenol-d5 | 77 | | 30-130 |
| Nitrobenzene-d5 | 76 | | 30-130 |
| 2-Fluorophenol | 74 | | 30-130 |
| 2,4,6-Tribromophenol | 74 | | 30-130 |
| Terphenyl-d14 | 70 | | 30-130 |

**Project Name:** PASSAIC RI/FS CAGED BIVALVE **Lab Number:** L1110328

**Project Number:** TASK23.2.1 **Report Date:** 10/19/11

## SAMPLE RESULTS

| | | | |
|---|---|---|---|
| Lab ID: | L1110328-10 | Date Collected: | 05/09/11 11:20 |
| Client ID: | LPR3-GDST-COMP03 | Date Received: | 07/26/11 |
| Sample Location: | Not Specified | Field Prep: | Not Specified |
| Matrix: | Tissue | Extraction Method: | EPA 3570 |
| Analytical Method: | 1,8270C | Extraction Date: | 09/12/11 13:00 |
| Analytical Date: | 09/16/11 04:47 | Cleanup Method1: | EPA 3640A |
| Analyst: | AW | Cleanup Date1: | 09/14/11 |
| Percent Solids: | Results reported on an 'AS RECEIVED' basis. | | |

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| Semivolatile Organics by GC/MS - Mansfield Lab | | | | | | |
| Benzaldehyde | ND | | ug/kg | 1900 | 950. | 5 |

| Surrogate | % Recovery | Qualifier | Acceptance Criteria |
|---|---|---|---|
| 2-Fluorobiphenyl | 66 | | 30-130 |
| Nitrobenzene-d5 | 73 | | 30-130 |
| Terphenyl-d14 | 71 | | 30-130 |

**Project Name:** PASSAIC RI/FS CAGED BIVALVE **Lab Number:** L1110328

**Project Number:** TASK23.2.1 **Report Date:** 10/19/11

## SAMPLE RESULTS

| | | | |
|---|---|---|---|
| Lab ID: | L1110328-10 | Date Collected: | 05/09/11 11:20 |
| Client ID: | LPR3-GDST-COMP03 | Date Received: | 07/26/11 |
| Sample Location: | Not Specified | Field Prep: | Not Specified |
| Matrix: | Tissue | Extraction Method: | ALPHA OP-018 |
| Analytical Method: | 1,8270C-SIM(M) | Extraction Date: | 09/12/11 13:12 |
| Analytical Date: | 09/17/11 05:08 | Cleanup Method1: | EPA 3611B |
| Analyst: | AC | Cleanup Date1: | 09/13/11 |
| Percent Solids: | Results reported on an 'AS RECEIVED' basis. | Cleanup Method2: | EPA 3640A |
| | | Cleanup Date2: | 09/15/11 |

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| PAHs - Mansfield Lab | | | | | | |
| Naphthalene | 19.8 | | ug/kg | 0.962 | 0.481 | 1 |
| C2-Naphthalenes | 5.93 | | ug/kg | 0.962 | 0.481 | 1 |
| C3-Naphthalenes | 3.97 | | ug/kg | 0.962 | 0.481 | 1 |
| C4-Naphthalenes | 2.19 | | ug/kg | 0.962 | 0.481 | 1 |
| 2-Methylnaphthalene | 7.94 | | ug/kg | 0.962 | 0.481 | 1 |
| 1-Methylnaphthalene | 9.07 | | ug/kg | 0.962 | 0.481 | 1 |
| 2,6-Dimethylnaphthalene | 1.05 | | ug/kg | 0.962 | 0.481 | 1 |
| Acenaphthylene | 0.964 | | ug/kg | 0.962 | 0.481 | 1 |
| Acenaphthene | 5.85 | | ug/kg | 0.962 | 0.481 | 1 |
| 2,3,5-Trimethylnaphthalene | ND | | ug/kg | 0.962 | 0.481 | 1 |
| Fluorene | 3.39 | | ug/kg | 0.962 | 0.481 | 1 |
| C1-Fluorenes | 1.17 | | ug/kg | 0.962 | 0.481 | 1 |
| C2-Fluorenes | 1.50 | | ug/kg | 0.962 | 0.481 | 1 |
| C3-Fluorenes | ND | | ug/kg | 0.962 | 0.481 | 1 |
| Dibenzothiophene | 1.24 | | ug/kg | 0.962 | 0.481 | 1 |
| C1-Dibenzothiophenes | 0.707 | J | ug/kg | 0.962 | 0.481 | 1 |
| C2-Dibenzothiophenes | 1.16 | | ug/kg | 0.962 | 0.481 | 1 |
| C3-Dibenzothiophenes | 1.32 | | ug/kg | 0.962 | 0.481 | 1 |
| C4-Dibenzothiophenes | ND | | ug/kg | 0.962 | 0.481 | 1 |
| Phenanthrene | 13.3 | | ug/kg | 0.962 | 0.481 | 1 |
| C1-Phenanthrenes/Anthracenes | 3.71 | | ug/kg | 0.962 | 0.481 | 1 |
| C2-Phenanthrenes/Anthracenes | 2.58 | | ug/kg | 0.962 | 0.481 | 1 |
| C3-Phenanthrenes/Anthracenes | 1.44 | | ug/kg | 0.962 | 0.481 | 1 |
| C4-Phenanthrenes/Anthracenes | ND | | ug/kg | 0.962 | 0.481 | 1 |
| Anthracene | 1.02 | | ug/kg | 0.962 | 0.481 | 1 |
| 1-Methylphenanthrene | 1.23 | | ug/kg | 0.962 | 0.481 | 1 |
| Fluoranthene | 7.51 | | ug/kg | 0.962 | 0.481 | 1 |
| Pyrene | 10.8 | | ug/kg | 0.962 | 0.481 | 1 |
| C1-Fluoranthenes/Pyrenes | 3.51 | | ug/kg | 0.962 | 0.481 | 1 |
| Benz(a)anthracene | 1.61 | | ug/kg | 0.962 | 0.481 | 1 |
| Chrysene | 3.18 | | ug/kg | 0.962 | 0.481 | 1 |

**Project Name:** PASSAIC RI/FS CAGED BIVALVE **Lab Number:** L1110328

**Project Number:** TASK23.2.1 **Report Date:** 10/19/11

## SAMPLE RESULTS

| | | | |
|---|---|---|---|
| Lab ID: | L1110328-10 | Date Collected: | 05/09/11 11:20 |
| Client ID: | LPR3-GDST-COMP03 | Date Received: | 07/26/11 |
| Sample Location: | Not Specified | Field Prep: | Not Specified |

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| PAHs - Mansfield Lab | | | | | | |
| C1-Benzanthracene/chrysenes | 0.892 | J | ug/kg | 0.962 | 0.481 | 1 |
| C2-Benzanthracene/chrysenes | ND | | ug/kg | 0.962 | 0.481 | 1 |
| C3-Benzanthracene/chrysenes | ND | | ug/kg | 0.962 | 0.481 | 1 |
| C4-Benzanthracene/chrysenes | ND | | ug/kg | 0.962 | 0.481 | 1 |
| Benzo(b)fluoranthene | 0.975 | | ug/kg | 0.962 | 0.481 | 1 |
| Benzo(j,k)fluoranthene | 1.15 | | ug/kg | 0.962 | 0.481 | 1 |
| Benzo(e)pyrene | 1.04 | | ug/kg | 0.962 | 0.481 | 1 |
| Benzo(a)pyrene | 1.01 | | ug/kg | 0.962 | 0.481 | 1 |
| Perylene | ND | | ug/kg | 0.962 | 0.481 | 1 |
| Indeno(1,2,3-cd)pyrene | ND | | ug/kg | 0.962 | 0.481 | 1 |
| Dibenz(a,c+a,h)anthracene | ND | | ug/kg | 0.962 | 0.481 | 1 |
| Benzo(g,h,i)perylene | 0.499 | J | ug/kg | 0.962 | 0.481 | 1 |

| Surrogate | % Recovery | Qualifier | Acceptance Criteria |
|---|---|---|---|
| Naphthalene-d8 | 79 | | 50-130 |
| Phenanthrene-d10 | 80 | | 50-130 |
| Benzo(a)pyrene-d12 | 71 | | 50-130 |

**Project Name:** PASSAIC RI/FS CAGED BIVALVE **Lab Number:** L1110328

**Project Number:** TASK23.2.1 **Report Date:** 10/19/11

## SAMPLE RESULTS

| | | | |
|---|---|---|---|
| Lab ID: | L1110328-11 | Date Collected: | 07/18/11 17:00 |
| Client ID: | LPR-071811RB | Date Received: | 07/18/11 |
| Sample Location: | Not Specified | Field Prep: | Not Specified |
| Matrix: | Water | Extraction Method: | EPA 3510C |
| Analytical Method: | 1,8270C | Extraction Date: | 07/20/11 10:30 |
| Analytical Date: | 07/28/11 13:39 | | |
| Analyst: | JD | | |

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| Semivolatile Organics by GC/MS - Mansfield Lab | | | | | | |
| Benzaldehyde | ND | | ug/l | 2.00 | 1.00 | 1 |
| Bis(2-chloroethyl)ether | ND | | ug/l | 0.500 | 0.250 | 1 |
| Phenol | ND | | ug/l | 0.500 | 0.250 | 1 |
| 2-Chlorophenol | ND | | ug/l | 0.500 | 0.250 | 1 |
| Bis(2-chloroisopropyl)ether | ND | | ug/l | 0.500 | 0.250 | 1 |
| 2-Methylphenol | ND | | ug/l | 0.500 | 0.250 | 1 |
| Acetophenone | ND | | ug/l | 0.500 | 0.250 | 1 |
| Hexachloroethane | ND | | ug/l | 0.500 | 0.250 | 1 |
| N-Nitroso-di-n-propylamine | ND | | ug/l | 0.500 | 0.250 | 1 |
| 4-Methylphenol | ND | | ug/l | 0.500 | 0.250 | 1 |
| Nitrobenzene | ND | | ug/l | 0.500 | 0.250 | 1 |
| Isophorone | ND | | ug/l | 0.500 | 0.250 | 1 |
| 2-Nitrophenol | ND | | ug/l | 0.500 | 0.250 | 1 |
| 2,4-Dimethylphenol | ND | | ug/l | 0.500 | 0.250 | 1 |
| Bis(2-chloroethoxy)methane | ND | | ug/l | 0.500 | 0.250 | 1 |
| 2,4-Dichlorophenol | ND | | ug/l | 0.500 | 0.250 | 1 |
| Naphthalene | ND | | ug/l | 0.500 | 0.250 | 1 |
| 4-Chloroaniline | ND | | ug/l | 0.500 | 0.250 | 1 |
| Hexachlorobutadiene | ND | | ug/l | 0.500 | 0.250 | 1 |
| Caprolactam | ND | | ug/l | 0.500 | 0.250 | 1 |
| P-Chloro-M-Cresol | ND | | ug/l | 0.500 | 0.250 | 1 |
| 2-Methylnaphthalene | ND | | ug/l | 0.500 | 0.250 | 1 |
| Hexachlorocyclopentadiene | ND | | ug/l | 0.500 | 0.250 | 1 |
| 2,4,6-Trichlorophenol | ND | | ug/l | 0.500 | 0.250 | 1 |
| 2,4,5-Trichlorophenol | ND | | ug/l | 0.500 | 0.250 | 1 |
| Biphenyl | ND | | ug/l | 0.500 | 0.250 | 1 |
| 2-Chloronaphthalene | ND | | ug/l | 0.500 | 0.250 | 1 |
| 2-Nitroaniline | ND | | ug/l | 0.500 | 0.250 | 1 |
| Acenaphthylene | ND | | ug/l | 0.500 | 0.250 | 1 |
| Dimethylphthalate | ND | | ug/l | 0.500 | 0.250 | 1 |
| 2,6-Dinitrotoluene | ND | | ug/l | 0.500 | 0.250 | 1 |

**Project Name:** PASSAIC RI/FS CAGED BIVALVE **Lab Number:** L1110328

**Project Number:** TASK23.2.1 **Report Date:** 10/19/11

## SAMPLE RESULTS

Lab ID: L1110328-11 Date Collected: 07/18/11 17:00

Client ID: LPR-071811RB Date Received: 07/18/11

Sample Location: Not Specified Field Prep: Not Specified

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| Semivolatile Organics by GC/MS - Mansfield Lab | | | | | | |
| Acenaphthene | ND | | ug/l | 0.500 | 0.250 | 1 |
| 3-Nitroaniline | ND | | ug/l | 0.500 | 0.250 | 1 |
| 2,4-Dinitrophenol | ND | | ug/l | 5.00 | 2.50 | 1 |
| Dibenzofuran | ND | | ug/l | 0.500 | 0.250 | 1 |
| 2,4-Dinitrotoluene | ND | | ug/l | 0.500 | 0.250 | 1 |
| 4-Nitrophenol | ND | | ug/l | 1.00 | 0.500 | 1 |
| Fluorene | ND | | ug/l | 0.500 | 0.250 | 1 |
| 4-Chlorophenyl-phenylether | ND | | ug/l | 0.500 | 0.250 | 1 |
| Diethylphthalate | ND | | ug/l | 0.500 | 0.250 | 1 |
| 4-Nitroaniline | ND | | ug/l | 0.500 | 0.250 | 1 |
| 4,6-Dinitro-2-Methylphenol | ND | | ug/l | 2.00 | 1.00 | 1 |
| NitrosoDiPhenylAmine(NDPA)/DPA | ND | | ug/l | 0.500 | 0.250 | 1 |
| 4-Bromophenyl-phenylether | ND | | ug/l | 0.500 | 0.250 | 1 |
| Hexachlorobenzene | ND | | ug/l | 0.500 | 0.250 | 1 |
| Atrazine | ND | | ug/l | 0.500 | 0.250 | 1 |
| Pentachlorophenol | ND | | ug/l | 2.00 | 1.00 | 1 |
| Phenanthrene | ND | | ug/l | 0.500 | 0.250 | 1 |
| Anthracene | ND | | ug/l | 0.500 | 0.250 | 1 |
| Carbazole | ND | | ug/l | 0.500 | 0.250 | 1 |
| Di-n-butylphthalate | ND | | ug/l | 0.500 | 0.250 | 1 |
| Fluoranthene | ND | | ug/l | 0.500 | 0.250 | 1 |
| Pyrene | ND | | ug/l | 0.500 | 0.250 | 1 |
| Butylbenzylphthalate | ND | | ug/l | 0.500 | 0.250 | 1 |
| 3,3'-Dichlorobenzidine | ND | | ug/l | 0.500 | 0.250 | 1 |
| Benz(a)anthracene | ND | | ug/l | 0.500 | 0.250 | 1 |
| Chrysene | ND | | ug/l | 0.500 | 0.250 | 1 |
| Bis(2-Ethylhexyl)phthalate | 0.634 | | ug/l | 0.500 | 0.250 | 1 |
| Di-n-octylphthalate | ND | | ug/l | 0.500 | 0.250 | 1 |
| Benzo(b)fluoranthene | ND | | ug/l | 0.500 | 0.250 | 1 |
| Benzo(k)fluoranthene | ND | | ug/l | 0.500 | 0.250 | 1 |
| Benzo(a)pyrene | ND | | ug/l | 0.500 | 0.250 | 1 |
| Indeno(1,2,3-cd)Pyrene | ND | | ug/l | 0.500 | 0.250 | 1 |
| Dibenz(a,h)anthracene | ND | | ug/l | 0.500 | 0.250 | 1 |
| Benzo(ghi)perylene | ND | | ug/l | 0.500 | 0.250 | 1 |

**Project Name:** PASSAIC RI/FS CAGED BIVALVE **Lab Number:** L1110328

**Project Number:** TASK23.2.1 **Report Date:** 10/19/11

## SAMPLE RESULTS

| | | | |
|---|---|---|---|
| Lab ID: | L1110328-11 | Date Collected: | 07/18/11 17:00 |
| Client ID: | LPR-071811RB | Date Received: | 07/18/11 |
| Sample Location: | Not Specified | Field Prep: | Not Specified |

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| Semivolatile Organics by GC/MS - Mansfield Lab | | | | | | |

| Surrogate | % Recovery | Qualifier | Acceptance Criteria |
|---|---|---|---|
| 2-Fluorophenol | 53 | | 15-115 |
| Phenol-d5 | 34 | | 15-115 |
| Nitrobenzene-d5 | 85 | | 30-130 |
| 2-Fluorobiphenyl | 80 | | 30-130 |
| 2,4,6-Tribromophenol | 91 | | 15-115 |
| Terphenyl-d14 | 89 | | 30-130 |

**Project Name:** PASSAIC RI/FS CAGED BIVALVE **Lab Number:** L1110328

**Project Number:** TASK23.2.1 **Report Date:** 10/19/11

## SAMPLE RESULTS

| | | | |
|---|---|---|---|
| Lab ID: | L1110328-11 | Date Collected: | 07/18/11 17:00 |
| Client ID: | LPR-071811RB | Date Received: | 07/18/11 |
| Sample Location: | Not Specified | Field Prep: | Not Specified |
| Matrix: | Water | Extraction Method: | EPA 3510C |
| Analytical Method: | 1,8270C-SIM(M) | Extraction Date: | 07/20/11 10:32 |
| Analytical Date: | 07/21/11 03:16 | | |
| Analyst: | AC | | |

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| PAHs - Mansfield Lab | | | | | | |
| Naphthalene | ND | | ng/l | 10.0 | 5.00 | 1 |
| C2-Naphthalenes | ND | | ng/l | 10.0 | 5.00 | 1 |
| C3-Naphthalenes | ND | | ng/l | 10.0 | 5.00 | 1 |
| C4-Naphthalenes | ND | | ng/l | 10.0 | 5.00 | 1 |
| 2-Methylnaphthalene | ND | | ng/l | 10.0 | 5.00 | 1 |
| 1-Methylnaphthalene | ND | | ng/l | 10.0 | 5.00 | 1 |
| 2,6-Dimethylnaphthalene | ND | | ng/l | 10.0 | 5.00 | 1 |
| Acenaphthylene | ND | | ng/l | 10.0 | 5.00 | 1 |
| Acenaphthene | ND | | ng/l | 10.0 | 5.00 | 1 |
| 2,3,5-Trimethylnaphthalene | ND | | ng/l | 10.0 | 5.00 | 1 |
| Fluorene | ND | | ng/l | 10.0 | 5.00 | 1 |
| C1-Fluorenes | ND | | ng/l | 10.0 | 5.00 | 1 |
| C2-Fluorenes | ND | | ng/l | 10.0 | 5.00 | 1 |
| C3-Fluorenes | ND | | ng/l | 10.0 | 5.00 | 1 |
| Dibenzothiophene | ND | | ng/l | 10.0 | 5.00 | 1 |
| C1-Dibenzothiophenes | ND | | ng/l | 10.0 | 5.00 | 1 |
| C2-Dibenzothiophenes | ND | | ng/l | 10.0 | 5.00 | 1 |
| C3-Dibenzothiophenes | ND | | ng/l | 10.0 | 5.00 | 1 |
| C4-Dibenzothiophenes | ND | | ng/l | 10.0 | 5.00 | 1 |
| Phenanthrene | 5.11 | J | ng/l | 10.0 | 5.00 | 1 |
| C1-Phenanthrenes/Anthracenes | ND | | ng/l | 10.0 | 5.00 | 1 |
| C2-Phenanthrenes/Anthracenes | ND | | ng/l | 10.0 | 5.00 | 1 |
| C3-Phenanthrenes/Anthracenes | ND | | ng/l | 10.0 | 5.00 | 1 |
| C4-Phenanthrenes/Anthracenes | ND | | ng/l | 10.0 | 5.00 | 1 |
| Anthracene | ND | | ng/l | 10.0 | 5.00 | 1 |
| 1-Methylphenanthrene | ND | | ng/l | 10.0 | 5.00 | 1 |
| Fluoranthene | 6.78 | J | ng/l | 10.0 | 5.00 | 1 |
| Pyrene | 7.70 | J | ng/l | 10.0 | 5.00 | 1 |
| C1-Fluoranthenes/Pyrenes | ND | | ng/l | 10.0 | 5.00 | 1 |
| Benz(a)anthracene | ND | | ng/l | 10.0 | 5.00 | 1 |
| Chrysene | ND | | ng/l | 10.0 | 5.00 | 1 |

**Project Name:** PASSAIC RI/FS CAGED BIVALVE **Lab Number:** L1110328

**Project Number:** TASK23.2.1 **Report Date:** 10/19/11

## SAMPLE RESULTS

| | | | |
|---|---|---|---|
| Lab ID: | L1110328-11 | Date Collected: | 07/18/11 17:00 |
| Client ID: | LPR-071811RB | Date Received: | 07/18/11 |
| Sample Location: | Not Specified | Field Prep: | Not Specified |

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| PAHs - Mansfield Lab | | | | | | |
| C1-Benzanthracene/chrysenes | ND | | ng/l | 10.0 | 5.00 | 1 |
| C2-Benzanthracene/chrysenes | ND | | ng/l | 10.0 | 5.00 | 1 |
| C3-Benzanthracene/chrysenes | ND | | ng/l | 10.0 | 5.00 | 1 |
| C4-Benzanthracene/chrysenes | ND | | ng/l | 10.0 | 5.00 | 1 |
| Benzo(b)fluoranthene | ND | | ng/l | 10.0 | 5.00 | 1 |
| Benzo(j,k)fluoranthene | ND | | ng/l | 10.0 | 5.00 | 1 |
| Benzo(e)pyrene | ND | | ng/l | 10.0 | 5.00 | 1 |
| Benzo(a)pyrene | ND | | ng/l | 10.0 | 5.00 | 1 |
| Perylene | ND | | ng/l | 10.0 | 5.00 | 1 |
| Indeno(1,2,3-cd)pyrene | ND | | ng/l | 10.0 | 5.00 | 1 |
| Dibenz(a,c+a,h)anthracene | ND | | ng/l | 10.0 | 5.00 | 1 |
| Benzo(g,h,i)perylene | ND | | ng/l | 10.0 | 5.00 | 1 |

| Surrogate | % Recovery | Qualifier | Acceptance Criteria |
|---|---|---|---|
| Naphthalene-d8 | 74 | | 50-130 |
| Phenanthrene-d10 | 76 | | 50-130 |
| Benzo(a)pyrene-d12 | 74 | | 50-130 |

**Project Name:** PASSAIC RI/FS CAGED BIVALVE **Lab Number:** L1110328

**Project Number:** TASK23.2.1 **Report Date:** 10/19/11

# Method Blank Analysis
## Batch Quality Control

Analytical Method: 1,8270C
Analytical Date: 07/28/11 11:09
Analyst: JD

Extraction Method: EPA 3510C
Extraction Date: 07/20/11 10:30

| Parameter | Result | Qualifier | Units | RL | MDL |
|---|---|---|---|---|---|
| Semivolatile Organics by GC/MS - Mansfield Lab for sample(s): 11 Batch: WG479960-1 | | | | | |
| Benzaldehyde | ND | | ug/l | 2.00 | 1.00 |
| Bis(2-chloroethyl)ether | ND | | ug/l | 0.500 | 0.250 |
| Phenol | ND | | ug/l | 0.500 | 0.250 |
| 2-Chlorophenol | ND | | ug/l | 0.500 | 0.250 |
| Bis(2-chloroisopropyl)ether | ND | | ug/l | 0.500 | 0.250 |
| 2-Methylphenol | ND | | ug/l | 0.500 | 0.250 |
| Acetophenone | ND | | ug/l | 0.500 | 0.250 |
| Hexachloroethane | ND | | ug/l | 0.500 | 0.250 |
| N-Nitroso-di-n-propylamine | ND | | ug/l | 0.500 | 0.250 |
| 4-Methylphenol | ND | | ug/l | 0.500 | 0.250 |
| Nitrobenzene | ND | | ug/l | 0.500 | 0.250 |
| Isophorone | ND | | ug/l | 0.500 | 0.250 |
| 2-Nitrophenol | ND | | ug/l | 0.500 | 0.250 |
| 2,4-Dimethylphenol | ND | | ug/l | 0.500 | 0.250 |
| Bis(2-chloroethoxy)methane | ND | | ug/l | 0.500 | 0.250 |
| 2,4-Dichlorophenol | ND | | ug/l | 0.500 | 0.250 |
| Naphthalene | ND | | ug/l | 0.500 | 0.250 |
| 4-Chloroaniline | ND | | ug/l | 0.500 | 0.250 |
| Hexachlorobutadiene | ND | | ug/l | 0.500 | 0.250 |
| Caprolactam | ND | | ug/l | 0.500 | 0.250 |
| P-Chloro-M-Cresol | ND | | ug/l | 0.500 | 0.250 |
| 2-Methylnaphthalene | ND | | ug/l | 0.500 | 0.250 |
| Hexachlorocyclopentadiene | ND | | ug/l | 0.500 | 0.250 |
| 2,4,6-Trichlorophenol | ND | | ug/l | 0.500 | 0.250 |
| 2,4,5-Trichlorophenol | ND | | ug/l | 0.500 | 0.250 |
| Biphenyl | ND | | ug/l | 0.500 | 0.250 |
| 2-Chloronaphthalene | ND | | ug/l | 0.500 | 0.250 |
| 2-Nitroaniline | ND | | ug/l | 0.500 | 0.250 |
| Acenaphthylene | ND | | ug/l | 0.500 | 0.250 |
| Dimethylphthalate | ND | | ug/l | 0.500 | 0.250 |
| 2,6-Dinitrotoluene | ND | | ug/l | 0.500 | 0.250 |

**Project Name:** PASSAIC RI/FS CAGED BIVALVE **Lab Number:** L1110328

**Project Number:** TASK23.2.1 **Report Date:** 10/19/11

# Method Blank Analysis
## Batch Quality Control

Analytical Method: 1,8270C
Analytical Date: 07/28/11 11:09
Analyst: JD

Extraction Method: EPA 3510C
Extraction Date: 07/20/11 10:30

| Parameter | Result | Qualifier | Units | RL | MDL |
|---|---|---|---|---|---|
| Semivolatile Organics by GC/MS - Mansfield Lab for sample(s): 11 Batch: WG479960-1 | | | | | |
| Acenaphthene | ND | | ug/l | 0.500 | 0.250 |
| 3-Nitroaniline | ND | | ug/l | 0.500 | 0.250 |
| 2,4-Dinitrophenol | ND | | ug/l | 5.00 | 2.50 |
| Dibenzofuran | ND | | ug/l | 0.500 | 0.250 |
| 2,4-Dinitrotoluene | ND | | ug/l | 0.500 | 0.250 |
| 4-Nitrophenol | ND | | ug/l | 1.00 | 0.500 |
| Fluorene | ND | | ug/l | 0.500 | 0.250 |
| 4-Chlorophenyl-phenylether | ND | | ug/l | 0.500 | 0.250 |
| Diethylphthalate | ND | | ug/l | 0.500 | 0.250 |
| 4-Nitroaniline | ND | | ug/l | 0.500 | 0.250 |
| 4,6-Dinitro-2-Methylphenol | ND | | ug/l | 2.00 | 1.00 |
| NitrosoDiPhenylAmine(NDPA)/DPA | ND | | ug/l | 0.500 | 0.250 |
| 4-Bromophenyl-phenylether | ND | | ug/l | 0.500 | 0.250 |
| Hexachlorobenzene | ND | | ug/l | 0.500 | 0.250 |
| Atrazine | ND | | ug/l | 0.500 | 0.250 |
| Pentachlorophenol | ND | | ug/l | 2.00 | 1.00 |
| Phenanthrene | ND | | ug/l | 0.500 | 0.250 |
| Anthracene | ND | | ug/l | 0.500 | 0.250 |
| Carbazole | ND | | ug/l | 0.500 | 0.250 |
| Di-n-butylphthalate | ND | | ug/l | 0.500 | 0.250 |
| Fluoranthene | ND | | ug/l | 0.500 | 0.250 |
| Pyrene | ND | | ug/l | 0.500 | 0.250 |
| Butylbenzylphthalate | ND | | ug/l | 0.500 | 0.250 |
| 3,3'-Dichlorobenzidine | ND | | ug/l | 0.500 | 0.250 |
| Benz(a)anthracene | ND | | ug/l | 0.500 | 0.250 |
| Chrysene | ND | | ug/l | 0.500 | 0.250 |
| Bis(2-Ethylhexyl)phthalate | ND | | ug/l | 0.500 | 0.250 |
| Di-n-octylphthalate | ND | | ug/l | 0.500 | 0.250 |
| Benzo(b)fluoranthene | ND | | ug/l | 0.500 | 0.250 |
| Benzo(k)fluoranthene | ND | | ug/l | 0.500 | 0.250 |
| Benzo(a)pyrene | ND | | ug/l | 0.500 | 0.250 |

**Project Name:** PASSAIC RI/FS CAGED BIVALVE
**Project Number:** TASK23.2.1

**Lab Number:** L1110328
**Report Date:** 10/19/11

# Method Blank Analysis
## Batch Quality Control

Analytical Method: 1,8270C
Analytical Date: 07/28/11 11:09
Analyst: JD

Extraction Method: EPA 3510C
Extraction Date: 07/20/11 10:30

| Parameter | Result | Qualifier | Units | RL | MDL |
|---|---|---|---|---|---|
| Semivolatile Organics by GC/MS - Mansfield Lab for sample(s): 11 Batch: WG479960-1 | | | | | |
| Indeno(1,2,3-cd)Pyrene | ND | | ug/l | 0.500 | 0.250 |
| Dibenz(a,h)anthracene | ND | | ug/l | 0.500 | 0.250 |
| Benzo(ghi)perylene | ND | | ug/l | 0.500 | 0.250 |

| Surrogate | %Recovery | Qualifier | Acceptance Criteria |
|---|---|---|---|
| 2-Fluorophenol | 63 | | 15-115 |
| Phenol-d5 | 42 | | 15-115 |
| Nitrobenzene-d5 | 95 | | 30-130 |
| 2-Fluorobiphenyl | 89 | | 30-130 |
| 2,4,6-Tribromophenol | 80 | | 15-115 |
| Terphenyl-d14 | 98 | | 30-130 |

**Project Name:** PASSAIC RI/FS CAGED BIVALVE **Lab Number:** L1110328

**Project Number:** TASK23.2.1 **Report Date:** 10/19/11

# Method Blank Analysis
## Batch Quality Control

Analytical Method: 1,8270C-SIM(M)
Analytical Date: 07/20/11 22:38
Analyst: AC

Extraction Method: EPA 3510C
Extraction Date: 07/20/11 10:32

| Parameter | Result | Qualifier | Units | RL | MDL |
|---|---|---|---|---|---|
| PAHs - Mansfield Lab for sample(s): 11 Batch: WG479975-1 | | | | | |
| Naphthalene | ND | | ng/l | 10.0 | 5.00 |
| C2-Naphthalenes | ND | | ng/l | 10.0 | 5.00 |
| C3-Naphthalenes | ND | | ng/l | 10.0 | 5.00 |
| C4-Naphthalenes | ND | | ng/l | 10.0 | 5.00 |
| 2-Methylnaphthalene | ND | | ng/l | 10.0 | 5.00 |
| 1-Methylnaphthalene | ND | | ng/l | 10.0 | 5.00 |
| 2,6-Dimethylnaphthalene | ND | | ng/l | 10.0 | 5.00 |
| Acenaphthylene | ND | | ng/l | 10.0 | 5.00 |
| Acenaphthene | ND | | ng/l | 10.0 | 5.00 |
| 2,3,5-Trimethylnaphthalene | ND | | ng/l | 10.0 | 5.00 |
| Fluorene | ND | | ng/l | 10.0 | 5.00 |
| C1-Fluorenes | ND | | ng/l | 10.0 | 5.00 |
| C2-Fluorenes | ND | | ng/l | 10.0 | 5.00 |
| C3-Fluorenes | ND | | ng/l | 10.0 | 5.00 |
| Dibenzothiophene | ND | | ng/l | 10.0 | 5.00 |
| C1-Dibenzothiophenes | ND | | ng/l | 10.0 | 5.00 |
| C2-Dibenzothiophenes | ND | | ng/l | 10.0 | 5.00 |
| C3-Dibenzothiophenes | ND | | ng/l | 10.0 | 5.00 |
| C4-Dibenzothiophenes | ND | | ng/l | 10.0 | 5.00 |
| Phenanthrene | ND | | ng/l | 10.0 | 5.00 |
| C1-Phenanthrenes/Anthracenes | ND | | ng/l | 10.0 | 5.00 |
| C2-Phenanthrenes/Anthracenes | ND | | ng/l | 10.0 | 5.00 |
| C3-Phenanthrenes/Anthracenes | ND | | ng/l | 10.0 | 5.00 |
| C4-Phenanthrenes/Anthracenes | ND | | ng/l | 10.0 | 5.00 |
| Anthracene | ND | | ng/l | 10.0 | 5.00 |
| 1-Methylphenanthrene | ND | | ng/l | 10.0 | 5.00 |
| Fluoranthene | ND | | ng/l | 10.0 | 5.00 |
| Pyrene | ND | | ng/l | 10.0 | 5.00 |
| C1-Fluoranthenes/Pyrenes | ND | | ng/l | 10.0 | 5.00 |
| Benz(a)anthracene | ND | | ng/l | 10.0 | 5.00 |
| Chrysene | ND | | ng/l | 10.0 | 5.00 |

**Project Name:** PASSAIC RI/FS CAGED BIVALVE **Lab Number:** L1110328

**Project Number:** TASK23.2.1 **Report Date:** 10/19/11

# Method Blank Analysis
## Batch Quality Control

Analytical Method: 1,8270C-SIM(M)
Analytical Date: 07/20/11 22:38
Analyst: AC

Extraction Method: EPA 3510C
Extraction Date: 07/20/11 10:32

| Parameter | Result | Qualifier | Units | RL | MDL |
|---|---|---|---|---|---|
| PAHs - Mansfield Lab for sample(s): 11 Batch: WG479975-1 | | | | | |
| C1-Benzanthracene/chrysenes | ND | | ng/l | 10.0 | 5.00 |
| C2-Benzanthracene/chrysenes | ND | | ng/l | 10.0 | 5.00 |
| C3-Benzanthracene/chrysenes | ND | | ng/l | 10.0 | 5.00 |
| C4-Benzanthracene/chrysenes | ND | | ng/l | 10.0 | 5.00 |
| Benzo(b)fluoranthene | ND | | ng/l | 10.0 | 5.00 |
| Benzo(j,k)fluoranthene | ND | | ng/l | 10.0 | 5.00 |
| Benzo(e)pyrene | ND | | ng/l | 10.0 | 5.00 |
| Benzo(a)pyrene | ND | | ng/l | 10.0 | 5.00 |
| Perylene | ND | | ng/l | 10.0 | 5.00 |
| Indeno(1,2,3-cd)pyrene | ND | | ng/l | 10.0 | 5.00 |
| Dibenz(a,c+a,h)anthracene | ND | | ng/l | 10.0 | 5.00 |
| Benzo(g,h,i)perylene | ND | | ng/l | 10.0 | 5.00 |

| Surrogate | %Recovery | Qualifier | Acceptance Criteria |
|---|---|---|---|
| Naphthalene-d8 | 74 | | 50-130 |
| Phenanthrene-d10 | 79 | | 50-130 |
| Benzo(a)pyrene-d12 | 77 | | 50-130 |

**Project Name:** PASSAIC RI/FS CAGED BIVALVE **Lab Number:** L1110328

**Project Number:** TASK23.2.1 **Report Date:** 10/19/11

# Method Blank Analysis
## Batch Quality Control

Analytical Method: 1,8270C
Analytical Date: 08/15/11 12:27
Analyst: AW

Extraction Method: EPA 3570
Extraction Date: 07/28/11 16:25
Cleanup Method1: EPA 3640A
Cleanup Date1: 08/03/11

| Parameter | Result | Qualifier | Units | RL | MDL |
|---|---|---|---|---|---|
| Semivolatile Organics by GC/MS - Mansfield Lab for sample(s): 01-10 Batch: WG481282-1 | | | | | |
| Bis(2-chloroethyl)ether | ND | | ug/kg | 200 | 100. |
| Phenol | ND | | ug/kg | 200 | 100. |
| 2-Chlorophenol | ND | | ug/kg | 200 | 100. |
| Bis(2-chloroisopropyl)ether | ND | | ug/kg | 200 | 100. |
| 2-Methylphenol | ND | | ug/kg | 200 | 100. |
| Acetophenone | 210 | | ug/kg | 200 | 100. |
| Hexachloroethane | ND | | ug/kg | 200 | 100. |
| N-Nitroso-di-n-propylamine | ND | | ug/kg | 200 | 100. |
| 4-Methylphenol | ND | | ug/kg | 200 | 100. |
| Nitrobenzene | ND | | ug/kg | 200 | 100. |
| Isophorone | ND | | ug/kg | 200 | 100. |
| 2-Nitrophenol | ND | | ug/kg | 200 | 100. |
| 2,4-Dimethylphenol | ND | | ug/kg | 200 | 100. |
| Bis(2-chloroethoxy)methane | ND | | ug/kg | 200 | 100. |
| 2,4-Dichlorophenol | ND | | ug/kg | 200 | 100. |
| Naphthalene | ND | | ug/kg | 200 | 100. |
| 4-Chloroaniline | ND | | ug/kg | 200 | 100. |
| Hexachlorobutadiene | ND | | ug/kg | 200 | 100. |
| Caprolactam | ND | | ug/kg | 200 | 100. |
| P-Chloro-M-Cresol | ND | | ug/kg | 200 | 100. |
| 2-Methylnaphthalene | ND | | ug/kg | 200 | 100. |
| Hexachlorocyclopentadiene | ND | | ug/kg | 200 | 100. |
| 2,4,6-Trichlorophenol | ND | | ug/kg | 200 | 100. |
| 2,4,5-Trichlorophenol | ND | | ug/kg | 200 | 100. |
| Biphenyl | ND | | ug/kg | 200 | 100. |
| 2-Chloronaphthalene | ND | | ug/kg | 200 | 100. |
| 2-Nitroaniline | ND | | ug/kg | 200 | 100. |
| Acenaphthylene | ND | | ug/kg | 200 | 100. |
| Dimethylphthalate | ND | | ug/kg | 200 | 100. |
| 2,6-Dinitrotoluene | ND | | ug/kg | 200 | 100. |
| Acenaphthene | ND | | ug/kg | 200 | 100. |

**Project Name:** PASSAIC RI/FS CAGED BIVALVE **Lab Number:** L1110328

**Project Number:** TASK23.2.1 **Report Date:** 10/19/11

# Method Blank Analysis
## Batch Quality Control

Analytical Method: 1,8270C
Analytical Date: 08/15/11 12:27
Analyst: AW

Extraction Method: EPA 3570
Extraction Date: 07/28/11 16:25
Cleanup Method1: EPA 3640A
Cleanup Date1: 08/03/11

| Parameter | Result | Qualifier | Units | RL | MDL |
|---|---|---|---|---|---|
| Semivolatile Organics by GC/MS - Mansfield Lab for sample(s): 01-10 Batch: WG481282-1 | | | | | |
| 3-Nitroaniline | ND | | ug/kg | 200 | 100. |
| 2,4-Dinitrophenol | ND | | ug/kg | 800 | 400. |
| Dibenzofuran | ND | | ug/kg | 200 | 100. |
| 2,4-Dinitrotoluene | ND | | ug/kg | 200 | 100. |
| 4-Nitrophenol | ND | | ug/kg | 400 | 200. |
| Fluorene | ND | | ug/kg | 200 | 100. |
| 4-Chlorophenyl-phenylether | ND | | ug/kg | 200 | 100. |
| Diethylphthalate | ND | | ug/kg | 200 | 100. |
| 4-Nitroaniline | ND | | ug/kg | 200 | 100. |
| 4,6-Dinitro-2-Methylphenol | ND | | ug/kg | 800 | 400. |
| NitrosoDiPhenylAmine(NDPA)/DPA | ND | | ug/kg | 200 | 100. |
| 4-Bromophenyl-phenylether | ND | | ug/kg | 200 | 100. |
| Hexachlorobenzene | ND | | ug/kg | 200 | 100. |
| Atrazine | ND | | ug/kg | 200 | 100. |
| Pentachlorophenol | ND | | ug/kg | 800 | 400. |
| Phenanthrene | ND | | ug/kg | 200 | 100. |
| Anthracene | ND | | ug/kg | 200 | 100. |
| Carbazole | ND | | ug/kg | 200 | 100. |
| Di-n-butylphthalate | ND | | ug/kg | 200 | 100. |
| Fluoranthene | ND | | ug/kg | 200 | 100. |
| Pyrene | ND | | ug/kg | 200 | 100. |
| Butylbenzylphthalate | ND | | ug/kg | 200 | 100. |
| 3,3'-Dichlorobenzidine | ND | | ug/kg | 200 | 100. |
| Benz(a)anthracene | ND | | ug/kg | 200 | 100. |
| Chrysene | ND | | ug/kg | 200 | 100. |
| Bis(2-Ethylhexyl)phthalate | ND | | ug/kg | 200 | 100. |
| Di-n-octylphthalate | ND | | ug/kg | 200 | 100. |
| Benzo(b)fluoranthene | ND | | ug/kg | 200 | 100. |
| Benzo(k)fluoranthene | ND | | ug/kg | 200 | 100. |
| Benzo(a)pyrene | ND | | ug/kg | 200 | 100. |
| Indeno(1,2,3-cd)Pyrene | ND | | ug/kg | 200 | 100. |

**Project Name:** PASSAIC RI/FS CAGED BIVALVE
**Project Number:** TASK23.2.1

**Lab Number:** L1110328
**Report Date:** 10/19/11

# Method Blank Analysis
## Batch Quality Control

Analytical Method: 1,8270C
Analytical Date: 08/15/11 12:27
Analyst: AW

Extraction Method: EPA 3570
Extraction Date: 07/28/11 16:25
Cleanup Method1: EPA 3640A
Cleanup Date1: 08/03/11

| Parameter | Result | Qualifier | Units | RL | MDL |
|---|---|---|---|---|---|
| Semivolatile Organics by GC/MS - Mansfield Lab for sample(s): 01-10 Batch: WG481282-1 | | | | | |
| Dibenz(a,h)anthracene | ND | | ug/kg | 200 | 100. |
| Benzo(ghi)perylene | ND | | ug/kg | 200 | 100. |

| Surrogate | %Recovery | Qualifier | Acceptance Criteria |
|---|---|---|---|
| 2-Fluorobiphenyl | 92 | | 30-130 |
| Phenol-d5 | 100 | | 30-130 |
| Nitrobenzene-d5 | 99 | | 30-130 |
| 2-Fluorophenol | 100 | | 30-130 |
| 2,4,6-Tribromophenol | 75 | | 30-130 |
| Terphenyl-d14 | 105 | | 30-130 |

**Project Name:** PASSAIC RI/FS CAGED BIVALVE

**Lab Number:** L1110328

**Project Number:** TASK23.2.1

**Report Date:** 10/19/11

# Method Blank Analysis
## Batch Quality Control

Analytical Method: 1,8270C-SIM(M)
Analytical Date: 08/06/11 00:59
Analyst: AC

Extraction Method: ALPHA OP-018
Extraction Date: 07/28/11 12:19
Cleanup Method1: EPA 3611B
Cleanup Date1: 08/02/11
Cleanup Method2: EPA 3640A
Cleanup Date2: 08/02/11

| Parameter | Result | Qualifier | Units | RL | MDL |
|---|---|---|---|---|---|
| PAHs - Mansfield Lab for sample(s): 03-07 Batch: WG481307-1 | | | | | |
| Naphthalene | ND | | ug/kg | 1.00 | 0.500 |
| C2-Naphthalenes | ND | | ug/kg | 1.00 | 0.500 |
| C3-Naphthalenes | ND | | ug/kg | 1.00 | 0.500 |
| C4-Naphthalenes | ND | | ug/kg | 1.00 | 0.500 |
| 2-Methylnaphthalene | ND | | ug/kg | 1.00 | 0.500 |
| 1-Methylnaphthalene | ND | | ug/kg | 1.00 | 0.500 |
| 2,6-Dimethylnaphthalene | ND | | ug/kg | 1.00 | 0.500 |
| Acenaphthylene | ND | | ug/kg | 1.00 | 0.500 |
| Acenaphthene | ND | | ug/kg | 1.00 | 0.500 |
| 2,3,5-Trimethylnaphthalene | ND | | ug/kg | 1.00 | 0.500 |
| Fluorene | ND | | ug/kg | 1.00 | 0.500 |
| C1-Fluorenes | ND | | ug/kg | 1.00 | 0.500 |
| C2-Fluorenes | ND | | ug/kg | 1.00 | 0.500 |
| C3-Fluorenes | ND | | ug/kg | 1.00 | 0.500 |
| Dibenzothiophene | ND | | ug/kg | 1.00 | 0.500 |
| C1-Dibenzothiophenes | ND | | ug/kg | 1.00 | 0.500 |
| C2-Dibenzothiophenes | ND | | ug/kg | 1.00 | 0.500 |
| C3-Dibenzothiophenes | ND | | ug/kg | 1.00 | 0.500 |
| C4-Dibenzothiophenes | ND | | ug/kg | 1.00 | 0.500 |
| Phenanthrene | 0.760 | J | ug/kg | 1.00 | 0.500 |
| C1-Phenanthrenes/Anthracenes | ND | | ug/kg | 1.00 | 0.500 |
| C2-Phenanthrenes/Anthracenes | ND | | ug/kg | 1.00 | 0.500 |
| C3-Phenanthrenes/Anthracenes | ND | | ug/kg | 1.00 | 0.500 |
| C4-Phenanthrenes/Anthracenes | ND | | ug/kg | 1.00 | 0.500 |
| Anthracene | ND | | ug/kg | 1.00 | 0.500 |
| 1-Methylphenanthrene | ND | | ug/kg | 1.00 | 0.500 |
| Fluoranthene | 2.52 | | ug/kg | 1.00 | 0.500 |
| Pyrene | 11.1 | | ug/kg | 1.00 | 0.500 |
| C1-Fluoranthenes/Pyrenes | ND | | ug/kg | 1.00 | 0.500 |
| Benz(a)anthracene | ND | | ug/kg | 1.00 | 0.500 |
| Chrysene | ND | | ug/kg | 1.00 | 0.500 |

**Project Name:** PASSAIC RI/FS CAGED BIVALVE

**Project Number:** TASK23.2.1

**Lab Number:** L1110328

**Report Date:** 10/19/11

# Method Blank Analysis
## Batch Quality Control

Analytical Method: 1,8270C-SIM(M)
Analytical Date: 08/06/11 00:59
Analyst: AC

Extraction Method: ALPHA OP-018
Extraction Date: 07/28/11 12:19
Cleanup Method1: EPA 3611B
Cleanup Date1: 08/02/11
Cleanup Method2: EPA 3640A
Cleanup Date2: 08/02/11

| Parameter | Result | Qualifier | Units | RL | MDL |
|---|---|---|---|---|---|
| PAHs - Mansfield Lab for sample(s): 03-07 Batch: WG481307-1 | | | | | |
| C1-Benzanthracene/chrysenes | ND | | ug/kg | 1.00 | 0.500 |
| C2-Benzanthracene/chrysenes | ND | | ug/kg | 1.00 | 0.500 |
| C3-Benzanthracene/chrysenes | ND | | ug/kg | 1.00 | 0.500 |
| C4-Benzanthracene/chrysenes | ND | | ug/kg | 1.00 | 0.500 |
| Benzo(b)fluoranthene | ND | | ug/kg | 1.00 | 0.500 |
| Benzo(j,k)fluoranthene | ND | | ug/kg | 1.00 | 0.500 |
| Benzo(e)pyrene | ND | | ug/kg | 1.00 | 0.500 |
| Benzo(a)pyrene | ND | | ug/kg | 1.00 | 0.500 |
| Perylene | ND | | ug/kg | 1.00 | 0.500 |
| Indeno(1,2,3-cd)pyrene | ND | | ug/kg | 1.00 | 0.500 |
| Dibenz(a,c+a,h)anthracene | ND | | ug/kg | 1.00 | 0.500 |
| Benzo(g,h,i)perylene | ND | | ug/kg | 1.00 | 0.500 |

| Surrogate | %Recovery | Qualifier | Acceptance Criteria |
|---|---|---|---|
| Naphthalene-d8 | 85 | | 50-130 |
| Phenanthrene-d10 | 106 | | 50-130 |
| Benzo(a)pyrene-d12 | 104 | | 50-130 |

**Project Name:** PASSAIC RI/FS CAGED BIVALVE

**Project Number:** TASK23.2.1

**Lab Number:** L1110328

**Report Date:** 10/19/11

# Method Blank Analysis
## Batch Quality Control

Analytical Method: 1,8270C-SIM(M)
Analytical Date: 09/16/11 20:29
Analyst: AC

Extraction Method: ALPHA OP-018
Extraction Date: 09/12/11 13:12
Cleanup Method1: EPA 3611B
Cleanup Date1: 09/13/11
Cleanup Method2: EPA 3640A
Cleanup Date2: 09/15/11

| Parameter | Result | Qualifier | Units | RL | MDL |
|---|---|---|---|---|---|
| PAHs - Mansfield Lab for sample(s): 02,08-10 Batch: WG489480-1 | | | | | |
| Naphthalene | ND | | ug/kg | 1.00 | 0.500 |
| C2-Naphthalenes | ND | | ug/kg | 1.00 | 0.500 |
| C3-Naphthalenes | ND | | ug/kg | 1.00 | 0.500 |
| C4-Naphthalenes | ND | | ug/kg | 1.00 | 0.500 |
| 2-Methylnaphthalene | ND | | ug/kg | 1.00 | 0.500 |
| 1-Methylnaphthalene | ND | | ug/kg | 1.00 | 0.500 |
| 2,6-Dimethylnaphthalene | ND | | ug/kg | 1.00 | 0.500 |
| Acenaphthylene | ND | | ug/kg | 1.00 | 0.500 |
| Acenaphthene | ND | | ug/kg | 1.00 | 0.500 |
| 2,3,5-Trimethylnaphthalene | ND | | ug/kg | 1.00 | 0.500 |
| Fluorene | ND | | ug/kg | 1.00 | 0.500 |
| C1-Fluorenes | ND | | ug/kg | 1.00 | 0.500 |
| C2-Fluorenes | ND | | ug/kg | 1.00 | 0.500 |
| C3-Fluorenes | ND | | ug/kg | 1.00 | 0.500 |
| Dibenzothiophene | ND | | ug/kg | 1.00 | 0.500 |
| C1-Dibenzothiophenes | ND | | ug/kg | 1.00 | 0.500 |
| C2-Dibenzothiophenes | ND | | ug/kg | 1.00 | 0.500 |
| C3-Dibenzothiophenes | ND | | ug/kg | 1.00 | 0.500 |
| C4-Dibenzothiophenes | ND | | ug/kg | 1.00 | 0.500 |
| Phenanthrene | ND | | ug/kg | 1.00 | 0.500 |
| C1-Phenanthrenes/Anthracenes | ND | | ug/kg | 1.00 | 0.500 |
| C2-Phenanthrenes/Anthracenes | ND | | ug/kg | 1.00 | 0.500 |
| C3-Phenanthrenes/Anthracenes | ND | | ug/kg | 1.00 | 0.500 |
| C4-Phenanthrenes/Anthracenes | ND | | ug/kg | 1.00 | 0.500 |
| Anthracene | ND | | ug/kg | 1.00 | 0.500 |
| 1-Methylphenanthrene | ND | | ug/kg | 1.00 | 0.500 |
| Fluoranthene | ND | | ug/kg | 1.00 | 0.500 |
| Pyrene | ND | | ug/kg | 1.00 | 0.500 |
| C1-Fluoranthenes/Pyrenes | ND | | ug/kg | 1.00 | 0.500 |
| Benz(a)anthracene | ND | | ug/kg | 1.00 | 0.500 |
| Chrysene | ND | | ug/kg | 1.00 | 0.500 |

**Project Name:** PASSAIC RI/FS CAGED BIVALVE

**Project Number:** TASK23.2.1

**Lab Number:** L1110328

**Report Date:** 10/19/11

# Method Blank Analysis
## Batch Quality Control

Analytical Method: 1,8270C-SIM(M)
Analytical Date: 09/16/11 20:29
Analyst: AC

Extraction Method: ALPHA OP-018
Extraction Date: 09/12/11 13:12
Cleanup Method1: EPA 3611B
Cleanup Date1: 09/13/11
Cleanup Method2: EPA 3640A
Cleanup Date2: 09/15/11

| Parameter | Result | Qualifier | Units | RL | MDL |
|---|---|---|---|---|---|
| PAHs - Mansfield Lab for sample(s): 02,08-10 Batch: WG489480-1 | | | | | |
| C1-Benzanthracene/chrysenes | ND | | ug/kg | 1.00 | 0.500 |
| C2-Benzanthracene/chrysenes | ND | | ug/kg | 1.00 | 0.500 |
| C3-Benzanthracene/chrysenes | ND | | ug/kg | 1.00 | 0.500 |
| C4-Benzanthracene/chrysenes | ND | | ug/kg | 1.00 | 0.500 |
| Benzo(b)fluoranthene | ND | | ug/kg | 1.00 | 0.500 |
| Benzo(j,k)fluoranthene | ND | | ug/kg | 1.00 | 0.500 |
| Benzo(e)pyrene | ND | | ug/kg | 1.00 | 0.500 |
| Benzo(a)pyrene | ND | | ug/kg | 1.00 | 0.500 |
| Perylene | ND | | ug/kg | 1.00 | 0.500 |
| Indeno(1,2,3-cd)pyrene | ND | | ug/kg | 1.00 | 0.500 |
| Dibenz(a,c+a,h)anthracene | ND | | ug/kg | 1.00 | 0.500 |
| Benzo(g,h,i)perylene | ND | | ug/kg | 1.00 | 0.500 |

| Surrogate | %Recovery | Qualifier | Acceptance Criteria |
|---|---|---|---|
| Naphthalene-d8 | 88 | | 50-130 |
| Phenanthrene-d10 | 93 | | 50-130 |
| Benzo(a)pyrene-d12 | 84 | | 50-130 |

**Project Name:** PASSAIC RI/FS CAGED BIVALVE

**Project Number:** TASK23.2.1

**Lab Number:** L1110328

**Report Date:** 10/19/11

# Method Blank Analysis
## Batch Quality Control

Analytical Method: 1,8270C-SIM(M)
Analytical Date: 09/23/11 10:45
Analyst: AC

Extraction Method: ALPHA OP-018
Extraction Date: 09/22/11 05:18
Cleanup Method1: EPA 3611B
Cleanup Date1: 09/22/11
Cleanup Method2: EPA 3640A
Cleanup Date2: 09/22/11

| Parameter | Result | Qualifier | Units | RL | MDL |
|---|---|---|---|---|---|
| PAHs - Mansfield Lab for sample(s): 01 Batch: WG491520-1 | | | | | |
| Naphthalene | ND | | ug/kg | 1.00 | 0.500 |
| C2-Naphthalenes | ND | | ug/kg | 1.00 | 0.500 |
| C3-Naphthalenes | ND | | ug/kg | 1.00 | 0.500 |
| C4-Naphthalenes | ND | | ug/kg | 1.00 | 0.500 |
| 2-Methylnaphthalene | ND | | ug/kg | 1.00 | 0.500 |
| 1-Methylnaphthalene | ND | | ug/kg | 1.00 | 0.500 |
| 2,6-Dimethylnaphthalene | ND | | ug/kg | 1.00 | 0.500 |
| Acenaphthylene | ND | | ug/kg | 1.00 | 0.500 |
| Acenaphthene | ND | | ug/kg | 1.00 | 0.500 |
| 2,3,5-Trimethylnaphthalene | ND | | ug/kg | 1.00 | 0.500 |
| Fluorene | ND | | ug/kg | 1.00 | 0.500 |
| C1-Fluorenes | ND | | ug/kg | 1.00 | 0.500 |
| C2-Fluorenes | ND | | ug/kg | 1.00 | 0.500 |
| C3-Fluorenes | ND | | ug/kg | 1.00 | 0.500 |
| Dibenzothiophene | ND | | ug/kg | 1.00 | 0.500 |
| C1-Dibenzothiophenes | ND | | ug/kg | 1.00 | 0.500 |
| C2-Dibenzothiophenes | ND | | ug/kg | 1.00 | 0.500 |
| C3-Dibenzothiophenes | ND | | ug/kg | 1.00 | 0.500 |
| C4-Dibenzothiophenes | ND | | ug/kg | 1.00 | 0.500 |
| Phenanthrene | ND | | ug/kg | 1.00 | 0.500 |
| C1-Phenanthrenes/Anthracenes | ND | | ug/kg | 1.00 | 0.500 |
| C2-Phenanthrenes/Anthracenes | ND | | ug/kg | 1.00 | 0.500 |
| C3-Phenanthrenes/Anthracenes | ND | | ug/kg | 1.00 | 0.500 |
| C4-Phenanthrenes/Anthracenes | ND | | ug/kg | 1.00 | 0.500 |
| Anthracene | ND | | ug/kg | 1.00 | 0.500 |
| 1-Methylphenanthrene | ND | | ug/kg | 1.00 | 0.500 |
| Fluoranthene | ND | | ug/kg | 1.00 | 0.500 |
| Pyrene | ND | | ug/kg | 1.00 | 0.500 |
| C1-Fluoranthenes/Pyrenes | ND | | ug/kg | 1.00 | 0.500 |
| Benz(a)anthracene | ND | | ug/kg | 1.00 | 0.500 |
| Chrysene | ND | | ug/kg | 1.00 | 0.500 |

**Project Name:** PASSAIC RI/FS CAGED BIVALVE

**Project Number:** TASK23.2.1

**Lab Number:** L1110328

**Report Date:** 10/19/11

# Method Blank Analysis
## Batch Quality Control

Analytical Method: 1,8270C-SIM(M)
Analytical Date: 09/23/11 10:45
Analyst: AC

Extraction Method: ALPHA OP-018
Extraction Date: 09/22/11 05:18
Cleanup Method1: EPA 3611B
Cleanup Date1: 09/22/11
Cleanup Method2: EPA 3640A
Cleanup Date2: 09/22/11

| Parameter | Result | Qualifier | Units | RL | MDL |
|---|---|---|---|---|---|
| PAHs - Mansfield Lab for sample(s): 01 Batch: WG491520-1 | | | | | |
| C1-Benzanthracene/chrysenes | ND | | ug/kg | 1.00 | 0.500 |
| C2-Benzanthracene/chrysenes | ND | | ug/kg | 1.00 | 0.500 |
| C3-Benzanthracene/chrysenes | ND | | ug/kg | 1.00 | 0.500 |
| C4-Benzanthracene/chrysenes | ND | | ug/kg | 1.00 | 0.500 |
| Benzo(b)fluoranthene | ND | | ug/kg | 1.00 | 0.500 |
| Benzo(j,k)fluoranthene | ND | | ug/kg | 1.00 | 0.500 |
| Benzo(e)pyrene | ND | | ug/kg | 1.00 | 0.500 |
| Benzo(a)pyrene | ND | | ug/kg | 1.00 | 0.500 |
| Perylene | ND | | ug/kg | 1.00 | 0.500 |
| Indeno(1,2,3-cd)pyrene | ND | | ug/kg | 1.00 | 0.500 |
| Dibenz(a,c+a,h)anthracene | ND | | ug/kg | 1.00 | 0.500 |
| Benzo(g,h,i)perylene | ND | | ug/kg | 1.00 | 0.500 |

| Surrogate | %Recovery | Qualifier | Acceptance Criteria |
|---|---|---|---|
| Naphthalene-d8 | 75 | | 50-130 |
| Phenanthrene-d10 | 88 | | 50-130 |
| Benzo(a)pyrene-d12 | 84 | | 50-130 |

# Lab Control Sample Analysis
## Batch Quality Control

**Project Name:** PASSAIC RI/FS CAGED BIVALVE
**Project Number:** TASK23.2.1

**Lab Number:** L1110328
**Report Date:** 10/19/11

| Parameter | LCS %Recovery | Qual | LCSD %Recovery | Qual | %Recovery Limits | RPD | Qual | RPD Limits |
|---|---|---|---|---|---|---|---|---|
| Semivolatile Organics by GC/MS - Mansfield Lab Associated sample(s): 11 Batch: WG479960-2 WG479960-3 | | | | | | | | |
| Benzaldehyde | **186** | Q | **181** | Q | 40-140 | 3 | | 30 |
| Bis(2-chloroethyl)ether | 90 | | 88 | | 40-140 | 2 | | 30 |
| Phenol | 44 | | 43 | | 30-130 | 2 | | 30 |
| 2-Chlorophenol | 87 | | 85 | | 30-130 | 2 | | 30 |
| Bis(2-chloroisopropyl)ether | 88 | | 87 | | 40-140 | 1 | | 30 |
| 2-Methylphenol | 82 | | 81 | | 30-130 | 1 | | 30 |
| Acetophenone | 88 | | 87 | | 40-140 | 1 | | 30 |
| Hexachloroethane | 86 | | 88 | | 40-140 | 2 | | 30 |
| N-Nitroso-di-n-propylamine | 88 | | 86 | | 40-140 | 2 | | 30 |
| 4-Methylphenol | 77 | | 76 | | 30-130 | 1 | | 30 |
| Nitrobenzene | 89 | | 88 | | 40-140 | 1 | | 30 |
| Isophorone | 102 | | 102 | | 40-140 | 0 | | 30 |
| 2-Nitrophenol | 96 | | 96 | | 40-140 | 0 | | 30 |
| 2,4-Dimethylphenol | 84 | | 83 | | 40-140 | 1 | | 30 |
| Bis(2-chloroethoxy)methane | 88 | | 89 | | 40-140 | 1 | | 30 |
| 2,4-Dichlorophenol | 92 | | 91 | | 30-130 | 1 | | 30 |
| Naphthalene | 100 | | 99 | | 40-140 | 1 | | 30 |
| 4-Chloroaniline | 74 | | 77 | | 40-140 | 4 | | 30 |
| Hexachlorobutadiene | 93 | | 94 | | 40-140 | 1 | | 30 |
| Caprolactam | **32** | Q | **32** | Q | 40-140 | 0 | | 30 |
| P-Chloro-M-Cresol | 92 | | 91 | | 30-130 | 1 | | 30 |

# Lab Control Sample Analysis
## Batch Quality Control

**Project Name:** PASSAIC RI/FS CAGED BIVALVE
**Project Number:** TASK23.2.1

**Lab Number:** L1110328
**Report Date:** 10/19/11

| Parameter | LCS %Recovery | Qual | LCSD %Recovery | Qual | %Recovery Limits | RPD | Qual | RPD Limits |
|---|---|---|---|---|---|---|---|---|
| Semivolatile Organics by GC/MS - Mansfield Lab Associated sample(s): 11 Batch: WG479960-2 WG479960-3 | | | | | | | | |
| 2-Methylnaphthalene | 84 | | 83 | | 40-140 | 1 | | 30 |
| Hexachlorocyclopentadiene | 64 | | 65 | | 40-140 | 2 | | 30 |
| 2,4,6-Trichlorophenol | 91 | | 90 | | 30-130 | 1 | | 30 |
| 2,4,5-Trichlorophenol | 94 | | 93 | | 30-130 | 1 | | 30 |
| Biphenyl | 89 | | 87 | | 40-140 | 2 | | 30 |
| 2-Chloronaphthalene | 83 | | 82 | | 40-140 | 1 | | 30 |
| 2-Nitroaniline | 96 | | 95 | | 40-140 | 1 | | 30 |
| Acenaphthylene | 89 | | 88 | | 40-140 | 1 | | 30 |
| Dimethylphthalate | 83 | | 82 | | 40-140 | 1 | | 30 |
| 2,6-Dinitrotoluene | 102 | | 100 | | 40-140 | 2 | | 30 |
| Acenaphthene | 88 | | 88 | | 40-140 | 0 | | 30 |
| 3-Nitroaniline | 89 | | 88 | | 40-140 | 1 | | 30 |
| 2,4-Dinitrophenol | 97 | | 95 | | 30-130 | 2 | | 30 |
| Dibenzofuran | 87 | | 85 | | 40-140 | 2 | | 30 |
| 2,4-Dinitrotoluene | 100 | | 98 | | 40-140 | 2 | | 30 |
| 4-Nitrophenol | 50 | | 49 | | 30-130 | 2 | | 30 |
| Fluorene | 89 | | 88 | | 40-140 | 1 | | 30 |
| 4-Chlorophenyl-phenylether | 84 | | 83 | | 40-140 | 1 | | 30 |
| Diethylphthalate | 90 | | 89 | | 40-140 | 1 | | 30 |
| 4-Nitroaniline | 95 | | 95 | | 40-140 | 0 | | 30 |
| 4,6-Dinitro-2-Methylphenol | 102 | | 103 | | 30-130 | 1 | | 30 |

# Lab Control Sample Analysis
## Batch Quality Control

**Project Name:** PASSAIC RI/FS CAGED BIVALVE
**Project Number:** TASK23.2.1

**Lab Number:** L1110328
**Report Date:** 10/19/11

| Parameter | LCS %Recovery | Qual | LCSD %Recovery | Qual | %Recovery Limits | RPD | Qual | RPD Limits |
|---|---|---|---|---|---|---|---|---|
| Semivolatile Organics by GC/MS - Mansfield Lab Associated sample(s): 11 Batch: WG479960-2 WG479960-3 | | | | | | | | |
| NitrosoDiPhenylAmine(NDPA)/DPA | 104 | | 103 | | 40-140 | 1 | | 30 |
| 4-Bromophenyl-phenylether | 88 | | 88 | | 40-140 | 0 | | 30 |
| Hexachlorobenzene | 88 | | 88 | | 40-140 | 0 | | 30 |
| Atrazine | 89 | | 88 | | 40-140 | 1 | | 30 |
| Pentachlorophenol | 111 | | 108 | | 30-130 | 3 | | 30 |
| Phenanthrene | 90 | | 89 | | 40-140 | 1 | | 30 |
| Anthracene | 89 | | 88 | | 40-140 | 1 | | 30 |
| Carbazole | 92 | | 91 | | 40-140 | 1 | | 30 |
| Di-n-butylphthalate | 91 | | 90 | | 40-140 | 1 | | 30 |
| Fluoranthene | 94 | | 92 | | 40-140 | 2 | | 30 |
| Pyrene | 90 | | 91 | | 40-140 | 1 | | 30 |
| Butylbenzylphthalate | 101 | | 100 | | 40-140 | 1 | | 30 |
| 3,3'-Dichlorobenzidine | 97 | | 97 | | 40-140 | 0 | | 30 |
| Benz(a)anthracene | 95 | | 94 | | 40-140 | 1 | | 30 |
| Chrysene | 99 | | 98 | | 40-140 | 1 | | 30 |
| Bis(2-Ethylhexyl)phthalate | 103 | | 102 | | 40-140 | 1 | | 30 |
| Di-n-octylphthalate | 104 | | 104 | | 40-140 | 0 | | 30 |
| Benzo(b)fluoranthene | 99 | | 93 | | 40-140 | 6 | | 30 |
| Benzo(k)fluoranthene | 93 | | 99 | | 40-140 | 6 | | 30 |
| Benzo(a)pyrene | 97 | | 96 | | 40-140 | 1 | | 30 |
| Indeno(1,2,3-cd)Pyrene | 110 | | 110 | | 40-140 | 0 | | 30 |

# Lab Control Sample Analysis

## Batch Quality Control

**Project Name:** PASSAIC RI/FS CAGED BIVALVE

**Project Number:** TASK23.2.1

**Lab Number:** L1110328

**Report Date:** 10/19/11

| Parameter | LCS %Recovery | Qual | LCSD %Recovery | Qual | %Recovery Limits | RPD | Qual | RPD Limits |
|---|---|---|---|---|---|---|---|---|
| Semivolatile Organics by GC/MS - Mansfield Lab Associated sample(s): 11 Batch: WG479960-2 WG479960-3 | | | | | | | | |
| Dibenz(a,h)anthracene | 87 | | 86 | | 40-140 | 1 | | 30 |
| Benzo(ghi)perylene | 96 | | 95 | | 40-140 | 1 | | 30 |

| Surrogate | LCS %Recovery | Qual | LCSD %Recovery | Qual | Acceptance Criteria |
|---|---|---|---|---|---|
| 2-Fluorophenol | 68 | | 65 | | 15-115 |
| Phenol-d5 | 45 | | 43 | | 15-115 |
| Nitrobenzene-d5 | 94 | | 92 | | 30-130 |
| 2-Fluorobiphenyl | 85 | | 84 | | 30-130 |
| 2,4,6-Tribromophenol | 100 | | 98 | | 15-115 |
| Terphenyl-d14 | 92 | | 91 | | 30-130 |

# Lab Control Sample Analysis

## Batch Quality Control

**Project Name:** PASSAIC RI/FS CAGED BIVALVE

**Project Number:** TASK23.2.1

**Lab Number:** L1110328

**Report Date:** 10/19/11

| Parameter | LCS %Recovery | Qual | LCSD %Recovery | Qual | %Recovery Limits | RPD | Qual | RPD Limits |
|---|---|---|---|---|---|---|---|---|
| PAHs - Mansfield Lab Associated sample(s): 11 Batch: WG479975-2 WG479975-3 | | | | | | | | |
| Naphthalene | 87 | | 91 | | 50-130 | 4 | | 30 |
| 2-Methylnaphthalene | 84 | | 88 | | 50-130 | 5 | | 30 |
| Acenaphthylene | 85 | | 89 | | 50-130 | 5 | | 30 |
| Acenaphthene | 86 | | 90 | | 50-130 | 5 | | 30 |
| Fluorene | 83 | | 87 | | 50-130 | 5 | | 30 |
| Phenanthrene | 81 | | 85 | | 50-130 | 5 | | 30 |
| Anthracene | 86 | | 92 | | 50-130 | 7 | | 30 |
| Fluoranthene | 79 | | 83 | | 50-130 | 5 | | 30 |
| Pyrene | 82 | | 86 | | 50-130 | 5 | | 30 |
| Benz(a)anthracene | 75 | | 75 | | 50-130 | 0 | | 30 |
| Chrysene | 74 | | 75 | | 50-130 | 1 | | 30 |
| Benzo(b)fluoranthene | 71 | | 71 | | 50-130 | 0 | | 30 |
| Benzo(j)+(k)Fluoranthene | 74 | | 75 | | 50-130 | 1 | | 30 |
| Benzo(a)pyrene | 77 | | 77 | | 50-130 | 0 | | 30 |
| Indeno(1,2,3-cd)Pyrene | 72 | | 72 | | 50-130 | 0 | | 30 |
| Dibenz(a,h)+(a,c)anthracene | 73 | | 72 | | 50-130 | 1 | | 30 |
| Benzo(ghi)perylene | 71 | | 71 | | 50-130 | 0 | | 30 |

# Lab Control Sample Analysis

## Batch Quality Control

**Project Name:** PASSAIC RI/FS CAGED BIVALVE

**Project Number:** TASK23.2.1

**Lab Number:** L1110328

**Report Date:** 10/19/11

| Parameter | LCS %Recovery | Qual | LCSD %Recovery | Qual | %Recovery Limits | RPD | Qual | RPD Limits |
|---|---|---|---|---|---|---|---|---|
| PAHs - Mansfield Lab Associated sample(s): 11 Batch: WG479975-2 WG479975-3 | | | | | | | | |

| Surrogate | LCS %Recovery | Qual | LCSD %Recovery | Qual | Acceptance Criteria |
|---|---|---|---|---|---|
| Naphthalene-d8 | 87 | | 90 | | 50-130 |
| Phenanthrene-d10 | 76 | | 79 | | 50-130 |
| Benzo(a)pyrene-d12 | 78 | | 77 | | 50-130 |

| Semivolatile Organics by GC/MS - Mansfield Lab Associated sample(s): 01-10 Batch: WG481282-2 WG481282-3 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Bis(2-chloroethyl)ether | 69 | | 70 | | 40-140 | 1 | | 30 |
| Phenol | 72 | | 72 | | 30-130 | 0 | | 30 |
| 2-Chlorophenol | 70 | | 68 | | 30-130 | 3 | | 30 |
| Bis(2-chloroisopropyl)ether | 69 | | 69 | | 40-140 | 0 | | 30 |
| 2-Methylphenol | 60 | | 61 | | 30-130 | 2 | | 30 |
| Acetophenone | 76 | | 77 | | 40-140 | 1 | | 30 |
| Hexachloroethane | 67 | | 68 | | 40-140 | 1 | | 30 |
| N-Nitroso-di-n-propylamine | 66 | | 67 | | 40-140 | 2 | | 30 |
| 4-Methylphenol | 65 | | 65 | | 30-130 | 0 | | 30 |

# Lab Control Sample Analysis
## Batch Quality Control

**Project Name:** PASSAIC RI/FS CAGED BIVALVE
**Project Number:** TASK23.2.1

**Lab Number:** L1110328
**Report Date:** 10/19/11

| Parameter | LCS %Recovery | Qual | LCSD %Recovery | Qual | %Recovery Limits | RPD | Qual | RPD Limits |
|---|---|---|---|---|---|---|---|---|
| Semivolatile Organics by GC/MS - Mansfield Lab Associated sample(s): 01-10 Batch: WG481282-2 WG481282-3 | | | | | | | | |
| Nitrobenzene | 71 | | 72 | | 40-140 | 1 | | 30 |
| Isophorone | 78 | | 78 | | 40-140 | 0 | | 30 |
| 2-Nitrophenol | 76 | | 73 | | 30-130 | 4 | | 30 |
| 2,4-Dimethylphenol | 64 | | 61 | | 30-130 | 5 | | 30 |
| Bis(2-chloroethoxy)methane | 70 | | 69 | | 40-140 | 1 | | 30 |
| 2,4-Dichlorophenol | 72 | | 71 | | 30-130 | 1 | | 30 |
| Naphthalene | 77 | | 78 | | 40-140 | 1 | | 30 |
| 4-Chloroaniline | 48 | | 55 | | 40-140 | 14 | | 30 |
| Hexachlorobutadiene | 73 | | 72 | | 40-140 | 1 | | 30 |
| Caprolactam | 85 | | 85 | | 40-140 | 0 | | 30 |
| P-Chloro-M-Cresol | 74 | | 74 | | 30-130 | 0 | | 30 |
| 2-Methylnaphthalene | 63 | | 64 | | 40-140 | 2 | | 30 |
| Hexachlorocyclopentadiene | 49 | | 51 | | 40-140 | 4 | | 30 |
| 2,4,6-Trichlorophenol | 73 | | 71 | | 30-130 | 3 | | 30 |
| 2,4,5-Trichlorophenol | 68 | | 67 | | 30-130 | 1 | | 30 |
| Biphenyl | 71 | | 71 | | 40-140 | 0 | | 30 |
| 2-Chloronaphthalene | 67 | | 66 | | 40-140 | 2 | | 30 |
| 2-Nitroaniline | 73 | | 74 | | 40-140 | 1 | | 30 |
| Acenaphthylene | 72 | | 72 | | 40-140 | 0 | | 30 |
| Dimethylphthalate | 66 | | 66 | | 40-140 | 0 | | 30 |
| 2,6-Dinitrotoluene | 82 | | 83 | | 40-140 | 1 | | 30 |

# Lab Control Sample Analysis
## Batch Quality Control

**Project Name:** PASSAIC RI/FS CAGED BIVALVE
**Project Number:** TASK23.2.1

**Lab Number:** L1110328
**Report Date:** 10/19/11

| Parameter | LCS %Recovery | Qual | LCSD %Recovery | Qual | %Recovery Limits | RPD | Qual | RPD Limits |
|---|---|---|---|---|---|---|---|---|
| Semivolatile Organics by GC/MS - Mansfield Lab Associated sample(s): 01-10 Batch: WG481282-2 WG481282-3 | | | | | | | | |
| Acenaphthene | 70 | | 71 | | 40-140 | 1 | | 30 |
| 3-Nitroaniline | 61 | | 68 | | 40-140 | 11 | | 30 |
| 2,4-Dinitrophenol | **22** | Q | **20** | Q | 30-130 | 10 | | 30 |
| Dibenzofuran | 65 | | 66 | | 40-140 | 2 | | 30 |
| 2,4-Dinitrotoluene | 82 | | 83 | | 40-140 | 1 | | 30 |
| 4-Nitrophenol | 78 | | 72 | | 30-130 | 8 | | 30 |
| Fluorene | 72 | | 74 | | 40-140 | 3 | | 30 |
| 4-Chlorophenyl-phenylether | 67 | | 67 | | 40-140 | 0 | | 30 |
| Diethylphthalate | 72 | | 73 | | 40-140 | 1 | | 30 |
| 4-Nitroaniline | 72 | | 72 | | 40-140 | 0 | | 30 |
| 4,6-Dinitro-2-Methylphenol | 65 | | 64 | | 30-130 | 2 | | 30 |
| NitrosoDiPhenylAmine(NDPA)/DPA | 84 | | 86 | | 40-140 | 2 | | 30 |
| 4-Bromophenyl-phenylether | 72 | | 73 | | 40-140 | 1 | | 30 |
| Hexachlorobenzene | 73 | | 72 | | 40-140 | 1 | | 30 |
| Atrazine | 79 | | 78 | | 40-140 | 1 | | 30 |
| Pentachlorophenol | 69 | | 53 | | 30-130 | 26 | | 30 |
| Phenanthrene | 75 | | 77 | | 40-140 | 3 | | 30 |
| Anthracene | 74 | | 76 | | 40-140 | 3 | | 30 |
| Carbazole | 76 | | 78 | | 40-140 | 3 | | 30 |
| Di-n-butylphthalate | 77 | | 77 | | 40-140 | 0 | | 30 |
| Fluoranthene | 80 | | 81 | | 40-140 | 1 | | 30 |

# Lab Control Sample Analysis
## Batch Quality Control

**Project Name:** PASSAIC RI/FS CAGED BIVALVE
**Project Number:** TASK23.2.1

**Lab Number:** L1110328
**Report Date:** 10/19/11

| Parameter | LCS %Recovery | Qual | LCSD %Recovery | Qual | %Recovery Limits | RPD | Qual | RPD Limits |
|---|---|---|---|---|---|---|---|---|
| Semivolatile Organics by GC/MS - Mansfield Lab Associated sample(s): 01-10 Batch: WG481282-2 WG481282-3 | | | | | | | | |
| Pyrene | 77 | | 78 | | 40-140 | 1 | | 30 |
| Butylbenzylphthalate | 85 | | 87 | | 40-140 | 2 | | 30 |
| 3,3'-Dichlorobenzidine | 75 | | 76 | | 40-140 | 1 | | 30 |
| Benz(a)anthracene | 81 | | 82 | | 40-140 | 1 | | 30 |
| Chrysene | 97 | | 97 | | 40-140 | 0 | | 30 |
| Bis(2-Ethylhexyl)phthalate | 85 | | 93 | | 40-140 | 9 | | 30 |
| Di-n-octylphthalate | 88 | | 90 | | 40-140 | 2 | | 30 |
| Benzo(b)fluoranthene | 79 | | 79 | | 40-140 | 0 | | 30 |
| Benzo(k)fluoranthene | 82 | | 84 | | 40-140 | 2 | | 30 |
| Benzo(a)pyrene | 80 | | 81 | | 40-140 | 1 | | 30 |
| Indeno(1,2,3-cd)Pyrene | 85 | | 82 | | 40-140 | 4 | | 30 |
| Dibenz(a,h)anthracene | 80 | | 81 | | 40-140 | 1 | | 30 |
| Benzo(ghi)perylene | 76 | | 76 | | 40-140 | 0 | | 30 |

| Surrogate | LCS %Recovery | Qual | LCSD %Recovery | Qual | Acceptance Criteria |
|---|---|---|---|---|---|
| 2-Fluorobiphenyl | 87 | | 78 | | 30-130 |
| Phenol-d5 | 98 | | 88 | | 30-130 |
| Nitrobenzene-d5 | 96 | | 88 | | 30-130 |
| 2-Fluorophenol | 101 | | 89 | | 30-130 |
| 2,4,6-Tribromophenol | 107 | | 91 | | 30-130 |
| Terphenyl-d14 | 98 | | 89 | | 30-130 |

# Lab Control Sample Analysis
## Batch Quality Control

**Project Name:** PASSAIC RI/FS CAGED BIVALVE
**Project Number:** TASK23.2.1

**Lab Number:** L1110328
**Report Date:** 10/19/11

| Parameter | LCS %Recovery | Qual | LCSD %Recovery | Qual | %Recovery Limits | RPD | Qual | RPD Limits |
|---|---|---|---|---|---|---|---|---|
| PAHs - Mansfield Lab Associated sample(s): 03-07 Batch: WG481307-2 WG481307-3 | | | | | | | | |
| Naphthalene | 75 | | 96 | | 50-130 | 25 | | 30 |
| 2-Methylnaphthalene | 77 | | 93 | | 50-130 | 19 | | 30 |
| Acenaphthylene | 85 | | 95 | | 50-130 | 11 | | 30 |
| Acenaphthene | 84 | | 95 | | 50-130 | 12 | | 30 |
| Fluorene | 91 | | 96 | | 50-130 | 5 | | 30 |
| Phenanthrene | 99 | | 104 | | 50-130 | 5 | | 30 |
| Anthracene | 95 | | 100 | | 50-130 | 5 | | 30 |
| Fluoranthene | 99 | | 104 | | 50-130 | 5 | | 30 |
| Pyrene | 103 | | 108 | | 50-130 | 5 | | 30 |
| Benz(a)anthracene | 94 | | 98 | | 50-130 | 4 | | 30 |
| Chrysene | 102 | | 104 | | 50-130 | 2 | | 30 |
| Benzo(b)fluoranthene | 94 | | 93 | | 50-130 | 1 | | 30 |
| Benzo(j)+(k)Fluoranthene | 103 | | 112 | | 50-130 | 8 | | 30 |
| Benzo(a)pyrene | 100 | | 103 | | 50-130 | 3 | | 30 |
| Indeno(1,2,3-cd)Pyrene | 102 | | 105 | | 50-130 | 3 | | 30 |
| Dibenz(a,h)+(a,c)anthracene | 104 | | 108 | | 50-130 | 4 | | 30 |
| Benzo(ghi)perylene | 98 | | 99 | | 50-130 | 1 | | 30 |

# Lab Control Sample Analysis

## Batch Quality Control

**Project Name:** PASSAIC RI/FS CAGED BIVALVE

**Project Number:** TASK23.2.1

**Lab Number:** L1110328

**Report Date:** 10/19/11

| Parameter | LCS %Recovery | Qual | LCSD %Recovery | Qual | %Recovery Limits | RPD | Qual | RPD Limits |
|---|---|---|---|---|---|---|---|---|
| PAHs - Mansfield Lab Associated sample(s): 03-07 Batch: WG481307-2 WG481307-3 | | | | | | | | |

| Surrogate | LCS %Recovery | Qual | LCSD %Recovery | Qual | Acceptance Criteria |
|---|---|---|---|---|---|
| Naphthalene-d8 | 68 | | 90 | | 50-130 |
| Phenanthrene-d10 | 104 | | 107 | | 50-130 |
| Benzo(a)pyrene-d12 | 96 | | 96 | | 50-130 |

| PAHs - Mansfield Lab Associated sample(s): 02,08-10 Batch: WG489480-2 WG489480-3 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Naphthalene | 84 | | 81 | | 50-130 | 4 | | 30 |
| 2-Methylnaphthalene | 88 | | 82 | | 50-130 | 7 | | 30 |
| Acenaphthylene | 91 | | 88 | | 50-130 | 3 | | 30 |
| Acenaphthene | 89 | | 87 | | 50-130 | 2 | | 30 |
| Fluorene | 93 | | 90 | | 50-130 | 3 | | 30 |
| Phenanthrene | 91 | | 88 | | 50-130 | 3 | | 30 |
| Anthracene | 86 | | 83 | | 50-130 | 4 | | 30 |
| Fluoranthene | 87 | | 79 | | 50-130 | 10 | | 30 |
| Pyrene | 91 | | 83 | | 50-130 | 9 | | 30 |

# Lab Control Sample Analysis
## Batch Quality Control

**Project Name:** PASSAIC RI/FS CAGED BIVALVE
**Project Number:** TASK23.2.1

**Lab Number:** L1110328
**Report Date:** 10/19/11

| Parameter | LCS %Recovery | Qual | LCSD %Recovery | Qual | %Recovery Limits | RPD | Qual | RPD Limits |
|---|---|---|---|---|---|---|---|---|
| PAHs - Mansfield Lab Associated sample(s): 02,08-10 Batch: WG489480-2 WG489480-3 | | | | | | | | |
| Benz(a)anthracene | 99 | | 94 | | 50-130 | 5 | | 30 |
| Chrysene | 97 | | 94 | | 50-130 | 3 | | 30 |
| Benzo(b)fluoranthene | 88 | | 86 | | 50-130 | 2 | | 30 |
| Benzo(j)+(k)Fluoranthene | 97 | | 89 | | 50-130 | 9 | | 30 |
| Benzo(a)pyrene | 88 | | 83 | | 50-130 | 6 | | 30 |
| Indeno(1,2,3-cd)Pyrene | 90 | | 82 | | 50-130 | 9 | | 30 |
| Dibenz(a,h)+(a,c)anthracene | 90 | | 79 | | 50-130 | 13 | | 30 |
| Benzo(ghi)perylene | 86 | | 76 | | 50-130 | 12 | | 30 |

| Surrogate | LCS %Recovery | Qual | LCSD %Recovery | Qual | Acceptance Criteria |
|---|---|---|---|---|---|
| Naphthalene-d8 | 78 | | 75 | | 50-130 |
| Phenanthrene-d10 | 86 | | 82 | | 50-130 |
| Benzo(a)pyrene-d12 | 74 | | 69 | | 50-130 |

# Lab Control Sample Analysis

## Batch Quality Control

**Project Name:** PASSAIC RI/FS CAGED BIVALVE

**Project Number:** TASK23.2.1

**Lab Number:** L1110328

**Report Date:** 10/19/11

| Parameter | LCS %Recovery | Qual | LCSD %Recovery | Qual | %Recovery Limits | RPD | Qual | RPD Limits |
|---|---|---|---|---|---|---|---|---|
| PAHs - Mansfield Lab Associated sample(s): 01 Batch: WG491520-2 WG491520-3 | | | | | | | | |
| Naphthalene | 74 | | 72 | | 50-130 | 3 | | 30 |
| 2-Methylnaphthalene | 83 | | 80 | | 50-130 | 4 | | 30 |
| Acenaphthylene | 88 | | 84 | | 50-130 | 5 | | 30 |
| Acenaphthene | 86 | | 82 | | 50-130 | 5 | | 30 |
| Fluorene | 89 | | 90 | | 50-130 | 1 | | 30 |
| Phenanthrene | 93 | | 88 | | 50-130 | 6 | | 30 |
| Anthracene | 85 | | 80 | | 50-130 | 6 | | 30 |
| Fluoranthene | 86 | | 87 | | 50-130 | 1 | | 30 |
| Pyrene | 90 | | 90 | | 50-130 | 0 | | 30 |
| Benz(a)anthracene | 100 | | 96 | | 50-130 | 4 | | 30 |
| Chrysene | 95 | | 91 | | 50-130 | 4 | | 30 |
| Benzo(b)fluoranthene | 92 | | 87 | | 50-130 | 6 | | 30 |
| Benzo(j)+(k)Fluoranthene | 93 | | 88 | | 50-130 | 6 | | 30 |
| Benzo(a)pyrene | 86 | | 82 | | 50-130 | 5 | | 30 |
| Indeno(1,2,3-cd)Pyrene | 97 | | 93 | | 50-130 | 4 | | 30 |
| Dibenz(a,h)+(a,c)anthracene | 96 | | 92 | | 50-130 | 4 | | 30 |
| Benzo(ghi)perylene | 89 | | 85 | | 50-130 | 5 | | 30 |

# Lab Control Sample Analysis

## Batch Quality Control

**Project Name:** PASSAIC RI/FS CAGED BIVALVE

**Project Number:** TASK23.2.1

**Lab Number:** L1110328

**Report Date:** 10/19/11

| Parameter | LCS %Recovery | Qual | LCSD %Recovery | Qual | %Recovery Limits | RPD | Qual | RPD Limits |
|---|---|---|---|---|---|---|---|---|
| PAHs - Mansfield Lab Associated sample(s): 01 Batch: WG491520-2 WG491520-3 | | | | | | | | |

| Surrogate | LCS %Recovery | Qual | LCSD %Recovery | Qual | Acceptance Criteria |
|---|---|---|---|---|---|
| Naphthalene-d8 | 75 | | 72 | | 50-130 |
| Phenanthrene-d10 | 93 | | 88 | | 50-130 |
| Benzo(a)pyrene-d12 | 80 | | 76 | | 50-130 |

# Matrix Spike Analysis
## Batch Quality Control

**Project Name:** PASSAIC RI/FS CAGED BIVALVE
**Project Number:** TASK23.2.1

**Lab Number:** L1110328
**Report Date:** 10/19/11

Semivolatile Organics by GC/MS - Mansfield Lab Associated sample(s): 01-10 QC Batch ID: WG481282-5 WG481282-6 QC Sample: L1110328-01 Client ID: LPR6-ECST-COMP01

| Parameter | Native Sample | MS Added | MS Found | MS %Recovery | Qual | MSD Found | MSD %Recovery | Qual | Recovery Limits | RPD | Qual | RPD Limits |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Bis(2-chloroethyl)ether | ND | 37700 | 30100 | 80 | | 28000 | 76 | | 40-140 | 7 | | 30 |
| Phenol | ND | 37700 | 29600 | 78 | | 27400 | 74 | | 30-130 | 8 | | 30 |
| 2-Chlorophenol | ND | 37700 | 29300 | 78 | | 27600 | 75 | | 30-130 | 6 | | 30 |
| Bis(2-chloroisopropyl)ether | ND | 37700 | 30200 | 80 | | 28200 | 76 | | 40-140 | 7 | | 30 |
| 2-Methylphenol | ND | 37700 | 23200 | 62 | | 21200 | 58 | | 30-130 | 9 | | 30 |
| Acetophenone | ND | 37700 | 30600 | 81 | | 28400 | 77 | | 40-140 | 7 | | 30 |
| Hexachloroethane | ND | 37700 | 27200 | 72 | | 26000 | 71 | | 40-140 | 5 | | 30 |
| N-Nitroso-di-n-propylamine | ND | 37700 | 29600 | 78 | | 27600 | 75 | | 40-140 | 7 | | 30 |
| 4-Methylphenol | ND | 37700 | 25200 | 67 | | 23400 | 63 | | 30-130 | 7 | | 30 |
| Nitrobenzene | ND | 37700 | 30800 | 82 | | 28900 | 78 | | 40-140 | 6 | | 30 |
| Isophorone | ND | 37700 | 34500 | 91 | | 32500 | 88 | | 40-140 | 6 | | 30 |
| 2-Nitrophenol | ND | 37700 | 35500 | 94 | | 33800 | 92 | | 30-130 | 5 | | 30 |
| 2,4-Dimethylphenol | ND | 37700 | 5010 | **13** | Q | 4310 | **12** | Q | 30-130 | 15 | | 30 |
| Bis(2-chloroethoxy)methane | ND | 37700 | 30000 | 80 | | 28100 | 76 | | 40-140 | 7 | | 30 |
| 2,4-Dichlorophenol | ND | 37700 | 30800 | 82 | | 28900 | 78 | | 30-130 | 6 | | 30 |
| Naphthalene | ND | 37700 | 31400 | 83 | | 29700 | 81 | | 40-140 | 6 | | 30 |
| 4-Chloroaniline | ND | 37700 | 18200 | 48 | | 17500 | 47 | | 40-140 | 4 | | 30 |
| Hexachlorobutadiene | ND | 37700 | 28900 | 77 | | 27900 | 76 | | 40-140 | 4 | | 30 |
| Caprolactam | ND | 37700 | 34700 | 92 | | 31800 | 86 | | 40-140 | 9 | | 30 |
| P-Chloro-M-Cresol | ND | 37700 | 30800 | 82 | | 29200 | 79 | | 30-130 | 5 | | 30 |
| 2-Methylnaphthalene | ND | 37700 | 25900 | 69 | | 24700 | 67 | | 40-140 | 5 | | 30 |

# Matrix Spike Analysis
## Batch Quality Control

**Project Name:** PASSAIC RI/FS CAGED BIVALVE
**Project Number:** TASK23.2.1
**Lab Number:** L1110328
**Report Date:** 10/19/11

| Parameter | Native Sample | MS Added | MS Found | MS %Recovery | Qual | MSD Found | MSD %Recovery | Qual | Recovery Limits | RPD | Qual | RPD Limits |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Semivolatile Organics by GC/MS - Mansfield Lab Associated sample(s): 01-10 QC Batch ID: WG481282-5 WG481282-6 QC Sample: L1110328-01 Client ID: LPR6-ECST-COMP01 | | | | | | | | | | | | |
| Hexachlorocyclopentadiene | ND | 37700 | ND | **0** | Q | ND | **0** | Q | 40-140 | NC | | 30 |
| 2,4,6-Trichlorophenol | ND | 37700 | 29800 | 79 | | 28400 | 77 | | 30-130 | 5 | | 30 |
| 2,4,5-Trichlorophenol | ND | 37700 | 28900 | 77 | | 27200 | 74 | | 30-130 | 6 | | 30 |
| Biphenyl | ND | 37700 | 28600 | 76 | | 27400 | 74 | | 40-140 | 4 | | 30 |
| 2-Chloronaphthalene | ND | 37700 | 26800 | 71 | | 25700 | 70 | | 40-140 | 4 | | 30 |
| 2-Nitroaniline | ND | 37700 | 34100 | 90 | | 32200 | 87 | | 40-140 | 6 | | 30 |
| Acenaphthylene | ND | 37700 | 26600 | 71 | | 25500 | 69 | | 40-140 | 4 | | 30 |
| Dimethylphthalate | ND | 37700 | 27200 | 72 | | 25800 | 70 | | 40-140 | 5 | | 30 |
| 2,6-Dinitrotoluene | ND | 37700 | 34700 | 92 | | 32900 | 89 | | 40-140 | 5 | | 30 |
| Acenaphthene | ND | 37700 | 28500 | 76 | | 27400 | 74 | | 40-140 | 4 | | 30 |
| 3-Nitroaniline | ND | 37700 | 25500 | 68 | | 23600 | 64 | | 40-140 | 8 | | 30 |
| 2,4-Dinitrophenol | ND | 37700 | 18700 | 50 | | 18900 | 51 | | 30-130 | 1 | | 30 |
| Dibenzofuran | ND | 37700 | 26400 | 70 | | 25300 | 69 | | 40-140 | 4 | | 30 |
| 2,4-Dinitrotoluene | ND | 37700 | 35500 | 94 | | 33500 | 91 | | 40-140 | 6 | | 30 |
| 4-Nitrophenol | ND | 37700 | 38900 | 103 | | 36600 | 99 | | 30-130 | 6 | | 30 |
| Fluorene | ND | 37700 | 28400 | 75 | | 27300 | 74 | | 40-140 | 4 | | 30 |
| 4-Chlorophenyl-phenylether | ND | 37700 | 25900 | 69 | | 25000 | 68 | | 40-140 | 4 | | 30 |
| Diethylphthalate | ND | 37700 | 29300 | 78 | | 27800 | 75 | | 40-140 | 5 | | 30 |
| 4-Nitroaniline | ND | 37700 | 24900 | 66 | | 24400 | 66 | | 40-140 | 2 | | 30 |
| 4,6-Dinitro-2-Methylphenol | ND | 37700 | 29200 | 77 | | 30600 | 83 | | 30-130 | 5 | | 30 |
| NitrosoDiPhenylAmine(NDPA)/DPA | ND | 37700 | 32000 | 85 | | 30900 | 84 | | 40-140 | 3 | | 30 |

# Matrix Spike Analysis
## Batch Quality Control

**Project Name:** PASSAIC RI/FS CAGED BIVALVE
**Project Number:** TASK23.2.1

**Lab Number:** L1110328
**Report Date:** 10/19/11

| Parameter | Native Sample | MS Added | MS Found | MS %Recovery | Qual | MSD Found | MSD %Recovery | Qual | Recovery Limits | RPD | Qual | RPD Limits |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Semivolatile Organics by GC/MS - Mansfield Lab Associated sample(s): 01-10 QC Batch ID: WG481282-5 WG481282-6 QC Sample: L1110328-01 Client ID: LPR6-ECST-COMP01 | | | | | | | | | | | | |
| 4-Bromophenyl-phenylether | ND | 37700 | 28100 | 75 | | 27500 | 75 | | 40-140 | 2 | | 30 |
| Hexachlorobenzene | ND | 37700 | 26700 | 71 | | 26200 | 71 | | 40-140 | 2 | | 30 |
| Atrazine | ND | 37700 | 31100 | 82 | | 29900 | 81 | | 40-140 | 4 | | 30 |
| Pentachlorophenol | ND | 37700 | 27200 | 72 | | 26400 | 72 | | 30-130 | 3 | | 30 |
| Phenanthrene | ND | 37700 | 29000 | 77 | | 28500 | 77 | | 40-140 | 2 | | 30 |
| Anthracene | ND | 37700 | 26000 | 69 | | 25300 | 69 | | 40-140 | 3 | | 30 |
| Carbazole | ND | 37700 | 30100 | 80 | | 29000 | 79 | | 40-140 | 4 | | 30 |
| Di-n-butylphthalate | ND | 37700 | 29400 | 78 | | 28800 | 78 | | 40-140 | 2 | | 30 |
| Fluoranthene | ND | 37700 | 30100 | 80 | | 29400 | 80 | | 40-140 | 2 | | 30 |
| Pyrene | ND | 37700 | 29400 | 78 | | 28800 | 78 | | 40-140 | 2 | | 30 |
| Butylbenzylphthalate | ND | 37700 | 35100 | 93 | | 34800 | 94 | | 40-140 | 1 | | 30 |
| 3,3'-Dichlorobenzidine | ND | 37700 | 15400 | 41 | | 15000 | 41 | | 40-140 | 3 | | 30 |
| Benz(a)anthracene | ND | 37700 | 31100 | 82 | | 30800 | 84 | | 40-140 | 1 | | 30 |
| Chrysene | ND | 37700 | 36200 | 96 | | 35400 | 96 | | 40-140 | 2 | | 30 |
| Bis(2-Ethylhexyl)phthalate | 1570 | 37700 | 34700 | 88 | | 34000 | 88 | | 40-140 | 2 | | 30 |
| Di-n-octylphthalate | ND | 37700 | 36400 | 97 | | 36300 | 98 | | 40-140 | 0 | | 30 |
| Benzo(b)fluoranthene | ND | 37700 | 31100 | 82 | | 29000 | 79 | | 40-140 | 7 | | 30 |
| Benzo(k)fluoranthene | ND | 37700 | 28000 | 74 | | 28800 | 78 | | 40-140 | 3 | | 30 |
| Benzo(a)pyrene | ND | 37700 | 29500 | 78 | | 28800 | 78 | | 40-140 | 2 | | 30 |
| Indeno(1,2,3-cd)Pyrene | ND | 37700 | 31200 | 83 | | 31200 | 85 | | 40-140 | 0 | | 30 |
| Dibenz(a,h)anthracene | ND | 37700 | 29700 | 79 | | 29000 | 79 | | 40-140 | 2 | | 30 |

# Matrix Spike Analysis
## Batch Quality Control

**Project Name:** PASSAIC RI/FS CAGED BIVALVE
**Project Number:** TASK23.2.1
**Lab Number:** L1110328
**Report Date:** 10/19/11

| Parameter | Native Sample | MS Added | MS Found | MS %Recovery | Qual | MSD Found | MSD %Recovery | Qual | Recovery Limits | RPD | Qual | RPD Limits |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Semivolatile Organics by GC/MS - Mansfield Lab Associated sample(s): 01-10 QC Batch ID: WG481282-5 WG481282-6 QC Sample: L1110328-01 Client ID: LPR6-ECST-COMP01 | | | | | | | | | | | | |
| Benzo(ghi)perylene | ND | 37700 | 28200 | 75 | | 26900 | 73 | | 40-140 | 5 | | 30 |

| Surrogate | MS % Recovery | MS Qualifier | MSD % Recovery | MSD Qualifier | Acceptance Criteria |
|---|---|---|---|---|---|
| 2,4,6-Tribromophenol | 81 | | 80 | | 30-130 |
| 2-Fluorobiphenyl | 74 | | 73 | | 30-130 |
| 2-Fluorophenol | 85 | | 81 | | 30-130 |
| Nitrobenzene-d5 | 88 | | 85 | | 30-130 |
| Phenol-d5 | 88 | | 84 | | 30-130 |
| Terphenyl-d14 | 76 | | 77 | | 30-130 |

# Matrix Spike Analysis
## Batch Quality Control

**Project Name:** PASSAIC RI/FS CAGED BIVALVE
**Project Number:** TASK23.2.1

**Lab Number:** L1110328
**Report Date:** 10/19/11

PAHs - Mansfield Lab Associated sample(s): 01 QC Batch ID: WG491520-5 WG491520-6 QC Sample: L1110328-01 Client ID: LPR6-ECST-COMP01

| Parameter | Native Sample | MS Added | MS Found | MS %Recovery | Qual | MSD Found | MSD %Recovery | Qual | Recovery Limits | RPD | Qual | RPD Limits |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Naphthalene | 0.491J | 188 | 129 | 69 | | 134 | 71 | | 50-150 | 4 | | 30 |
| 2-Methylnaphthalene | ND | 188 | 137 | 73 | | 150 | 80 | | 50-150 | 9 | | 30 |
| Acenaphthylene | 0.491J | 188 | 148 | 79 | | 156 | 83 | | 50-150 | 5 | | 30 |
| Acenaphthene | 1.40 | 188 | 152 | 80 | | 156 | 82 | | 50-150 | 3 | | 30 |
| Fluorene | 1.06 | 188 | 158 | 84 | | 173 | 92 | | 50-150 | 9 | | 30 |
| Phenanthrene | 8.44 | 188 | 160 | 81 | | 174 | 88 | | 50-150 | 8 | | 30 |
| Anthracene | 1.81 | 188 | 136 | 72 | | 153 | 81 | | 50-150 | 12 | | 30 |
| Fluoranthene | 40.9 | 188 | 193 | 81 | | 201 | 85 | | 50-150 | 4 | | 30 |
| Pyrene | 63.8 | 188 | 218 | 82 | | 228 | 88 | | 50-150 | 4 | | 30 |
| Benz(a)anthracene | 9.16 | 188 | 181 | 92 | | 183 | 93 | | 50-150 | 1 | | 30 |
| Chrysene | 44.3 | 188 | 211 | 89 | | 210 | 88 | | 50-150 | 0 | | 30 |
| Benzo(b)fluoranthene | 14.2 | 188 | 172 | 84 | | 172 | 84 | | 50-150 | 0 | | 30 |
| Benzo(j)+(k)Fluoranthene | 7.13 | 188 | 168 | 86 | | 169 | 86 | | 50-150 | 1 | | 30 |
| Benzo(a)pyrene | 5.47 | 188 | 159 | 82 | | 160 | 82 | | 50-150 | 1 | | 30 |
| Indeno(1,2,3-cd)Pyrene | 2.42 | 188 | 176 | 93 | | 174 | 92 | | 50-150 | 1 | | 30 |
| Dibenz(a,h)+(a,c)anthracene | 0.962 | 188 | 162 | 86 | | 160 | 85 | | 50-150 | 1 | | 30 |
| Benzo(ghi)perylene | 7.55 | 188 | 156 | 79 | | 155 | 79 | | 50-150 | 1 | | 30 |

| Surrogate | MS % Recovery | MS Qualifier | MSD % Recovery | MSD Qualifier | Acceptance Criteria |
|---|---|---|---|---|---|
| Benzo(a)pyrene-d12 | 78 | | 80 | | 50-130 |
| Naphthalene-d8 | 72 | | 75 | | 50-130 |

# Matrix Spike Analysis
## Batch Quality Control

**Project Name:** PASSAIC RI/FS CAGED BIVALVE
**Project Number:** TASK23.2.1

**Lab Number:** L1110328
**Report Date:** 10/19/11

| Parameter | Native Sample | MS Added | MS Found | MS %Recovery | Qual | MSD Found | MSD %Recovery | Qual | Recovery Limits | RPD | Qual | RPD Limits |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PAHs - Mansfield Lab Associated sample(s): 01 QC Batch ID: WG491520-5 WG491520-6 QC Sample: L1110328-01 Client ID: LPR6-ECST-COMP01 | | | | | | | | | | | | |

| Surrogate | MS % Recovery | MS Qualifier | MSD % Recovery | MSD Qualifier | Acceptance Criteria |
|---|---|---|---|---|---|
| Phenanthrene-d10 | 82 | | 90 | | 50-130 |

# Lab Duplicate Analysis
## Batch Quality Control

**Project Name:** PASSAIC RI/FS CAGED BIVALVE
**Project Number:** TASK23.2.1

**Lab Number:** L1110328
**Report Date:** 10/19/11

| Parameter | Native Sample | Duplicate Sample | Units | RPD | Qual | RPD Limits |
|---|---|---|---|---|---|---|
| Semivolatile Organics by GC/MS - Mansfield Lab Associated sample(s): 01-10 QC Batch ID: WG481282-4 QC Sample: L1110328-01 Client ID: LPR6-ECST-COMP01 | | | | | | |
| Bis(2-chloroethyl)ether | ND | ND | ug/kg | NC | | 30 |
| Phenol | ND | ND | ug/kg | NC | | 30 |
| 2-Chlorophenol | ND | ND | ug/kg | NC | | 30 |
| Bis(2-chloroisopropyl)ether | ND | ND | ug/kg | NC | | 30 |
| 2-Methylphenol | ND | ND | ug/kg | NC | | 30 |
| Acetophenone | ND | ND | ug/kg | NC | | 30 |
| Hexachloroethane | ND | ND | ug/kg | NC | | 30 |
| N-Nitroso-di-n-propylamine | ND | ND | ug/kg | NC | | 30 |
| 4-Methylphenol | ND | ND | ug/kg | NC | | 30 |
| Nitrobenzene | ND | ND | ug/kg | NC | | 30 |
| Isophorone | ND | ND | ug/kg | NC | | 30 |
| 2-Nitrophenol | ND | ND | ug/kg | NC | | 30 |
| 2,4-Dimethylphenol | ND | ND | ug/kg | NC | | 30 |
| Bis(2-chloroethoxy)methane | ND | ND | ug/kg | NC | | 30 |
| 2,4-Dichlorophenol | ND | ND | ug/kg | NC | | 30 |
| Naphthalene | ND | ND | ug/kg | NC | | 30 |
| 4-Chloroaniline | ND | ND | ug/kg | NC | | 30 |
| Hexachlorobutadiene | ND | ND | ug/kg | NC | | 30 |
| Caprolactam | ND | ND | ug/kg | NC | | 30 |

# Lab Duplicate Analysis
## Batch Quality Control

**Project Name:** PASSAIC RI/FS CAGED BIVALVE
**Project Number:** TASK23.2.1

**Lab Number:** L1110328
**Report Date:** 10/19/11

| Parameter | Native Sample | Duplicate Sample | Units | RPD | RPD Limits |
|---|---|---|---|---|---|
| Semivolatile Organics by GC/MS - Mansfield Lab Associated sample(s): 01-10 QC Batch ID: WG481282-4 QC Sample: L1110328-01 Client ID: LPR6-ECST-COMP01 | | | | | |
| P-Chloro-M-Cresol | ND | ND | ug/kg | NC | 30 |
| 2-Methylnaphthalene | ND | ND | ug/kg | NC | 30 |
| Hexachlorocyclopentadiene | ND | ND | ug/kg | NC | 30 |
| 2,4,6-Trichlorophenol | ND | ND | ug/kg | NC | 30 |
| 2,4,5-Trichlorophenol | ND | ND | ug/kg | NC | 30 |
| Biphenyl | ND | ND | ug/kg | NC | 30 |
| 2-Chloronaphthalene | ND | ND | ug/kg | NC | 30 |
| 2-Nitroaniline | ND | ND | ug/kg | NC | 30 |
| Acenaphthylene | ND | ND | ug/kg | NC | 30 |
| Dimethylphthalate | ND | ND | ug/kg | NC | 30 |
| 2,6-Dinitrotoluene | ND | ND | ug/kg | NC | 30 |
| Acenaphthene | ND | ND | ug/kg | NC | 30 |
| 3-Nitroaniline | ND | ND | ug/kg | NC | 30 |
| 2,4-Dinitrophenol | ND | ND | ug/kg | NC | 30 |
| Dibenzofuran | ND | ND | ug/kg | NC | 30 |
| 2,4-Dinitrotoluene | ND | ND | ug/kg | NC | 30 |
| 4-Nitrophenol | ND | ND | ug/kg | NC | 30 |
| Fluorene | ND | ND | ug/kg | NC | 30 |
| 4-Chlorophenyl-phenylether | ND | ND | ug/kg | NC | 30 |

# Lab Duplicate Analysis
## Batch Quality Control

**Project Name:** PASSAIC RI/FS CAGED BIVALVE
**Project Number:** TASK23.2.1

**Lab Number:** L1110328
**Report Date:** 10/19/11

| Parameter | Native Sample | Duplicate Sample | Units | RPD | RPD Limits |
|---|---|---|---|---|---|
| Semivolatile Organics by GC/MS - Mansfield Lab Associated sample(s): 01-10 QC Batch ID: WG481282-4 QC Sample: L1110328-01 Client ID: LPR6-ECST-COMP01 | | | | | |
| Diethylphthalate | ND | ND | ug/kg | NC | 30 |
| 4-Nitroaniline | ND | ND | ug/kg | NC | 30 |
| 4,6-Dinitro-2-Methylphenol | ND | ND | ug/kg | NC | 30 |
| NitrosoDiPhenylAmine(NDPA)/DPA | ND | ND | ug/kg | NC | 30 |
| 4-Bromophenyl-phenylether | ND | ND | ug/kg | NC | 30 |
| Hexachlorobenzene | ND | ND | ug/kg | NC | 30 |
| Atrazine | ND | ND | ug/kg | NC | 30 |
| Pentachlorophenol | ND | ND | ug/kg | NC | 30 |
| Phenanthrene | ND | ND | ug/kg | NC | 30 |
| Anthracene | ND | ND | ug/kg | NC | 30 |
| Carbazole | ND | ND | ug/kg | NC | 30 |
| Di-n-butylphthalate | ND | ND | ug/kg | NC | 30 |
| Fluoranthene | ND | ND | ug/kg | NC | 30 |
| Pyrene | ND | ND | ug/kg | NC | 30 |
| Butylbenzylphthalate | ND | ND | ug/kg | NC | 30 |
| 3,3'-Dichlorobenzidine | ND | ND | ug/kg | NC | 30 |
| Benz(a)anthracene | ND | ND | ug/kg | NC | 30 |
| Chrysene | ND | ND | ug/kg | NC | 30 |
| Bis(2-Ethylhexyl)phthalate | 1570 | ND | ug/kg | NC | 30 |

# Lab Duplicate Analysis
## Batch Quality Control

**Project Name:** PASSAIC RI/FS CAGED BIVALVE
**Project Number:** TASK23.2.1

**Lab Number:** L1110328
**Report Date:** 10/19/11

| Parameter | Native Sample | Duplicate Sample | Units | RPD | RPD Limits |
|---|---|---|---|---|---|
| Semivolatile Organics by GC/MS - Mansfield Lab Associated sample(s): 01-10 QC Batch ID: WG481282-4 QC Sample: L1110328-01 Client ID: LPR6-ECST-COMP01 | | | | | |
| Di-n-octylphthalate | ND | ND | ug/kg | NC | 30 |
| Benzo(b)fluoranthene | ND | ND | ug/kg | NC | 30 |
| Benzo(k)fluoranthene | ND | ND | ug/kg | NC | 30 |
| Benzo(a)pyrene | ND | ND | ug/kg | NC | 30 |
| Indeno(1,2,3-cd)Pyrene | ND | ND | ug/kg | NC | 30 |
| Dibenz(a,h)anthracene | ND | ND | ug/kg | NC | 30 |
| Benzo(ghi)perylene | ND | ND | ug/kg | NC | 30 |

| Surrogate | %Recovery | Qualifier | %Recovery | Qualifier | Acceptance Criteria |
|---|---|---|---|---|---|
| 2-Fluorobiphenyl | 78 | | 69 | | 30-130 |
| Phenol-d5 | 86 | | 77 | | 30-130 |
| Nitrobenzene-d5 | 87 | | 80 | | 30-130 |
| 2-Fluorophenol | 85 | | 73 | | 30-130 |
| 2,4,6-Tribromophenol | 82 | | 69 | | 30-130 |
| Terphenyl-d14 | 82 | | 73 | | 30-130 |

# Lab Duplicate Analysis
## Batch Quality Control

**Project Name:** PASSAIC RI/FS CAGED BIVALVE
**Project Number:** TASK23.2.1

**Lab Number:** L1110328
**Report Date:** 10/19/11

| Parameter | Native Sample | Duplicate Sample | Units | RPD | RPD Limits |
|---|---|---|---|---|---|
| PAHs - Mansfield Lab Associated sample(s): 01 QC Batch ID: WG491520-4 QC Sample: L1110328-01 Client ID: LPR6-ECST-COMP01 | | | | | |
| Naphthalene | 0.491J | 0.500J | ug/kg | NC | 30 |
| C2-Naphthalenes | 2.28 | 2.33 | ug/kg | 2 | 30 |
| C3-Naphthalenes | 4.37 | 4.52 | ug/kg | 3 | 30 |
| C4-Naphthalenes | 6.82 | 7.69 | ug/kg | 12 | 30 |
| 2-Methylnaphthalene | ND | ND | ug/kg | NC | 30 |
| 1-Methylnaphthalene | ND | ND | ug/kg | NC | 30 |
| 2,6-Dimethylnaphthalene | 0.624J | 0.668J | ug/kg | NC | 30 |
| Acenaphthylene | 0.491J | 0.498J | ug/kg | NC | 30 |
| Acenaphthene | 1.40 | 1.54 | ug/kg | 10 | 30 |
| 2,3,5-Trimethylnaphthalene | 0.547J | 0.620J | ug/kg | NC | 30 |
| Fluorene | 1.06 | 1.10 | ug/kg | 4 | 30 |
| C1-Fluorenes | 2.77 | 2.64 | ug/kg | 5 | 30 |
| C2-Fluorenes | 7.04 | 7.82 | ug/kg | 10 | 30 |
| C3-Fluorenes | 11.3 | 12.3 | ug/kg | 8 | 30 |
| Dibenzothiophene | 0.945 | 0.937 | ug/kg | 1 | 30 |
| C1-Dibenzothiophenes | 2.94 | 3.14 | ug/kg | 7 | 30 |
| C2-Dibenzothiophenes | 10.2 | 11.1 | ug/kg | 8 | 30 |
| C3-Dibenzothiophenes | 10.2 | 10.8 | ug/kg | 6 | 30 |
| C4-Dibenzothiophenes | 6.02 | 6.02 | ug/kg | 0 | 30 |

# Lab Duplicate Analysis
## Batch Quality Control

**Project Name:** PASSAIC RI/FS CAGED BIVALVE
**Project Number:** TASK23.2.1

**Lab Number:** L1110328
**Report Date:** 10/19/11

| Parameter | Native Sample | Duplicate Sample | Units | RPD | RPD Limits |
|---|---|---|---|---|---|
| PAHs - Mansfield Lab Associated sample(s): 01 QC Batch ID: WG491520-4 QC Sample: L1110328-01 Client ID: LPR6-ECST-COMP01 | | | | | |
| Phenanthrene | 8.44 | 8.98 | ug/kg | 6 | 30 |
| C1-Phenanthrenes/Anthracenes | 15.7 | 17.4 | ug/kg | 10 | 30 |
| C2-Phenanthrenes/Anthracenes | 26.3 | 29.2 | ug/kg | 10 | 30 |
| C3-Phenanthrenes/Anthracenes | 16.3 | 17.9 | ug/kg | 9 | 30 |
| C4-Phenanthrenes/Anthracenes | 6.95 | 6.67 | ug/kg | 4 | 30 |
| Anthracene | 1.81 | 2.17 | ug/kg | 18 | 30 |
| 1-Methylphenanthrene | 4.29 | 4.97 | ug/kg | 15 | 30 |
| Fluoranthene | 40.9 | 45.7 | ug/kg | 11 | 30 |
| Pyrene | 63.8 | 71.7 | ug/kg | 12 | 30 |
| C1-Fluoranthenes/Pyrenes | 49.0 | 53.6 | ug/kg | 9 | 30 |
| Benz(a)anthracene | 9.16 | 10.1 | ug/kg | 10 | 30 |
| Chrysene | 44.3 | 48.9 | ug/kg | 10 | 30 |
| C1-Benzanthracene/chrysenes | 14.1 | 15.1 | ug/kg | 7 | 30 |
| C2-Benzanthracene/chrysenes | 5.61 | 6.90 | ug/kg | 21 | 30 |
| C3-Benzanthracene/chrysenes | 7.72 | 6.44 | ug/kg | 18 | 30 |
| C4-Benzanthracene/chrysenes | ND | ND | ug/kg | NC | 30 |
| Benzo(b)fluoranthene | 14.2 | 14.8 | ug/kg | 4 | 30 |
| Benzo(j,k)fluoranthene | 7.13 | 8.65 | ug/kg | 19 | 30 |
| Benzo(e)pyrene | 23.9 | 26.6 | ug/kg | 11 | 30 |

# Lab Duplicate Analysis
## Batch Quality Control

**Project Name:** PASSAIC RI/FS CAGED BIVALVE
**Project Number:** TASK23.2.1

**Lab Number:** L1110328
**Report Date:** 10/19/11

| Parameter | Native Sample | Duplicate Sample | Units | RPD | RPD Limits |
|---|---|---|---|---|---|
| PAHs - Mansfield Lab Associated sample(s): 01 QC Batch ID: WG491520-4 QC Sample: L1110328-01 Client ID: LPR6-ECST-COMP01 | | | | | |
| Benzo(a)pyrene | 5.47 | 5.61 | ug/kg | 3 | 30 |
| Perylene | 2.30 | 2.22 | ug/kg | 4 | 30 |
| Indeno(1,2,3-cd)pyrene | 2.42 | 2.53 | ug/kg | 4 | 30 |
| Dibenz(a,c+a,h)anthracene | 0.962 | 1.00 | ug/kg | 4 | 30 |
| Benzo(g,h,i)perylene | 7.55 | 8.20 | ug/kg | 8 | 30 |

| Surrogate | %Recovery | Qualifier | %Recovery | Qualifier | Acceptance Criteria |
|---|---|---|---|---|---|
| Naphthalene-d8 | 74 | | 72 | | 50-130 |
| Phenanthrene-d10 | 90 | | 83 | | 50-130 |
| Benzo(a)pyrene-d12 | 82 | | 78 | | 50-130 |

# PCBS

**Project Name:** PASSAIC RI/FS CAGED BIVALVE **Lab Number:** L1110328

**Project Number:** TASK23.2.1 **Report Date:** 10/19/11

## SAMPLE RESULTS

| | | | |
|---|---|---|---|
| Lab ID: | L1110328-01 | Date Collected: | 06/08/11 08:48 |
| Client ID: | LPR6-ECST-COMP01 | Date Received: | 07/26/11 |
| Sample Location: | Not Specified | Field Prep: | Not Specified |
| Matrix: | Tissue | Extraction Method: | EPA 3570 |
| Analytical Method: | 1,8082 | Extraction Date: | 07/28/11 16:30 |
| Analytical Date: | 08/05/11 16:12 | Cleanup Method1: | EPA 3640A |
| Analyst: | JW | Cleanup Date1: | 08/04/11 |
| Percent Solids: | Results reported on an 'AS RECEIVED' basis. | | |

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| Polychlorinated Biphenyls by GC - Mansfield Lab | | | | | | |
| Aroclor 1016 | ND | | ug/kg | 7.00 | 7.00 | 2 |
| Aroclor 1221 | ND | | ug/kg | 7.00 | 7.00 | 2 |
| Aroclor 1242 | 25.4 | | ug/kg | 7.00 | 7.00 | 2 |
| Aroclor 1254 | 15.1 | | ug/kg | 7.00 | 7.00 | 2 |
| Aroclor 1262 | ND | | ug/kg | 7.00 | 7.00 | 2 |
| Aroclor 1268 | ND | | ug/kg | 7.00 | 7.00 | 2 |

| Surrogate | % Recovery | Qualifier | Acceptance Criteria |
|---|---|---|---|
| Tetrachloro-meta-Xylene | 56 | | 30-150 |
| Decachlorobiphenyl | 47 | | 30-150 |
| Tetrachloro-meta-Xylene | 57 | | 30-150 |
| Decachlorobiphenyl | 49 | | 30-150 |

**Project Name:** PASSAIC RI/FS CAGED BIVALVE **Lab Number:** L1110328

**Project Number:** TASK23.2.1 **Report Date:** 10/19/11

## SAMPLE RESULTS

| | | | |
|---|---|---|---|
| Lab ID: | L1110328-01 | Date Collected: | 06/08/11 08:48 |
| Client ID: | LPR6-ECST-COMP01 | Date Received: | 07/26/11 |
| Sample Location: | Not Specified | Field Prep: | Not Specified |
| Matrix: | Tissue | Extraction Method: | EPA 3570 |
| Analytical Method: | 1,8082 | Extraction Date: | 07/28/11 16:30 |
| Analytical Date: | 08/05/11 16:12 | Cleanup Method1: | EPA 3640A |
| Analyst: | JW | Cleanup Date1: | 08/04/11 |
| Percent Solids: | Results reported on an 'AS RECEIVED' basis. | | |

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| Polychlorinated Biphenyls by GC - Mansfield Lab | | | | | | |
| Aroclor 1232 | ND | | ug/kg | 7.00 | 7.00 | 2 |
| Aroclor 1248 | ND | | ug/kg | 7.00 | 7.00 | 2 |
| Aroclor 1260 | ND | | ug/kg | 7.00 | 7.00 | 2 |

| Surrogate | % Recovery | Qualifier | Acceptance Criteria |
|---|---|---|---|
| Tetrachloro-meta-Xylene | 56 | | 30-150 |
| Decachlorobiphenyl | 47 | | 30-150 |
| Tetrachloro-meta-Xylene | 57 | | 30-150 |
| Decachlorobiphenyl | 49 | | 30-150 |

**Project Name:** PASSAIC RI/FS CAGED BIVALVE **Lab Number:** L1110328

**Project Number:** TASK23.2.1 **Report Date:** 10/19/11

## SAMPLE RESULTS

| | | | |
|---|---|---|---|
| Lab ID: | L1110328-02 | Date Collected: | 03/09/11 15:00 |
| Client ID: | LPRBG-ECST-COMP01 | Date Received: | 07/26/11 |
| Sample Location: | Not Specified | Field Prep: | Not Specified |
| Matrix: | Tissue | Extraction Method: | EPA 3570 |
| Analytical Method: | 1,8082 | Extraction Date: | 07/28/11 16:30 |
| Analytical Date: | 08/05/11 18:13 | Cleanup Method1: | EPA 3640A |
| Analyst: | JW | Cleanup Date1: | 08/04/11 |
| Percent Solids: | Results reported on an 'AS RECEIVED' basis. | | |

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| Polychlorinated Biphenyls by GC - Mansfield Lab | | | | | | |
| Aroclor 1016 | ND | | ug/kg | 7.46 | 7.46 | 2 |
| Aroclor 1221 | ND | | ug/kg | 7.46 | 7.46 | 2 |
| Aroclor 1242 | ND | | ug/kg | 7.46 | 7.46 | 2 |
| Aroclor 1254 | ND | | ug/kg | 7.46 | 7.46 | 2 |
| Aroclor 1262 | ND | | ug/kg | 7.46 | 7.46 | 2 |
| Aroclor 1268 | ND | | ug/kg | 7.46 | 7.46 | 2 |

| Surrogate | % Recovery | Qualifier | Acceptance Criteria |
|---|---|---|---|
| Tetrachloro-meta-Xylene | 67 | | 30-150 |
| Decachlorobiphenyl | 62 | | 30-150 |
| Tetrachloro-meta-Xylene | 70 | | 30-150 |
| Decachlorobiphenyl | 65 | | 30-150 |

**Project Name:** PASSAIC RI/FS CAGED BIVALVE **Lab Number:** L1110328

**Project Number:** TASK23.2.1 **Report Date:** 10/19/11

## SAMPLE RESULTS

| | | | |
|---|---|---|---|
| Lab ID: | L1110328-02 | Date Collected: | 03/09/11 15:00 |
| Client ID: | LPRBG-ECST-COMP01 | Date Received: | 07/26/11 |
| Sample Location: | Not Specified | Field Prep: | Not Specified |
| Matrix: | Tissue | Extraction Method: | EPA 3570 |
| Analytical Method: | 1,8082 | Extraction Date: | 07/28/11 16:30 |
| Analytical Date: | 08/05/11 18:13 | Cleanup Method1: | EPA 3640A |
| Analyst: | JW | Cleanup Date1: | 08/04/11 |
| Percent Solids: | Results reported on an 'AS RECEIVED' basis. | | |

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| Polychlorinated Biphenyls by GC - Mansfield Lab | | | | | | |
| Aroclor 1232 | ND | | ug/kg | 7.46 | 7.46 | 2 |
| Aroclor 1248 | ND | | ug/kg | 7.46 | 7.46 | 2 |
| Aroclor 1260 | ND | | ug/kg | 7.46 | 7.46 | 2 |

| Surrogate | % Recovery | Qualifier | Acceptance Criteria |
|---|---|---|---|
| Tetrachloro-meta-Xylene | 67 | | 30-150 |
| Decachlorobiphenyl | 62 | | 30-150 |
| Tetrachloro-meta-Xylene | 70 | | 30-150 |
| Decachlorobiphenyl | 65 | | 30-150 |

**Project Name:** PASSAIC RI/FS CAGED BIVALVE **Lab Number:** L1110328

**Project Number:** TASK23.2.1 **Report Date:** 10/19/11

## SAMPLE RESULTS

| | | | |
|---|---|---|---|
| Lab ID: | L1110328-03 | Date Collected: | 06/08/11 09:03 |
| Client ID: | LPR6-ECST-COMP02 | Date Received: | 07/26/11 |
| Sample Location: | Not Specified | Field Prep: | Not Specified |
| Matrix: | Tissue | Extraction Method: | EPA 3570 |
| Analytical Method: | 1,8082 | Extraction Date: | 07/28/11 16:30 |
| Analytical Date: | 08/05/11 18:44 | Cleanup Method1: | EPA 3640A |
| Analyst: | JW | Cleanup Date1: | 08/04/11 |
| Percent Solids: | Results reported on an 'AS RECEIVED' basis. | | |

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| Polychlorinated Biphenyls by GC - Mansfield Lab | | | | | | |
| Aroclor 1016 | ND | | ug/kg | 7.41 | 7.41 | 2 |
| Aroclor 1221 | ND | | ug/kg | 7.41 | 7.41 | 2 |
| Aroclor 1242 | 36.0 | | ug/kg | 7.41 | 7.41 | 2 |
| Aroclor 1254 | 15.7 | | ug/kg | 7.41 | 7.41 | 2 |
| Aroclor 1262 | ND | | ug/kg | 7.41 | 7.41 | 2 |
| Aroclor 1268 | ND | | ug/kg | 7.41 | 7.41 | 2 |

| Surrogate | % Recovery | Qualifier | Acceptance Criteria |
|---|---|---|---|
| Tetrachloro-meta-Xylene | 61 | | 30-150 |
| Decachlorobiphenyl | 55 | | 30-150 |
| Tetrachloro-meta-Xylene | 64 | | 30-150 |
| Decachlorobiphenyl | 57 | | 30-150 |

**Project Name:** PASSAIC RI/FS CAGED BIVALVE **Lab Number:** L1110328

**Project Number:** TASK23.2.1 **Report Date:** 10/19/11

## SAMPLE RESULTS

| | | | |
|---|---|---|---|
| Lab ID: | L1110328-03 | Date Collected: | 06/08/11 09:03 |
| Client ID: | LPR6-ECST-COMP02 | Date Received: | 07/26/11 |
| Sample Location: | Not Specified | Field Prep: | Not Specified |
| Matrix: | Tissue | Extraction Method: | EPA 3570 |
| Analytical Method: | 1,8082 | Extraction Date: | 07/28/11 16:30 |
| Analytical Date: | 08/05/11 18:44 | Cleanup Method1: | EPA 3640A |
| Analyst: | JW | Cleanup Date1: | 08/04/11 |
| Percent Solids: | Results reported on an 'AS RECEIVED' basis. | | |

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| Polychlorinated Biphenyls by GC - Mansfield Lab | | | | | | |
| Aroclor 1232 | ND | | ug/kg | 7.41 | 7.41 | 2 |
| Aroclor 1248 | ND | | ug/kg | 7.41 | 7.41 | 2 |
| Aroclor 1260 | ND | | ug/kg | 7.41 | 7.41 | 2 |

| Surrogate | % Recovery | Qualifier | Acceptance Criteria |
|---|---|---|---|
| Tetrachloro-meta-Xylene | 61 | | 30-150 |
| Decachlorobiphenyl | 55 | | 30-150 |
| Tetrachloro-meta-Xylene | 64 | | 30-150 |
| Decachlorobiphenyl | 57 | | 30-150 |

**Project Name:** PASSAIC RI/FS CAGED BIVALVE **Lab Number:** L1110328

**Project Number:** TASK23.2.1 **Report Date:** 10/19/11

## SAMPLE RESULTS

| | | | |
|---|---|---|---|
| Lab ID: | L1110328-04 | Date Collected: | 06/08/11 08:20 |
| Client ID: | LPR7-ECST-COMP03 | Date Received: | 07/26/11 |
| Sample Location: | Not Specified | Field Prep: | Not Specified |
| Matrix: | Tissue | Extraction Method: | EPA 3570 |
| Analytical Method: | 1,8082 | Extraction Date: | 07/28/11 16:30 |
| Analytical Date: | 08/05/11 19:14 | Cleanup Method1: | EPA 3640A |
| Analyst: | JW | Cleanup Date1: | 08/04/11 |
| Percent Solids: | Results reported on an 'AS RECEIVED' basis. | | |

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| Polychlorinated Biphenyls by GC - Mansfield Lab | | | | | | |
| Aroclor 1016 | ND | | ug/kg | 7.48 | 7.48 | 2 |
| Aroclor 1221 | ND | | ug/kg | 7.48 | 7.48 | 2 |
| Aroclor 1242 | 39.3 | | ug/kg | 7.48 | 7.48 | 2 |
| Aroclor 1254 | 24.4 | | ug/kg | 7.48 | 7.48 | 2 |
| Aroclor 1262 | ND | | ug/kg | 7.48 | 7.48 | 2 |
| Aroclor 1268 | ND | | ug/kg | 7.48 | 7.48 | 2 |

| Surrogate | % Recovery | Qualifier | Acceptance Criteria |
|---|---|---|---|
| Tetrachloro-meta-Xylene | 68 | | 30-150 |
| Decachlorobiphenyl | 60 | | 30-150 |
| Tetrachloro-meta-Xylene | 71 | | 30-150 |
| Decachlorobiphenyl | 63 | | 30-150 |

**Project Name:** PASSAIC RI/FS CAGED BIVALVE **Lab Number:** L1110328

**Project Number:** TASK23.2.1 **Report Date:** 10/19/11

## SAMPLE RESULTS

| | | | |
|---|---|---|---|
| Lab ID: | L1110328-04 | Date Collected: | 06/08/11 08:20 |
| Client ID: | LPR7-ECST-COMP03 | Date Received: | 07/26/11 |
| Sample Location: | Not Specified | Field Prep: | Not Specified |
| Matrix: | Tissue | Extraction Method: | EPA 3570 |
| Analytical Method: | 1,8082 | Extraction Date: | 07/28/11 16:30 |
| Analytical Date: | 08/05/11 19:14 | Cleanup Method1: | EPA 3640A |
| Analyst: | JW | Cleanup Date1: | 08/04/11 |
| Percent Solids: | Results reported on an 'AS RECEIVED' basis. | | |

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| Polychlorinated Biphenyls by GC - Mansfield Lab | | | | | | |
| Aroclor 1232 | ND | | ug/kg | 7.48 | 7.48 | 2 |
| Aroclor 1248 | ND | | ug/kg | 7.48 | 7.48 | 2 |
| Aroclor 1260 | ND | | ug/kg | 7.48 | 7.48 | 2 |

| Surrogate | % Recovery | Qualifier | Acceptance Criteria |
|---|---|---|---|
| Tetrachloro-meta-Xylene | 68 | | 30-150 |
| Decachlorobiphenyl | 60 | | 30-150 |
| Tetrachloro-meta-Xylene | 71 | | 30-150 |
| Decachlorobiphenyl | 63 | | 30-150 |

**Project Name:** PASSAIC RI/FS CAGED BIVALVE **Lab Number:** L1110328

**Project Number:** TASK23.2.1 **Report Date:** 10/19/11

## SAMPLE RESULTS

| | | | |
|---|---|---|---|
| Lab ID: | L1110328-05 | Date Collected: | 06/08/11 07:55 |
| Client ID: | LPR7-ECST-COMP04 | Date Received: | 07/26/11 |
| Sample Location: | Not Specified | Field Prep: | Not Specified |
| Matrix: | Tissue | Extraction Method: | EPA 3570 |
| Analytical Method: | 1,8082 | Extraction Date: | 07/28/11 16:30 |
| Analytical Date: | 08/05/11 23:48 | Cleanup Method1: | EPA 3640A |
| Analyst: | JW | Cleanup Date1: | 08/04/11 |
| Percent Solids: | Results reported on an 'AS RECEIVED' basis. | | |

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| Polychlorinated Biphenyls by GC - Mansfield Lab | | | | | | |
| Aroclor 1016 | ND | | ug/kg | 7.48 | 7.48 | 2 |
| Aroclor 1221 | ND | | ug/kg | 7.48 | 7.48 | 2 |
| Aroclor 1242 | 31.4 | | ug/kg | 7.48 | 7.48 | 2 |
| Aroclor 1254 | 16.4 | | ug/kg | 7.48 | 7.48 | 2 |
| Aroclor 1262 | ND | | ug/kg | 7.48 | 7.48 | 2 |
| Aroclor 1268 | ND | | ug/kg | 7.48 | 7.48 | 2 |

| Surrogate | % Recovery | Qualifier | Acceptance Criteria |
|---|---|---|---|
| Tetrachloro-meta-Xylene | 77 | | 30-150 |
| Decachlorobiphenyl | 68 | | 30-150 |
| Tetrachloro-meta-Xylene | 81 | | 30-150 |
| Decachlorobiphenyl | 74 | | 30-150 |

**Project Name:** PASSAIC RI/FS CAGED BIVALVE **Lab Number:** L1110328

**Project Number:** TASK23.2.1 **Report Date:** 10/19/11

## SAMPLE RESULTS

| | | | |
|---|---|---|---|
| Lab ID: | L1110328-05 | Date Collected: | 06/08/11 07:55 |
| Client ID: | LPR7-ECST-COMP04 | Date Received: | 07/26/11 |
| Sample Location: | Not Specified | Field Prep: | Not Specified |
| Matrix: | Tissue | Extraction Method: | EPA 3570 |
| Analytical Method: | 1,8082 | Extraction Date: | 07/28/11 16:30 |
| Analytical Date: | 08/05/11 23:48 | Cleanup Method1: | EPA 3640A |
| Analyst: | JW | Cleanup Date1: | 08/04/11 |
| Percent Solids: | Results reported on an 'AS RECEIVED' basis. | | |

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| Polychlorinated Biphenyls by GC - Mansfield Lab | | | | | | |
| Aroclor 1232 | ND | | ug/kg | 7.48 | 7.48 | 2 |
| Aroclor 1248 | ND | | ug/kg | 7.48 | 7.48 | 2 |
| Aroclor 1260 | ND | | ug/kg | 7.48 | 7.48 | 2 |

| Surrogate | % Recovery | Qualifier | Acceptance Criteria |
|---|---|---|---|
| Tetrachloro-meta-Xylene | 77 | | 30-150 |
| Decachlorobiphenyl | 68 | | 30-150 |
| Tetrachloro-meta-Xylene | 81 | | 30-150 |
| Decachlorobiphenyl | 74 | | 30-150 |

**Project Name:** PASSAIC RI/FS CAGED BIVALVE **Lab Number:** L1110328

**Project Number:** TASK23.2.1 **Report Date:** 10/19/11

## SAMPLE RESULTS

| | | | |
|---|---|---|---|
| Lab ID: | L1110328-06 | Date Collected: | 06/08/11 07:40 |
| Client ID: | LPR8-ECST-COMP05 | Date Received: | 07/26/11 |
| Sample Location: | Not Specified | Field Prep: | Not Specified |
| Matrix: | Tissue | Extraction Method: | EPA 3570 |
| Analytical Method: | 1,8082 | Extraction Date: | 07/28/11 16:30 |
| Analytical Date: | 08/06/11 00:18 | Cleanup Method1: | EPA 3640A |
| Analyst: | JW | Cleanup Date1: | 08/04/11 |
| Percent Solids: | Results reported on an 'AS RECEIVED' basis. | | |

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| Polychlorinated Biphenyls by GC - Mansfield Lab | | | | | | |
| Aroclor 1016 | ND | | ug/kg | 7.56 | 7.56 | 2 |
| Aroclor 1221 | ND | | ug/kg | 7.56 | 7.56 | 2 |
| Aroclor 1242 | 24.1 | | ug/kg | 7.56 | 7.56 | 2 |
| Aroclor 1254 | 13.2 | | ug/kg | 7.56 | 7.56 | 2 |
| Aroclor 1262 | ND | | ug/kg | 7.56 | 7.56 | 2 |
| Aroclor 1268 | ND | | ug/kg | 7.56 | 7.56 | 2 |

| Surrogate | % Recovery | Qualifier | Acceptance Criteria |
|---|---|---|---|
| Tetrachloro-meta-Xylene | 69 | | 30-150 |
| Decachlorobiphenyl | 66 | | 30-150 |
| Tetrachloro-meta-Xylene | 73 | | 30-150 |
| Decachlorobiphenyl | 70 | | 30-150 |

**Project Name:** PASSAIC RI/FS CAGED BIVALVE **Lab Number:** L1110328

**Project Number:** TASK23.2.1 **Report Date:** 10/19/11

## SAMPLE RESULTS

| | | | |
|---|---|---|---|
| Lab ID: | L1110328-06 | Date Collected: | 06/08/11 07:40 |
| Client ID: | LPR8-ECST-COMP05 | Date Received: | 07/26/11 |
| Sample Location: | Not Specified | Field Prep: | Not Specified |
| Matrix: | Tissue | Extraction Method: | EPA 3570 |
| Analytical Method: | 1,8082 | Extraction Date: | 07/28/11 16:30 |
| Analytical Date: | 08/06/11 00:18 | Cleanup Method1: | EPA 3640A |
| Analyst: | JW | Cleanup Date1: | 08/04/11 |
| Percent Solids: | Results reported on an 'AS RECEIVED' basis. | | |

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| Polychlorinated Biphenyls by GC - Mansfield Lab | | | | | | |
| Aroclor 1232 | ND | | ug/kg | 7.56 | 7.56 | 2 |
| Aroclor 1248 | ND | | ug/kg | 7.56 | 7.56 | 2 |
| Aroclor 1260 | ND | | ug/kg | 7.56 | 7.56 | 2 |

| Surrogate | % Recovery | Qualifier | Acceptance Criteria |
|---|---|---|---|
| Tetrachloro-meta-Xylene | 69 | | 30-150 |
| Decachlorobiphenyl | 66 | | 30-150 |
| Tetrachloro-meta-Xylene | 73 | | 30-150 |
| Decachlorobiphenyl | 70 | | 30-150 |

**Project Name:** PASSAIC RI/FS CAGED BIVALVE **Lab Number:** L1110328

**Project Number:** TASK23.2.1 **Report Date:** 10/19/11

## SAMPLE RESULTS

| | | | |
|---|---|---|---|
| Lab ID: | L1110328-07 | Date Collected: | 05/09/11 10:20 |
| Client ID: | LPR1-GDST-COMP01 | Date Received: | 07/26/11 |
| Sample Location: | Not Specified | Field Prep: | Not Specified |
| Matrix: | Tissue | Extraction Method: | EPA 3570 |
| Analytical Method: | 1,8082 | Extraction Date: | 07/28/11 16:30 |
| Analytical Date: | 08/06/11 00:48 | Cleanup Method1: | EPA 3640A |
| Analyst: | JW | Cleanup Date1: | 08/04/11 |
| Percent Solids: | Results reported on an 'AS RECEIVED' basis. | | |

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| Polychlorinated Biphenyls by GC - Mansfield Lab | | | | | | |
| Aroclor 1016 | ND | | ug/kg | 7.49 | 7.49 | 2 |
| Aroclor 1221 | ND | | ug/kg | 7.49 | 7.49 | 2 |
| Aroclor 1254 | 13.5 | | ug/kg | 7.49 | 7.49 | 2 |
| Aroclor 1262 | ND | | ug/kg | 7.49 | 7.49 | 2 |
| Aroclor 1268 | ND | | ug/kg | 7.49 | 7.49 | 2 |

| Surrogate | % Recovery | Qualifier | Acceptance Criteria |
|---|---|---|---|
| Tetrachloro-meta-Xylene | 75 | | 30-150 |
| Decachlorobiphenyl | 66 | | 30-150 |
| Tetrachloro-meta-Xylene | 78 | | 30-150 |
| Decachlorobiphenyl | 69 | | 30-150 |

**Project Name:** PASSAIC RI/FS CAGED BIVALVE **Lab Number:** L1110328

**Project Number:** TASK23.2.1 **Report Date:** 10/19/11

## SAMPLE RESULTS

| | | | |
|---|---|---|---|
| Lab ID: | L1110328-07 | Date Collected: | 05/09/11 10:20 |
| Client ID: | LPR1-GDST-COMP01 | Date Received: | 07/26/11 |
| Sample Location: | Not Specified | Field Prep: | Not Specified |
| Matrix: | Tissue | Extraction Method: | EPA 3570 |
| Analytical Method: | 1,8082 | Extraction Date: | 07/28/11 16:30 |
| Analytical Date: | 08/06/11 00:48 | Cleanup Method1: | EPA 3640A |
| Analyst: | JW | Cleanup Date1: | 08/04/11 |
| Percent Solids: | Results reported on an 'AS RECEIVED' basis. | | |

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| Polychlorinated Biphenyls by GC - Mansfield Lab | | | | | | |
| Aroclor 1232 | ND | | ug/kg | 7.49 | 7.49 | 2 |
| Aroclor 1242 | 22.2 | | ug/kg | 7.49 | 7.49 | 2 |
| Aroclor 1248 | ND | | ug/kg | 7.49 | 7.49 | 2 |
| Aroclor 1260 | ND | | ug/kg | 7.49 | 7.49 | 2 |

| Surrogate | % Recovery | Qualifier | Acceptance Criteria |
|---|---|---|---|
| Tetrachloro-meta-Xylene | 75 | | 30-150 |
| Decachlorobiphenyl | 66 | | 30-150 |
| Tetrachloro-meta-Xylene | 78 | | 30-150 |
| Decachlorobiphenyl | 69 | | 30-150 |

**Project Name:** PASSAIC RI/FS CAGED BIVALVE **Lab Number:** L1110328

**Project Number:** TASK23.2.1 **Report Date:** 10/19/11

## SAMPLE RESULTS

| | | | |
|---|---|---|---|
| Lab ID: | L1110328-08 | Date Collected: | 03/08/11 18:30 |
| Client ID: | LPRBG-GDST-COMP01 | Date Received: | 07/26/11 |
| Sample Location: | Not Specified | Field Prep: | Not Specified |
| Matrix: | Tissue | Extraction Method: | EPA 3570 |
| Analytical Method: | 1,8082 | Extraction Date: | 07/28/11 16:30 |
| Analytical Date: | 08/06/11 01:19 | Cleanup Method1: | EPA 3640A |
| Analyst: | JW | Cleanup Date1: | 08/04/11 |
| Percent Solids: | Results reported on an 'AS RECEIVED' basis. | | |

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| Polychlorinated Biphenyls by GC - Mansfield Lab | | | | | | |
| Aroclor 1016 | ND | | ug/kg | 7.48 | 7.48 | 2 |
| Aroclor 1221 | ND | | ug/kg | 7.48 | 7.48 | 2 |
| Aroclor 1242 | ND | | ug/kg | 7.48 | 7.48 | 2 |
| Aroclor 1254 | ND | | ug/kg | 7.48 | 7.48 | 2 |
| Aroclor 1262 | ND | | ug/kg | 7.48 | 7.48 | 2 |
| Aroclor 1268 | ND | | ug/kg | 7.48 | 7.48 | 2 |

| Surrogate | % Recovery | Qualifier | Acceptance Criteria |
|---|---|---|---|
| Tetrachloro-meta-Xylene | 75 | | 30-150 |
| Decachlorobiphenyl | 64 | | 30-150 |
| Tetrachloro-meta-Xylene | 74 | | 30-150 |
| Decachlorobiphenyl | 67 | | 30-150 |

**Project Name:** PASSAIC RI/FS CAGED BIVALVE **Lab Number:** L1110328

**Project Number:** TASK23.2.1 **Report Date:** 10/19/11

## SAMPLE RESULTS

| | | | |
|---|---|---|---|
| Lab ID: | L1110328-08 | Date Collected: | 03/08/11 18:30 |
| Client ID: | LPRBG-GDST-COMP01 | Date Received: | 07/26/11 |
| Sample Location: | Not Specified | Field Prep: | Not Specified |
| Matrix: | Tissue | Extraction Method: | EPA 3570 |
| Analytical Method: | 1,8082 | Extraction Date: | 07/28/11 16:30 |
| Analytical Date: | 08/06/11 01:19 | Cleanup Method1: | EPA 3640A |
| Analyst: | JW | Cleanup Date1: | 08/04/11 |
| Percent Solids: | Results reported on an 'AS RECEIVED' basis. | | |

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| Polychlorinated Biphenyls by GC - Mansfield Lab | | | | | | |
| Aroclor 1232 | ND | | ug/kg | 7.48 | 7.48 | 2 |
| Aroclor 1248 | ND | | ug/kg | 7.48 | 7.48 | 2 |
| Aroclor 1260 | ND | | ug/kg | 7.48 | 7.48 | 2 |

| Surrogate | % Recovery | Qualifier | Acceptance Criteria |
|---|---|---|---|
| Tetrachloro-meta-Xylene | 75 | | 30-150 |
| Decachlorobiphenyl | 64 | | 30-150 |
| Tetrachloro-meta-Xylene | 74 | | 30-150 |
| Decachlorobiphenyl | 67 | | 30-150 |

**Project Name:** PASSAIC RI/FS CAGED BIVALVE **Lab Number:** L1110328

**Project Number:** TASK23.2.1 **Report Date:** 10/19/11

## SAMPLE RESULTS

| | | | |
|---|---|---|---|
| Lab ID: | L1110328-09 | Date Collected: | 05/09/11 10:45 |
| Client ID: | LPR2-GDST-COMP02 | Date Received: | 07/26/11 |
| Sample Location: | Not Specified | Field Prep: | Not Specified |
| Matrix: | Tissue | Extraction Method: | EPA 3570 |
| Analytical Method: | 1,8082 | Extraction Date: | 07/28/11 16:30 |
| Analytical Date: | 08/06/11 01:49 | Cleanup Method1: | EPA 3640A |
| Analyst: | JW | Cleanup Date1: | 08/04/11 |
| Percent Solids: | Results reported on an 'AS RECEIVED' basis. | | |

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| Polychlorinated Biphenyls by GC - Mansfield Lab | | | | | | |
| Aroclor 1016 | ND | | ug/kg | 7.48 | 7.48 | 2 |
| Aroclor 1221 | ND | | ug/kg | 7.48 | 7.48 | 2 |
| Aroclor 1254 | ND | | ug/kg | 7.48 | 7.48 | 2 |
| Aroclor 1262 | ND | | ug/kg | 7.48 | 7.48 | 2 |
| Aroclor 1268 | ND | | ug/kg | 7.48 | 7.48 | 2 |

| Surrogate | % Recovery | Qualifier | Acceptance Criteria |
|---|---|---|---|
| Tetrachloro-meta-Xylene | 73 | | 30-150 |
| Decachlorobiphenyl | 61 | | 30-150 |
| Tetrachloro-meta-Xylene | 74 | | 30-150 |
| Decachlorobiphenyl | 64 | | 30-150 |

**Project Name:** PASSAIC RI/FS CAGED BIVALVE **Lab Number:** L1110328

**Project Number:** TASK23.2.1 **Report Date:** 10/19/11

## SAMPLE RESULTS

| | | | |
|---|---|---|---|
| Lab ID: | L1110328-09 | Date Collected: | 05/09/11 10:45 |
| Client ID: | LPR2-GDST-COMP02 | Date Received: | 07/26/11 |
| Sample Location: | Not Specified | Field Prep: | Not Specified |
| Matrix: | Tissue | Extraction Method: | EPA 3570 |
| Analytical Method: | 1,8082 | Extraction Date: | 07/28/11 16:30 |
| Analytical Date: | 08/06/11 01:49 | Cleanup Method1: | EPA 3640A |
| Analyst: | JW | Cleanup Date1: | 08/04/11 |
| Percent Solids: | Results reported on an 'AS RECEIVED' basis. | | |

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| Polychlorinated Biphenyls by GC - Mansfield Lab | | | | | | |
| Aroclor 1232 | ND | | ug/kg | 7.48 | 7.48 | 2 |
| Aroclor 1242 | 19.9 | | ug/kg | 7.48 | 7.48 | 2 |
| Aroclor 1248 | ND | | ug/kg | 7.48 | 7.48 | 2 |
| Aroclor 1260 | ND | | ug/kg | 7.48 | 7.48 | 2 |

| Surrogate | % Recovery | Qualifier | Acceptance Criteria |
|---|---|---|---|
| Tetrachloro-meta-Xylene | 73 | | 30-150 |
| Decachlorobiphenyl | 61 | | 30-150 |
| Tetrachloro-meta-Xylene | 74 | | 30-150 |
| Decachlorobiphenyl | 64 | | 30-150 |

**Project Name:** PASSAIC RI/FS CAGED BIVALVE **Lab Number:** L1110328

**Project Number:** TASK23.2.1 **Report Date:** 10/19/11

## SAMPLE RESULTS

| | | | |
|---|---|---|---|
| Lab ID: | L1110328-10 | Date Collected: | 05/09/11 11:20 |
| Client ID: | LPR3-GDST-COMP03 | Date Received: | 07/26/11 |
| Sample Location: | Not Specified | Field Prep: | Not Specified |
| Matrix: | Tissue | Extraction Method: | EPA 3570 |
| Analytical Method: | 1,8082 | Extraction Date: | 07/28/11 16:30 |
| Analytical Date: | 08/06/11 02:19 | Cleanup Method1: | EPA 3640A |
| Analyst: | JW | Cleanup Date1: | 08/04/11 |
| Percent Solids: | Results reported on an 'AS RECEIVED' basis. | | |

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| Polychlorinated Biphenyls by GC - Mansfield Lab | | | | | | |
| Aroclor 1016 | ND | | ug/kg | 7.42 | 7.42 | 2 |
| Aroclor 1221 | ND | | ug/kg | 7.42 | 7.42 | 2 |
| Aroclor 1242 | ND | | ug/kg | 7.42 | 7.42 | 2 |
| Aroclor 1254 | ND | | ug/kg | 7.42 | 7.42 | 2 |
| Aroclor 1262 | ND | | ug/kg | 7.42 | 7.42 | 2 |
| Aroclor 1268 | ND | | ug/kg | 7.42 | 7.42 | 2 |

| Surrogate | % Recovery | Qualifier | Acceptance Criteria |
|---|---|---|---|
| Tetrachloro-meta-Xylene | 73 | | 30-150 |
| Decachlorobiphenyl | 57 | | 30-150 |
| Tetrachloro-meta-Xylene | 70 | | 30-150 |
| Decachlorobiphenyl | 60 | | 30-150 |

**Project Name:** PASSAIC RI/FS CAGED BIVALVE **Lab Number:** L1110328

**Project Number:** TASK23.2.1 **Report Date:** 10/19/11

## SAMPLE RESULTS

| | | | |
|---|---|---|---|
| Lab ID: | L1110328-10 | Date Collected: | 05/09/11 11:20 |
| Client ID: | LPR3-GDST-COMP03 | Date Received: | 07/26/11 |
| Sample Location: | Not Specified | Field Prep: | Not Specified |
| Matrix: | Tissue | Extraction Method: | EPA 3570 |
| Analytical Method: | 1,8082 | Extraction Date: | 07/28/11 16:30 |
| Analytical Date: | 08/06/11 02:19 | Cleanup Method1: | EPA 3640A |
| Analyst: | JW | Cleanup Date1: | 08/04/11 |
| Percent Solids: | Results reported on an 'AS RECEIVED' basis. | | |

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| Polychlorinated Biphenyls by GC - Mansfield Lab | | | | | | |
| Aroclor 1232 | ND | | ug/kg | 7.42 | 7.42 | 2 |
| Aroclor 1248 | ND | | ug/kg | 7.42 | 7.42 | 2 |
| Aroclor 1260 | ND | | ug/kg | 7.42 | 7.42 | 2 |

| Surrogate | % Recovery | Qualifier | Acceptance Criteria |
|---|---|---|---|
| Tetrachloro-meta-Xylene | 73 | | 30-150 |
| Decachlorobiphenyl | 57 | | 30-150 |
| Tetrachloro-meta-Xylene | 70 | | 30-150 |
| Decachlorobiphenyl | 60 | | 30-150 |

**Project Name:** PASSAIC RI/FS CAGED BIVALVE **Lab Number:** L1110328

**Project Number:** TASK23.2.1 **Report Date:** 10/19/11

## SAMPLE RESULTS

| | | | |
|---|---|---|---|
| Lab ID: | L1110328-11 | Date Collected: | 07/18/11 17:00 |
| Client ID: | LPR-071811RB | Date Received: | 07/18/11 |
| Sample Location: | Not Specified | Field Prep: | Not Specified |
| Matrix: | Water | Extraction Method: | EPA 3510C |
| Analytical Method: | 1,8082 | Extraction Date: | 07/20/11 10:29 |
| Analytical Date: | 07/21/11 11:58 | | |
| Analyst: | JS | | |

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor |
|---|---|---|---|---|---|---|
| Polychlorinated Biphenyls by GC - Mansfield Lab | | | | | | |
| Aroclor 1016 | ND | | ug/l | 0.020 | 0.020 | 1 |
| Aroclor 1221 | ND | | ug/l | 0.020 | 0.020 | 1 |
| Aroclor 1232 | ND | | ug/l | 0.020 | 0.020 | 1 |
| Aroclor 1242 | ND | | ug/l | 0.020 | 0.020 | 1 |
| Aroclor 1248 | ND | | ug/l | 0.020 | 0.020 | 1 |
| Aroclor 1254 | ND | | ug/l | 0.020 | 0.020 | 1 |
| Aroclor 1260 | ND | | ug/l | 0.020 | 0.020 | 1 |
| Aroclor 1262 | ND | | ug/l | 0.020 | 0.020 | 1 |
| Aroclor 1268 | ND | | ug/l | 0.020 | 0.020 | 1 |

| Surrogate | % Recovery | Qualifier | Acceptance Criteria |
|---|---|---|---|
| Tetrachloro-meta-Xylene | 80 | | 30-150 |
| Decachlorobiphenyl | 61 | | 30-150 |
| Tetrachloro-meta-Xylene | 87 | | 30-150 |
| Decachlorobiphenyl | 63 | | 30-150 |

**Project Name:** PASSAIC RI/FS CAGED BIVALVE **Lab Number:** L1110328

**Project Number:** TASK23.2.1 **Report Date:** 10/19/11

# Method Blank Analysis
## Batch Quality Control

Analytical Method: 1,8082
Analytical Date: 07/21/11 10:26
Analyst: JS

Extraction Method: EPA 3510C
Extraction Date: 07/20/11 10:29

| Parameter | Result | Qualifier | Units | RL | MDL |
|---|---|---|---|---|---|
| Polychlorinated Biphenyls by GC - Mansfield Lab for sample(s): 11 Batch: WG479958-1 | | | | | |
| Aroclor 1016 | ND | | ug/l | 0.020 | 0.020 |
| Aroclor 1221 | ND | | ug/l | 0.020 | 0.020 |
| Aroclor 1232 | ND | | ug/l | 0.020 | 0.020 |
| Aroclor 1242 | ND | | ug/l | 0.020 | 0.020 |
| Aroclor 1248 | ND | | ug/l | 0.020 | 0.020 |
| Aroclor 1254 | ND | | ug/l | 0.020 | 0.020 |
| Aroclor 1260 | ND | | ug/l | 0.020 | 0.020 |
| Aroclor 1262 | ND | | ug/l | 0.020 | 0.020 |
| Aroclor 1268 | ND | | ug/l | 0.020 | 0.020 |

| Surrogate | %Recovery | Qualifier | Acceptance Criteria |
|---|---|---|---|
| Tetrachloro-meta-Xylene | 78 | | 30-150 |
| Decachlorobiphenyl | 70 | | 30-150 |
| Tetrachloro-meta-Xylene | 84 | | 30-150 |
| Decachlorobiphenyl | 72 | | 30-150 |

**Project Name:** PASSAIC RI/FS CAGED BIVALVE
**Project Number:** TASK23.2.1

**Lab Number:** L1110328
**Report Date:** 10/19/11

# Method Blank Analysis
## Batch Quality Control

Analytical Method: 1,8082
Analytical Date: 08/05/11 14:41
Analyst: JW

Extraction Method: EPA 3570
Extraction Date: 07/28/11 16:30
Cleanup Method1: EPA 3640A
Cleanup Date1: 08/04/11

| Parameter | Result | Qualifier | Units | RL | MDL |
|---|---|---|---|---|---|
| Polychlorinated Biphenyls by GC - Mansfield Lab for sample(s): 01-10 Batch: WG481281-1 | | | | | |
| Aroclor 1016 | ND | | ug/kg | 4.00 | 4.00 |
| Aroclor 1221 | ND | | ug/kg | 4.00 | 4.00 |
| Aroclor 1242 | ND | | ug/kg | 4.00 | 4.00 |
| Aroclor 1254 | ND | | ug/kg | 4.00 | 4.00 |
| Aroclor 1262 | ND | | ug/kg | 4.00 | 4.00 |
| Aroclor 1268 | ND | | ug/kg | 4.00 | 4.00 |

| Surrogate | %Recovery | Qualifier | Acceptance Criteria |
|---|---|---|---|
| Tetrachloro-meta-Xylene | 68 | | 30-150 |
| Decachlorobiphenyl | 67 | | 30-150 |
| Tetrachloro-meta-Xylene | 72 | | 30-150 |
| Decachlorobiphenyl | 70 | | 30-150 |

**Project Name:** PASSAIC RI/FS CAGED BIVALVE
**Project Number:** TASK23.2.1

**Lab Number:** L1110328
**Report Date:** 10/19/11

# Method Blank Analysis
## Batch Quality Control

Analytical Method: 1,8082
Analytical Date: 08/05/11 14:41
Analyst: JW

Extraction Method: EPA 3570
Extraction Date: 07/28/11 16:30
Cleanup Method1: EPA 3640A
Cleanup Date1: 08/04/11

| Parameter | Result | Qualifier | Units | RL | MDL |
|---|---|---|---|---|---|
| Polychlorinated Biphenyls by GC - Mansfield Lab for sample(s): 01-10 Batch: WG481281-1 | | | | | |
| Aroclor 1232 | ND | | ug/kg | 4.00 | 4.00 |
| Aroclor 1248 | ND | | ug/kg | 4.00 | 4.00 |
| Aroclor 1260 | ND | | ug/kg | 4.00 | 4.00 |

| Surrogate | %Recovery | Qualifier | Acceptance Criteria |
|---|---|---|---|
| Tetrachloro-meta-Xylene | 68 | | 30-150 |
| Decachlorobiphenyl | 67 | | 30-150 |
| Tetrachloro-meta-Xylene | 72 | | 30-150 |
| Decachlorobiphenyl | 70 | | 30-150 |

# Matrix Spike Analysis
## Batch Quality Control

**Project Name:** PASSAIC RI/FS CAGED BIVALVE
**Project Number:** TASK23.2.1
**Lab Number:** L1110328
**Report Date:** 10/19/11

| Parameter | Native Sample | MS Added | MS Found | MS %Recovery | Qual | MSD Found | MSD %Recovery | Qual | Recovery Limits | RPD | Qual | RPD Limits |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Polychlorinated Biphenyls by GC - Mansfield Lab Associated sample(s): 01-10 QC Batch ID: WG481281-5 WG481281-6 QC Sample: L1110328-01 Client ID: LPR6-ECST-COMP01 | | | | | | | | | | | | |
| Aroclor 1016 | ND | 183 | 111 | 61 | | 104 | 56 | | 40-140 | 7 | | 50 |
| Aroclor 1260 | ND | 183 | 120 | 65 | | 111 | 60 | | 40-140 | 8 | | 50 |

| Surrogate | MS % Recovery | MS Qualifier | MSD % Recovery | MSD Qualifier | Acceptance Criteria |
|---|---|---|---|---|---|
| Decachlorobiphenyl | 63 | | 54 | | 30-150 |
| Tetrachloro-meta-Xylene | 65 | | 60 | | 30-150 |
| Decachlorobiphenyl | 66 | | 56 | | 30-150 |
| Tetrachloro-meta-Xylene | 70 | | 64 | | 30-150 |

# Lab Control Sample Analysis

## Batch Quality Control

**Project Name:** PASSAIC RI/FS CAGED BIVALVE

**Project Number:** TASK23.2.1

**Lab Number:** L1110328

**Report Date:** 10/19/11

| Parameter | LCS %Recovery | Qual | LCSD %Recovery | Qual | %Recovery Limits | RPD | Qual | RPD Limits |
|---|---|---|---|---|---|---|---|---|
| Polychlorinated Biphenyls by GC - Mansfield Lab Associated sample(s): 11 Batch: WG479958-2 WG479958-3 | | | | | | | | |
| Aroclor 1016 | 66 | | 69 | | 40-140 | 3 | | 50 |
| Aroclor 1260 | 86 | | 89 | | 40-140 | 3 | | 50 |

| Surrogate | LCS %Recovery | Qual | LCSD %Recovery | Qual | Acceptance Criteria |
|---|---|---|---|---|---|
| Tetrachloro-meta-Xylene | 81 | | 86 | | 30-150 |
| Decachlorobiphenyl | 72 | | 77 | | 30-150 |
| Tetrachloro-meta-Xylene | 87 | | 92 | | 30-150 |
| Decachlorobiphenyl | 75 | | 80 | | 30-150 |

| Parameter | LCS %Recovery | Qual | LCSD %Recovery | Qual | %Recovery Limits | RPD | Qual | RPD Limits |
|---|---|---|---|---|---|---|---|---|
| Polychlorinated Biphenyls by GC - Mansfield Lab Associated sample(s): 01-10 Batch: WG481281-2 WG481281-3 | | | | | | | | |
| Aroclor 1016 | 57 | | 55 | | 40-140 | 4 | | 50 |
| Aroclor 1260 | 70 | | 71 | | 40-140 | 1 | | 50 |

| Surrogate | LCS %Recovery | Qual | LCSD %Recovery | Qual | Acceptance Criteria |
|---|---|---|---|---|---|
| Tetrachloro-meta-Xylene | 73 | | 65 | | 30-150 |
| Decachlorobiphenyl | 69 | | 68 | | 30-150 |
| Tetrachloro-meta-Xylene | 77 | | 69 | | 30-150 |
| Decachlorobiphenyl | 71 | | 72 | | 30-150 |

# Lab Duplicate Analysis
## Batch Quality Control

**Project Name:** PASSAIC RI/FS CAGED BIVALVE
**Project Number:** TASK23.2.1

**Lab Number:** L1110328
**Report Date:** 10/19/11

| Parameter | Native Sample | Duplicate Sample | Units | RPD | Qual | RPD Limits |
|---|---|---|---|---|---|---|
| Polychlorinated Biphenyls by GC - Mansfield Lab Associated sample(s): 01-10 QC Batch ID: WG481281-4 QC Sample: L1110328-01 Client ID: LPR6-ECST-COMP01 | | | | | | |
| Aroclor 1016 | ND | ND | ug/kg | NC | | 50 |
| Aroclor 1221 | ND | ND | ug/kg | NC | | 50 |
| Aroclor 1242 | 25.4 | 28.8 | ug/kg | 13 | | 50 |
| Aroclor 1254 | 15.1 | 16.0 | ug/kg | 6 | | 50 |
| Aroclor 1262 | ND | ND | ug/kg | NC | | 50 |
| Aroclor 1268 | ND | ND | ug/kg | NC | | 50 |

| Surrogate | %Recovery | Qualifier | %Recovery | Qualifier | Acceptance Criteria |
|---|---|---|---|---|---|
| Tetrachloro-meta-Xylene | 56 | | 62 | | 30-150 |
| Decachlorobiphenyl | 47 | | 63 | | 30-150 |
| Tetrachloro-meta-Xylene | 57 | | 65 | | 30-150 |
| Decachlorobiphenyl | 49 | | 66 | | 30-150 |

# Lab Duplicate Analysis
## Batch Quality Control

**Project Name:** PASSAIC RI/FS CAGED BIVALVE
**Project Number:** TASK23.2.1

**Lab Number:** L1110328
**Report Date:** 10/19/11

| Parameter | Native Sample | Duplicate Sample | Units | RPD | RPD Limits |
|---|---|---|---|---|---|
| Polychlorinated Biphenyls by GC - Mansfield Lab Associated sample(s): 01-10 QC Batch ID: WG481281-4 QC Sample: L1110328-01 Client ID: LPR6-ECST-COMP01 | | | | | |
| Aroclor 1232 | ND | ND | ug/kg | NC | 50 |
| Aroclor 1248 | ND | ND | ug/kg | NC | 50 |
| Aroclor 1260 | ND | ND | ug/kg | NC | 50 |

| Surrogate | %Recovery | Qualifier | %Recovery | Qualifier | Acceptance Criteria |
|---|---|---|---|---|---|
| Tetrachloro-meta-Xylene | 56 | | 62 | | 30-150 |
| Decachlorobiphenyl | 47 | | 63 | | 30-150 |
| Tetrachloro-meta-Xylene | 57 | | 65 | | 30-150 |
| Decachlorobiphenyl | 49 | | 66 | | 30-150 |

# INORGANICS
# &
# MISCELLANEOUS

**Project Name:** PASSAIC RI/FS CAGED BIVALVE
**Project Number:** TASK23.2.1

**Lab Number:** L1110328
**Report Date:** 10/19/11

## SAMPLE RESULTS

Lab ID: L1110328-01
Client ID: LPR6-ECST-COMP01
Sample Location: Not Specified
Matrix: Tissue

Date Collected: 06/08/11 08:48
Date Received: 07/26/11
Field Prep: Not Specified

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor | Date Prepared | Date Analyzed | Analytical Method | Analyst |
|---|---|---|---|---|---|---|---|---|---|---|
| General Chemistry - Mansfield Lab | | | | | | | | | | |
| Moisture | 91.0 | | % | 0.100 | NA | 1 | - | 07/28/11 13:00 | 30,2540G | NR |

**Project Name:** PASSAIC RI/FS CAGED BIVALVE
**Project Number:** TASK23.2.1

**Lab Number:** L1110328
**Report Date:** 10/19/11

## SAMPLE RESULTS

Lab ID: L1110328-02
Client ID: LPRBG-ECST-COMP01
Sample Location: Not Specified
Matrix: Tissue

Date Collected: 03/09/11 15:00
Date Received: 07/26/11
Field Prep: Not Specified

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor | Date Prepared | Date Analyzed | Analytical Method | Analyst |
|---|---|---|---|---|---|---|---|---|---|---|
| General Chemistry - Mansfield Lab | | | | | | | | | | |
| Moisture | 90.1 | | % | 0.100 | NA | 1 | - | 07/28/11 13:00 | 30,2540G | NR |

**Project Name:** PASSAIC RI/FS CAGED BIVALVE
**Project Number:** TASK23.2.1

**Lab Number:** L1110328
**Report Date:** 10/19/11

## SAMPLE RESULTS

Lab ID: L1110328-03
Client ID: LPR6-ECST-COMP02
Sample Location: Not Specified
Matrix: Tissue

Date Collected: 06/08/11 09:03
Date Received: 07/26/11
Field Prep: Not Specified

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor | Date Prepared | Date Analyzed | Analytical Method | Analyst |
|---|---|---|---|---|---|---|---|---|---|---|
| General Chemistry - Mansfield Lab | | | | | | | | | | |
| Moisture | 90.9 | | % | 0.100 | NA | 1 | - | 07/28/11 13:00 | 30,2540G | NR |

**Project Name:** PASSAIC RI/FS CAGED BIVALVE
**Project Number:** TASK23.2.1

**Lab Number:** L1110328
**Report Date:** 10/19/11

## SAMPLE RESULTS

Lab ID: L1110328-04
Client ID: LPR7-ECST-COMP03
Sample Location: Not Specified
Matrix: Tissue

Date Collected: 06/08/11 08:20
Date Received: 07/26/11
Field Prep: Not Specified

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor | Date Prepared | Date Analyzed | Analytical Method | Analyst |
|---|---|---|---|---|---|---|---|---|---|---|
| General Chemistry - Mansfield Lab | | | | | | | | | | |
| Moisture | 91.3 | | % | 0.100 | NA | 1 | - | 07/28/11 13:00 | 30,2540G | NR |

**Project Name:** PASSAIC RI/FS CAGED BIVALVE
**Project Number:** TASK23.2.1

**Lab Number:** L1110328
**Report Date:** 10/19/11

## SAMPLE RESULTS

Lab ID: L1110328-05
Client ID: LPR7-ECST-COMP04
Sample Location: Not Specified
Matrix: Tissue

Date Collected: 06/08/11 07:55
Date Received: 07/26/11
Field Prep: Not Specified

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor | Date Prepared | Date Analyzed | Analytical Method | Analyst |
|---|---|---|---|---|---|---|---|---|---|---|
| General Chemistry - Mansfield Lab | | | | | | | | | | |
| Moisture | 89.9 | | % | 0.100 | NA | 1 | - | 07/28/11 13:00 | 30,2540G | NR |

**Project Name:** PASSAIC RI/FS CAGED BIVALVE
**Project Number:** TASK23.2.1

**Lab Number:** L1110328
**Report Date:** 10/19/11

## SAMPLE RESULTS

Lab ID: L1110328-06
Client ID: LPR8-ECST-COMP05
Sample Location: Not Specified
Matrix: Tissue

Date Collected: 06/08/11 07:40
Date Received: 07/26/11
Field Prep: Not Specified

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor | Date Prepared | Date Analyzed | Analytical Method | Analyst |
|---|---|---|---|---|---|---|---|---|---|---|
| General Chemistry - Mansfield Lab | | | | | | | | | | |
| Moisture | 91.0 | | % | 0.100 | NA | 1 | - | 07/28/11 13:00 | 30,2540G | NR |

**Project Name:** PASSAIC RI/FS CAGED BIVALVE
**Project Number:** TASK23.2.1

**Lab Number:** L1110328
**Report Date:** 10/19/11

## SAMPLE RESULTS

Lab ID: L1110328-07
Client ID: LPR1-GDST-COMP01
Sample Location: Not Specified
Matrix: Tissue

Date Collected: 05/09/11 10:20
Date Received: 07/26/11
Field Prep: Not Specified

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor | Date Prepared | Date Analyzed | Analytical Method | Analyst |
|---|---|---|---|---|---|---|---|---|---|---|
| General Chemistry - Mansfield Lab | | | | | | | | | | |
| Moisture | 94.1 | | % | 0.100 | NA | 1 | - | 07/28/11 13:00 | 30,2540G | NR |

**Project Name:** PASSAIC RI/FS CAGED BIVALVE
**Project Number:** TASK23.2.1

**Lab Number:** L1110328
**Report Date:** 10/19/11

## SAMPLE RESULTS

Lab ID: L1110328-08
Client ID: LPRBG-GDST-COMP01
Sample Location: Not Specified
Matrix: Tissue

Date Collected: 03/08/11 18:30
Date Received: 07/26/11
Field Prep: Not Specified

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor | Date Prepared | Date Analyzed | Analytical Method | Analyst |
|---|---|---|---|---|---|---|---|---|---|---|
| General Chemistry - Mansfield Lab | | | | | | | | | | |
| Moisture | 92.6 | | % | 0.100 | NA | 1 | - | 07/28/11 13:00 | 30,2540G | NR |

**Project Name:** PASSAIC RI/FS CAGED BIVALVE
**Project Number:** TASK23.2.1

**Lab Number:** L1110328
**Report Date:** 10/19/11

## SAMPLE RESULTS

Lab ID: L1110328-09
Client ID: LPR2-GDST-COMP02
Sample Location: Not Specified
Matrix: Tissue

Date Collected: 05/09/11 10:45
Date Received: 07/26/11
Field Prep: Not Specified

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor | Date Prepared | Date Analyzed | Analytical Method | Analyst |
|---|---|---|---|---|---|---|---|---|---|---|
| General Chemistry - Mansfield Lab | | | | | | | | | | |
| Moisture | 95.2 | | % | 0.100 | NA | 1 | - | 07/28/11 13:00 | 30,2540G | NR |

**Project Name:** PASSAIC RI/FS CAGED BIVALVE
**Project Number:** TASK23.2.1

**Lab Number:** L1110328
**Report Date:** 10/19/11

## SAMPLE RESULTS

Lab ID: L1110328-10
Client ID: LPR3-GDST-COMP03
Sample Location: Not Specified
Matrix: Tissue

Date Collected: 05/09/11 11:20
Date Received: 07/26/11
Field Prep: Not Specified

| Parameter | Result | Qualifier | Units | RL | MDL | Dilution Factor | Date Prepared | Date Analyzed | Analytical Method | Analyst |
|---|---|---|---|---|---|---|---|---|---|---|
| General Chemistry - Mansfield Lab | | | | | | | | | | |
| Moisture | 94.1 | | % | 0.100 | NA | 1 | - | 07/28/11 13:00 | 30,2540G | NR |

# Lab Duplicate Analysis
## Batch Quality Control

**Project Name:** PASSAIC RI/FS CAGED BIVALVE
**Project Number:** TASK23.2.1

**Lab Number:** L1110328
**Report Date:** 10/19/11

| Parameter | Native Sample | Duplicate Sample | Units | RPD | Qual | RPD Limits |
|---|---|---|---|---|---|---|
| General Chemistry - Mansfield Lab Associated sample(s): 01-10 QC Batch ID: WG481310-1 QC Sample: L1110328-01 Client ID: LPR6-ECST-COMP01 | | | | | | |
| Moisture | 91.0 | 91.5 | % | 1 | | 10 |

# Analytical Perspectives

# A3380 - TEQ

## Project ID: Passaic RI/FS Caged Bivalve Study

## Sample Summary Part 1

ANALYTICAL PERSPECTIVES

## Method 1613B

| Analyte | Method Blank<br>pg/L | LPR-071811-RB<br>pg/L |
|---|---|---|
| 2,3,7,8-TCDD | (1.67) | (1.75) |
| 1,2,3,7,8-PeCDD | (1.16) | (1.12) |
| 1,2,3,4,7,8-HxCDD | (0.914) | (0.628) |
| 1,2,3,6,7,8-HxCDD | (0.926) | (0.639) |
| 1,2,3,7,8,9-HxCDD | (1.08) | (0.738) |
| 1,2,3,4,6,7,8-HpCDD | (0.953) | (0.915) |
| OCDD | (1.72) | (1.88) |
| 2,3,7,8-TCDF | (1) | (1.19) |
| 1,2,3,7,8-PeCDF | (0.629) | (0.694) |
| 2,3,4,7,8-PeCDF | (0.54) | (0.641) |
| 1,2,3,4,7,8-HxCDF | (0.612) | (0.518) |
| 1,2,3,6,7,8-HxCDF | (0.568) | (0.51) |
| 2,3,4,6,7,8-HxCDF | (0.606) | (0.537) |
| 1,2,3,7,8,9-HxCDF | (1.02) | (0.918) |
| 1,2,3,4,6,7,8-HpCDF | (0.544) | (0.443) |
| 1,2,3,4,7,8,9-HpCDF | (1.12) | (0.815) |
| OCDF | (3.21) | (1.82) |
| **ITEF TEQ (ND=0; EMPC=0)** | **0.00** | **0.00** |
| **ITEF TEQ (ND=0; EMPC=EMPC)** | **0.00** | **0.00** |
| **ITEF TEQ (ND=DL/2; EMPC=0)** | **1.63** | **1.63** |
| **ITEF TEQ (ND=DL/2; EMPC=EMPC)** | **1.63** | **1.63** |
| **ITEF TEQ (ND=DL; EMPC=EMPC)** | **3.26** | **3.26** |
| Checkcode | 427-551-DGL | 943-181-TDG |
| Lab ID | MB1_8878_DF_TLX | A3380_8878_DF_001 |

( ) = DL
[ ] = EMPC

# A3380 - WHO-2005-TEQ

## Project ID: Passaic RI/FS Caged Bivalve Study

## Sample Summary Part 1

ANALYTICAL PERSPECTIVES

## Method 1613B

| Analyte | Method Blank<br>pg/L | LPR-071811-RB<br>pg/L |
|---|---|---|
| 2,3,7,8-TCDD | (1.67) | (1.75) |
| 1,2,3,7,8-PeCDD | (1.16) | (1.12) |
| 1,2,3,4,7,8-HxCDD | (0.914) | (0.628) |
| 1,2,3,6,7,8-HxCDD | (0.926) | (0.639) |
| 1,2,3,7,8,9-HxCDD | (1.08) | (0.738) |
| 1,2,3,4,6,7,8-HpCDD | (0.953) | (0.915) |
| OCDD | (1.72) | (1.88) |
| 2,3,7,8-TCDF | (1) | (1.19) |
| 1,2,3,7,8-PeCDF | (0.629) | (0.694) |
| 2,3,4,7,8-PeCDF | (0.54) | (0.641) |
| 1,2,3,4,7,8-HxCDF | (0.612) | (0.518) |
| 1,2,3,6,7,8-HxCDF | (0.568) | (0.51) |
| 2,3,4,6,7,8-HxCDF | (0.606) | (0.537) |
| 1,2,3,7,8,9-HxCDF | (1.02) | (0.918) |
| 1,2,3,4,6,7,8-HpCDF | (0.544) | (0.443) |
| 1,2,3,4,7,8,9-HpCDF | (1.12) | (0.815) |
| OCDF | (3.21) | (1.82) |
| **WHO-2005 TEQ (ND=0; EMPC=0)** | **0.00** | **0.00** |
| **WHO-2005 TEQ (ND=0; EMPC=EMPC)** | **0.00** | **0.00** |
| **WHO-2005 TEQ (ND=DL/2; EMPC=0)** | **1.86** | **1.84** |
| **WHO-2005 TEQ (ND=DL/2; EMPC=EMPC)** | **1.86** | **1.84** |
| **WHO-2005 TEQ (ND=DL; EMPC=EMPC)** | **3.71** | **3.68** |
| Checkcode | 427-551-DGL | 943-181-TDG |
| Lab ID | MB1_8878_DF_TLX | A3380_8878_DF_001 |

( ) = DL
[ ] = EMPC

# A3380 - Totals

## Project ID: Passaic RI/FS Caged Bivalve Study

## Sample Summary Part 2

ANALYTICAL PERSPECTIVES

## Method 1613B

| Analyte | Method Blank<br>pg/L | LPR-071811-RB<br>pg/L |
|---|---|---|
| **Totals** | | |
| TCDDs | 0 | 0 |
| PeCDDs | 0 | 0 |
| HxCDDs | 0 | 0 |
| HpCDDs | 0 | 0 |
| OCDD | 0 | 0 |
| TCDFs | 0 | 0 |
| PeCDFs | 0 | 0 |
| HxCDFs | 0 | 0 |
| HpCDFs | 0 | 0 |
| OCDF | 0 | 0 |
| **Total PCDD/Fs (ND=0; EMPC=0)** | **0.00** | **0.00** |
| **Total PCDD/Fs (ND=0; EMPC=EMPC)** | **0.00** | **0.00** |
| **Total PCDD/Fs (2378-X ND=DL; EMPC=EMPC)** | **18.3** | **15.8** |
| **Total 2378s (ND=0; EMPC=0)** | **0.00** | **0.00** |
| **Total 2378s (ND=0.5; EMPC=0)** | **9.13** | **7.88** |
| **Total 2378s (ND=1; EMPC=0)** | **18.3** | **15.8** |
| **Total 2378s (ND=0; EMPC=1)** | **0.00** | **0.00** |
| **Total 2378s (ND=0.5; EMPC=1)** | **9.13** | **7.88** |
| **Total 2378s (ND=1; EMPC=1)** | **18.3** | **15.8** |
| Checkcode | 427-551-DGL | 943-181-TDG |
| Lab ID | MB1_8878_DF_TLX | A3380_8878_DF_001 |

Total 2378s = Sum of 17 2378-substituted PCDD/PCDF congeners (SARA 313)

( ) = DL
[ ] = EMPC

# A3380 - Others

## Project ID: Passaic RI/FS Caged Bivalve Study

## Sample Summary Part 3

ANALYTICAL PERSPECTIVES

## Method 1613B

| Analyte | Method Blank<br>pg/L | LPR-071811-RB<br>pg/L |
|---|---|---|
| **Other PCDD/Fs (ND=0, EMPC=0)** | | |
| Other TCDD | 0 | 0 |
| Other PeCDD | 0 | 0 |
| Other HxCDD | 0 | 0 |
| Other HpCDD | 0 | 0 |
| Other TCDF | 0 | 0 |
| Other PeCDF | 0 | 0 |
| Other HxCDF | 0 | 0 |
| Other HpCDF | 0 | 0 |
| **Other PCDD/Fs (ND=0, EMPC=EMPC)** | | |
| Other TCDD | 0 | 0 |
| Other PeCDD | 0 | 0 |
| Other HxCDD | 0 | 0 |
| Other HpCDD | 0 | 0 |
| Other TCDF | 0 | 0 |
| Other PeCDF | 0 | 0 |
| Other HxCDF | 0 | 0 |
| Other HpCDF | 0 | 0 |
| Checkcode | 427-551-DGL | 943-181-TDG |
| Lab ID | MB1_8878_DF_TLX | A3380_8878_DF_001 |

( ) = DL
[ ] = EMPC

# A3380 - DLs

## Project ID: Passaic RI/FS Caged Bivalve Study

## Sample Summary
## Part 5 (DLs)

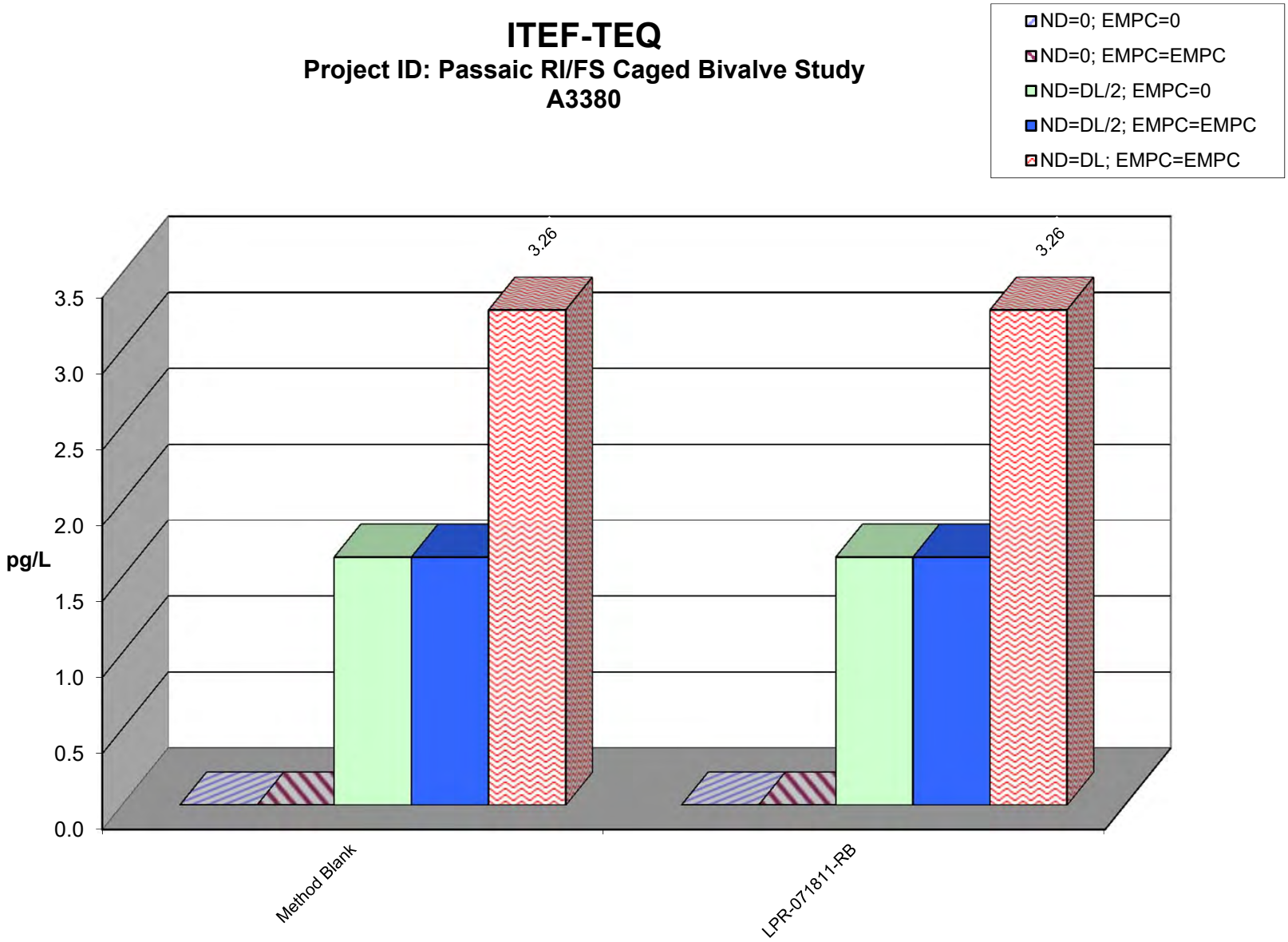
ANALYTICAL PERSPECTIVES

## Method 1613B

| Analyte | Method Blank | LPR-071811-RB |
|---|---|---|
| | pg/L | pg/L |
| 2,3,7,8-TCDD | 1.67 | 1.75 |
| 1,2,3,7,8-PeCDD | 1.16 | 1.12 |
| 1,2,3,4,7,8-HxCDD | 0.914 | 0.628 |
| 1,2,3,6,7,8-HxCDD | 0.926 | 0.639 |
| 1,2,3,7,8,9-HxCDD | 1.08 | 0.738 |
| 1,2,3,4,6,7,8-HpCDD | 0.953 | 0.915 |
| OCDD | 1.72 | 1.88 |
| 2,3,7,8-TCDF | 1 | 1.19 |
| 1,2,3,7,8-PeCDF | 0.629 | 0.694 |
| 2,3,4,7,8-PeCDF | 0.54 | 0.641 |
| 1,2,3,4,7,8-HxCDF | 0.612 | 0.518 |
| 1,2,3,6,7,8-HxCDF | 0.568 | 0.51 |
| 2,3,4,6,7,8-HxCDF | 0.606 | 0.537 |
| 1,2,3,7,8,9-HxCDF | 1.02 | 0.918 |
| 1,2,3,4,6,7,8-HpCDF | 0.544 | 0.443 |
| 1,2,3,4,7,8,9-HpCDF | 1.12 | 0.815 |
| OCDF | 3.21 | 1.82 |
| Total TCDD | 1.67 | 1.75 |
| Total PeCDD | 1.16 | 1.12 |
| Total HxCDD | 0.967 | 0.665 |
| Total HpCDD | 0.953 | 0.915 |
| Total TCDF | 1 | 1.19 |
| Total PeCDF | 0.583 | 0.667 |
| Total HxCDF | 0.671 | 0.593 |
| Total HpCDF | 0.754 | 0.587 |
| Checkcode | 427-551-DGL | 943-181-TDG |
| Lab ID | MB1_8878_DF_TLX | A3380_8878_DF_001 |

# ITEF-TEQ

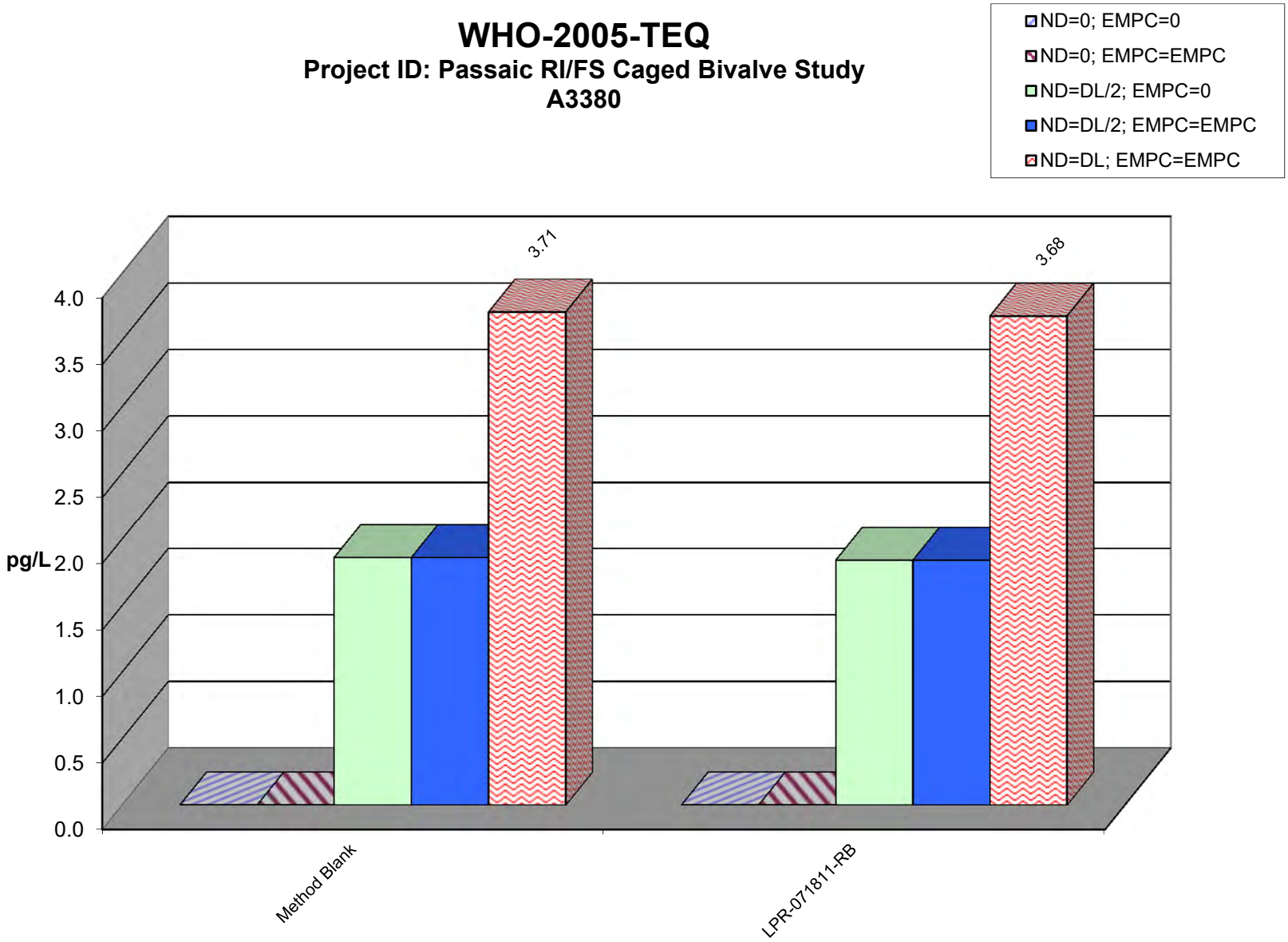
**Project ID: Passaic RI/FS Caged Bivalve Study**
**A3380**



# WHO-2005-TEQ

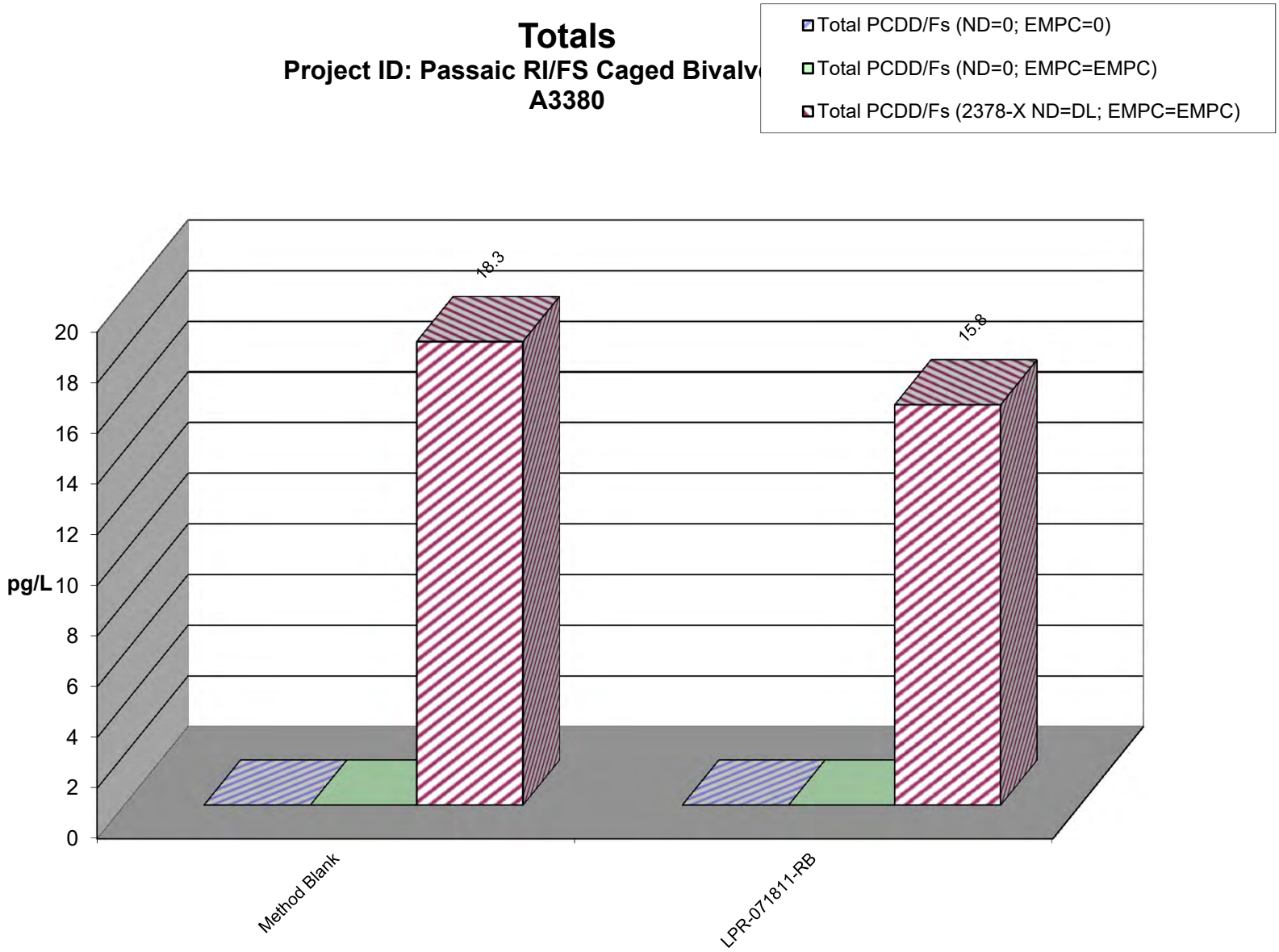
**Project ID: Passaic RI/FS Caged Bivalve Study**

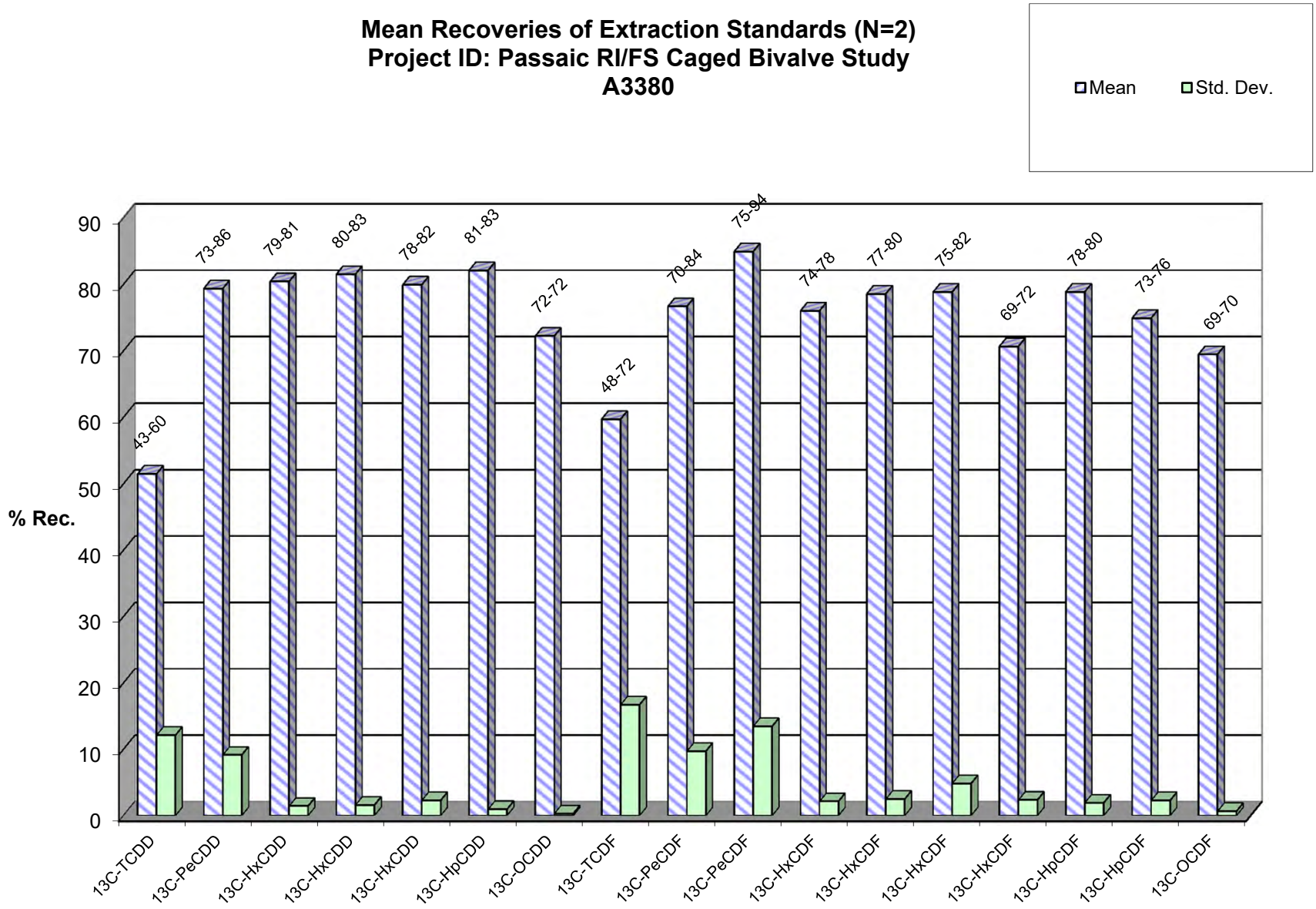
**A3380**

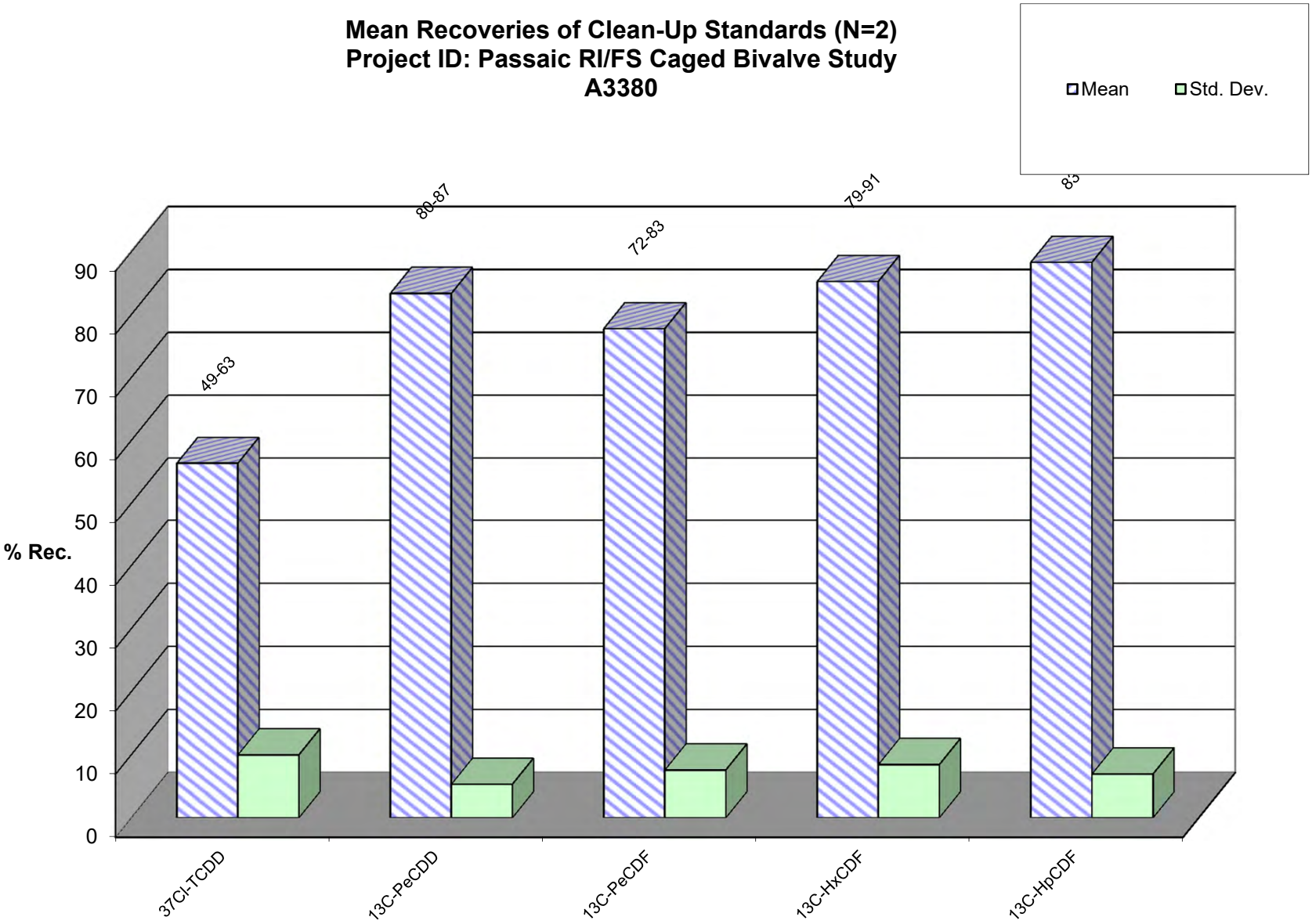


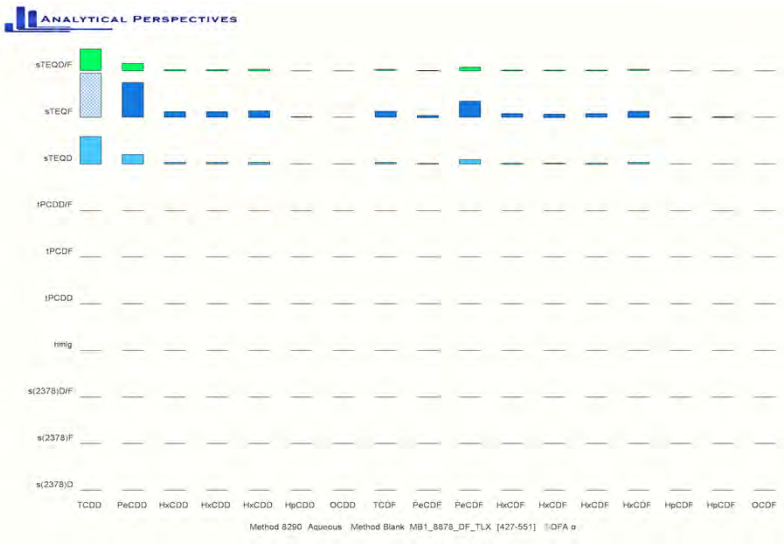
# Totals

**Project ID: Passaic RI/FS Caged Bivalv**
**A3380**

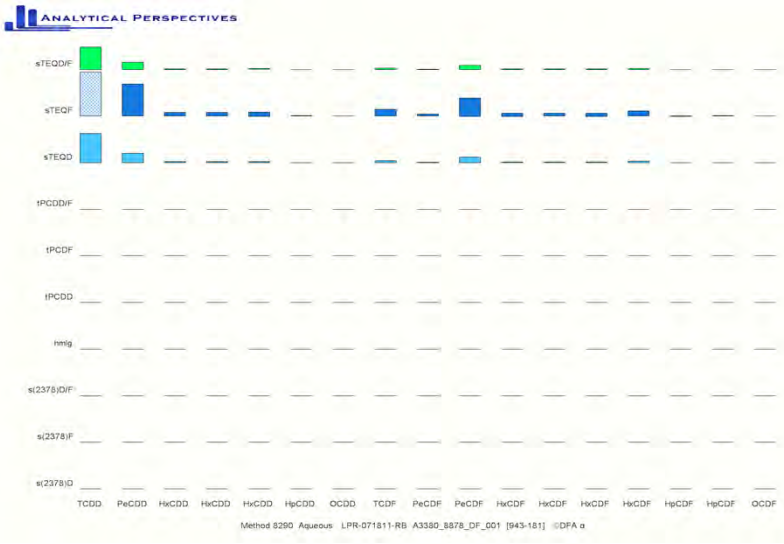



Mean Recoveries of Extraction Standards (N=2)
Project ID: Passaic RI/FS Caged Bivalve Study
A3380
Mean
Std. Dev.
% Rec.
0
10
20
30
40
50
60
70
80
90
43-60
73-86
79-81
80-83
78-82
81-83
72-72
48-72
70-84
75-94
74-78
77-80
75-82
69-72
78-80
73-76
69-70
13C-TCDD
13C-PeCDD
13C-HxCDD
13C-HxCDD
13C-HxCDD
13C-HpCDD
13C-OCDD
13C-TCDF
13C-PeCDF
13C-PeCDF
13C-HxCDF
13C-HxCDF
13C-HxCDF
13C-HxCDF
13C-HpCDF
13C-HpCDF
13C-OCDF


Mean Recoveries of Clean-Up Standards (N=2)
Project ID: Passaic RI/FS Caged Bivalve Study
A3380
Mean
Std. Dev.
% Rec.
0
10
20
30
40
50
60
70
80
90
49-63
80-87
72-83
79-91
83
37Cl-TCDD
13C-PeCDD
13C-PeCDF
13C-HxCDF
13C-HpCDF


ANALYTICAL PERSPECTIVES
sTEQD/F
sTEQF
sTEQD
tPCDD/F
tPCDF
tPCDD
nmig
s(2378)D/F
s(2378)F
s(2378)O
TCDD PeCDD HxCDD HxCDD HxCDD HpCDD OCDD TCDF PeCDF PeCDF HxCDF HxCDF HxCDF HxCDF HpCDF HpCDF OCDF
Method 8290 Aqueous Method Blank MB1_8878_DF_TLX [427-551] DFA α

ANALYTICAL PERSPECTIVES
Total-D
Total-F
Totals
TEQ-D
TEQ-F
TEQ
Total TCDD Total PeCDD Total HxCDD Total HpCDD OCDD Total TCDF Total PeCDF Total HxCDF Total HpCDF OCDF s2378 totPCDD/F
Method 8290 Aqueous Method Blank MB1_8878_DF_TLX [427-551] DFA β


ANALYTICAL PERSPECTIVES
sTEQD/F
sTEQF
sTEQD
tPCDD/F
tPCDF
tPCDD
nmig
s(2378)D/F
s(2378)F
s(2378)O
TCDD PeCDD HxCDD HxCDD HxCDD HpCDD OCDD TCDF PeCDF PeCDF HxCDF HxCDF HxCDF HxCDF HpCDF HpCDF OCDF
Method 8290 Aqueous LPR-071811-RB A3380_8878_DF_001 [943-181] DFA α

ANALYTICAL PERSPECTIVES
Total-D
Total-F
Totals
TEQ-D
TEQ-F
TEQ
Total TCDD Total PeCDD Total HxCDD Total HpCDD OCDD Total TCDF Total PeCDF Total HxCDF Total HpCDF OCDF s2378 totPCDD/F
Method 8290 Aqueous LPR-071811-RB A3380_8878_DF_001 [943-181] DFA β

# Sample ID: Method Blank — Method 1613B

| Client Data | | Sample Data | | Laboratory Data | | | |
|---|---|---|---|---|---|---|---|
| Name: | Windward Environmental, LLC | Matrix: | Aqueous | Lab Project ID: | A3380 | Date Received: | na |
| Project ID: | Passaic RI/FS Caged Bivalve Study | Weight/Volume: | 1.00 L | Lab Sample ID | MB1_8878_DF_TLX | Date Extracted: | 27-Jul-2011 |
| Date Collected: | na | pH: | 5 | QC Batch No: | 8878 | Date Analyzed: | 04-Aug-2011 |
| | | Split: | - | Dilution: | - | Time Analyzed: | 21:06:07 |

| Analyte | Conc. (pg/L) | DL (pg/L) | EMPC (pg/L) | Qualifiers | Standard | ES Recoveries | Qualifiers |
|---|---|---|---|---|---|---|---|
| 2378-TCDD | ND | 1.67 | | | ES 2378-TCDD | 60 | |
| 12378-PeCDD | ND | 1.16 | | | ES 12378-PeCDD | 85.8 | |
| 123478-HxCDD | ND | 0.914 | | | ES 123478-HxCDD | 81.4 | |
| 123678-HxCDD | ND | 0.926 | | | ES 123678-HxCDD | 80.4 | |
| 123789-HxCDD | ND | 1.08 | | | ES 123789-HxCDD | 78.3 | |
| 1234678-HpCDD | ND | 0.953 | | | ES 1234678-HpCDD | 81.4 | |
| OCDD | ND | 1.72 | | | ES OCDD | 72.4 | |
| | | | | | | | |
| 2378-TCDF | ND | 1 | | | ES 2378-TCDF | 71.5 | |
| 12378-PeCDF | ND | 0.629 | | | ES 12378-PeCDF | 83.5 | |
| 23478-PeCDF | ND | 0.54 | | | ES 23478-PeCDF | 94.4 | |
| 123478-HxCDF | ND | 0.612 | | | ES 123478-HxCDF | 77.5 | |
| 123678-HxCDF | ND | 0.568 | | | ES 123678-HxCDF | 80.3 | |
| 234678-HxCDF | ND | 0.606 | | | ES 234678-HxCDF | 82.2 | |
| 123789-HxCDF | ND | 1.02 | | | ES 123789-HxCDF | 72.3 | |
| 1234678-HpCDF | ND | 0.544 | | | ES 1234678-HpCDF | 80.2 | |
| 1234789-HpCDF | ND | 1.12 | | | ES 1234789-HpCDF | 73.3 | |
| OCDF | ND | 3.21 | | | ES OCDF | 69 | |
| **Totals** | | | | | **Standard** | **CS/AS Recoveries** | |
| | | | | | CS 37Cl-2378-TCDD | 63.4 | |
| Total TCDD | ND | 1.67 | ND | | CS 12347-PeCDD | 87.1 | |
| Total PeCDD | ND | 1.16 | ND | | CS 12346-PeCDF | 83.1 | |
| Total HxCDD | ND | 0.967 | ND | | CS 123469-HxCDF | 79.3 | |
| Total HpCDD | ND | 0.953 | ND | | CS 1234689-HpCDF | 83.4 | |
| | | | | | AS 1368-TCDD | 48.2 | |
| Total TCDF | ND | 1 | ND | | AS 1368-TCDF | 33.1 | |
| Total PeCDF | ND | 0.583 | ND | | | | |
| Total HxCDF | ND | 0.671 | ND | | | | |
| Total HpCDF | ND | 0.754 | ND | | | | |
| **Total PCDD/Fs** | **ND** | | **ND** | | | | |
| **ITEF TEQs** | | | | | | | |
| TEQ: ND=0 | 0 | | 0 | | | | |
| TEQ: ND=DL/2 | 1.63 | 1.63 | 1.63 | | | | |
| TEQ: ND=DL | 3.26 | 3.26 | 3.26 | | | | |

ANALYTICAL PERSPECTIVES
2714 Exchange Drive
Wilmington, NC 28405 , USA
info@ultratrace.com
Tel: +1 910 794-1613 (Fax: -3919); Toll-Free 866 846-8290
www.ultratrace.com

# Sample ID: Method Blank

Method 1613B

# Method 1613B

| Client Data | | Sample Data | | Laboratory Data | | | |
|---|---|---|---|---|---|---|---|
| Name: | Windward Environmental, LLC | Matrix: | Aqueous | Lab Project ID: | A3380 | Date Received: | na |
| Project ID: | Passaic RI/FS Caged Bivalve Study | Weight/Volume: | 1.00 L | Lab Sample ID: | MB1_8878_DF_TLX | Date Extracted: | 27-Jul-2011 |
| Date Collected: | na | pH: | 5 | QC Batch No.: | 8878 | Date Analyzed: | 04-Aug-2011 |
| | | Split: | - | Dilution: | - | Time Analyzed: | 21:06:07 |

| Tetra-Dioxins | Conc. (pg/L) | Qualifiers | Penta-Dioxins | Conc. (pg/L) | Qualifiers | Hexa-Dioxins | Conc (pg/L) | Qualifiers | Hepta-Dioxins | Conc (pg/L) | Qualifiers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1368D | (1.67) | | 12479/12468D | (1.16) | | 124679/124689D | (0.967) | | 1234679D | (0.953) | |
| 1379D | (1.67) | | 12469D | (1.16) | | 123468D | (0.967) | | 1234678D | (0.953) | |
| 1369D | (1.67) | | 12368D | (1.16) | | 123679/123689D | (0.967) | | | | |
| 1469D | (1.67) | | 12478D | (1.16) | | 123469D | (0.967) | | | | |
| 1247D...[4] | (1.67) | | 12379D | (1.16) | | 123478D | (0.914) | | | | |
| 1378D | (1.67) | | 12369D...[3] | (1.16) | | 123678D | (0.926) | | | | |
| 1268D | (1.67) | | 12346/12347D | (1.16) | | 123467D | (0.967) | | | | |
| 1478D | (1.67) | | 12378D | (1.16) | | 123789D | (1.08) | | Conc. | 0 | |
| 1279D | (1.67) | | 12367D | (1.16) | | | | | EMPC | 0 | |
| 1234/1269D | (1.67) | | 12389D | (1.16) | | | | | | | |
| 1236D | (1.67) | | | | | | | | Octa-Dioxin | Conc (pg/L) | Qualifiers |
| 1237/1238D | (1.67) | | | | | | | | | | |
| 1239D | (1.67) | | | | | | | | OCDD | (1.72) | |
| 2378D | (1.67) | | | | | | | | | | |
| 1278D | (1.67) | | | | | | | | | | |
| 1267D | (1.67) | | | | | | | | | | |
| 1289D | (1.67) | | | | | | | | | | |
| Conc. | 0 | | Conc. | 0 | | Conc. | 0 | | | | |
| EMPC | 0 | | EMPC | 0 | | EMPC | 0 | | | | |


ANALYTICAL PERSPECTIVES

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www.ultratrace.com


| ITEF TEQs | Conc. | EMPC |
|---|---|---|
| TEQ: ND=0 | 0 | 0 |
| TEQ: ND=DL/2 | 1.63 | 1.63 |
| TEQ: ND=DL | 3.26 | 3.26 |

| | Conc. | EMPC |
|---|---|---|
| Total PCDD/Fs | 0 | 0 |

Checkcode: 427-551-DGL

Report Created: 19-Aug-2011 14:27 Analyst: MC

# Sample ID: Method Blank — Method 1613B

| Client Data | | Sample Data | | Laboratory Data | | | |
|---|---|---|---|---|---|---|---|
| Name: | Windward Environmental, LLC | Matrix: | Aqueous | Lab Project ID: | A3380 | Date Received: | na |
| Project ID: | Passaic RI/FS Caged Bivalve Study | Weight/Volume: | 1.00 L | Lab Sample ID: | MB1_8878_DF_TLX | Date Extracted: | 27/Jul/2011 |
| Date Collected: | na | pH: | 5 | QC Batch No.: | 8878 | Date Analyzed: | 04/Aug/2011 |
| | | Split: | - | Dilution: | - | Time Analyzed: | 21:06:07 |

| Tetra-Furans | Conc. (pg/L) | Qualifiers | Penta-Furans | Conc. (pg/L) | Qualifiers | Hexa-Furans | Conc (pg/L) | Qualifiers | Hepta-Furans | Conc (pg/L) | Qualifiers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1368F | (1) | | 13468/12468F | (0.692) | | 123468F | (0.671) | | 1234678F | (0.544) | |
| 1468F | (1) | | 13678F...[3] | (0.583) | | 124678/134678F | (0.671) | | 1234679F | (0.754) | |
| 2468F | (1) | | 12368F...[3] | (0.583) | | 134679F | (0.671) | | 1234689F | (0.754) | |
| 1346/1246F | (1) | | 14678F | (0.583) | | 124679F | (0.671) | | 1234789F | (1.12) | |
| 1347F...[3] | (1) | | 13479F | (0.583) | | 124689F | (0.671) | | | | |
| 1348F | (1) | | 13469/12479F | (0.583) | | 123467F | (0.671) | | | | |
| 1248F...[3] | (1) | | 12346F | (0.583) | | 123478F | (0.612) | | | | |
| 1268F | (1) | | 23468/12469F | (0.583) | | 123678F | (0.568) | | | | |
| 1467F | (1) | | 12347F | (0.583) | | 123479F | (0.671) | | | | |
| 1478F | (1) | | 12348F | (0.583) | | 123469F | (0.671) | | | | |
| 1369/1237F | (1) | | 12378F | (0.629) | | 123679F | (0.671) | | | | |
| 2467F | (1) | | 12678/12367F | (0.583) | | 234678F | (0.606) | | Conc. | 0 | |
| 2368F | (1) | | 12379F | (0.583) | | 234678/123689F | (0.606) | | EMPC | 0 | |
| 1238F...[5] | (1) | | 12679F | (0.583) | | 123689F | (0.671) | | | | |
| 1278F | (1) | | 23467/12369F | (0.583) | | 123789F | (1.02) | | Octa-Furan | Conc (pg/L) | Qualifiers |
| 1349F | (1) | | 23478F | (0.54) | | 123789/123489F | (1.02) | | | | |
| 1267F | (1) | | 23478/12489F | (0.54) | | 123489F | (0.671) | | OCDF | (3.21) | |
| 2346/1249F | (1) | | 12489F | (0.583) | | | | | | | |
| 2347/1279F | (1) | | 12349F | (0.583) | | | | | | | |
| 2348F | (1) | | 12389F | (0.583) | | | | | | | |
| 2378F | (1) | | | | | | | | | | |
| 2367/3467F | (1) | | | | | | | | | | |
| 1269F | (1) | | | | | | | | | | |
| 1239F | (1) | | | | | | | | | | |
| 1289F | (1) | | | | | | | | | | |
| Conc. | 0 | | Conc. | 0 | | Conc. | 0 | | | | |
| EMPC | 0 | | EMPC | 0 | | EMPC | 0 | | | | |

Checkcode: 427-551-DGL

Report Created: 19-Aug-2011 14:27 Analyst: MC

# Sample ID: Method Blank — TEQ Summary — Method 1613B

| | | | | | |
|---|---|---|---|---|---|
| Client Project Name: | Windward Environmental, LLC | Matrix: | Aqueous | Lab Sample ID: | MB1_8878_DF_TLX |
| Cliend Project ID: | Passaic RI/FS Caged Bivalve Study | Weight/Volume: | 1.00 L | QC Batch No.: | 8878 |
| Date Collected: | na | Split: | - | Date Extracted: | 27-Jul-2011 |
| Date Received: | na | Dilution: | - | Date Analyzed: | 04-Aug-2011 21:06 |
| Lab Project No: | A3380 | Units | pg/L | | |

| Analyte | Result | Qualifiers | DLs | I-TEQ | WHO-1998 | WHO-2005 |
|---|---|---|---|---|---|---|
| 2378-TCDD | (1.67) | | 1.67 | (1.67) | (1.67) | (1.67) |
| 12378-PeCDD | (1.16) | | 1.16 | (0.58) | (1.16) | (1.16) |
| 123478-HxCDD | (0.914) | | 0.914 | (0.0914) | (0.0914) | (0.0914) |
| 123678-HxCDD | (0.926) | | 0.926 | (0.0926) | (0.0926) | (0.0926) |
| 123789-HxCDD | (1.08) | | 1.08 | (0.108) | (0.108) | (0.108) |
| 1234678-HpCDD | (0.953) | | 0.953 | (0.00953) | (0.00953) | (0.00953) |
| OCDD | (1.72) | | 1.72 | (0.00172) | (0.000172) | (0.000516) |
| | | | | | | |
| 2378-TCDF | (1) | | 1 | (0.1) | (0.1) | (0.1) |
| 12378-PeCDF | (0.629) | | 0.629 | (0.0315) | (0.0315) | (0.0189) |
| 23478-PeCDF | (0.54) | | 0.54 | (0.27) | (0.27) | (0.162) |
| 123478-HxCDF | (0.612) | | 0.612 | (0.0612) | (0.0612) | (0.0612) |
| 123678-HxCDF | (0.568) | | 0.568 | (0.0568) | (0.0568) | (0.0568) |
| 234678-HxCDF | (0.606) | | 0.606 | (0.0606) | (0.0606) | (0.0606) |
| 123789-HxCDF | (1.02) | | 1.02 | (0.102) | (0.102) | (0.102) |
| 1234678-HpCDF | (0.544) | | 0.544 | (0.00544) | (0.00544) | (0.00544) |
| 1234789-HpCDF | (1.12) | | 1.12 | (0.0112) | (0.0112) | (0.0112) |
| OCDF | (3.21) | | 3.21 | (0.00321) | (0.000321) | (0.000963) |

| TEQ Summaries | | | |
|---|---|---|---|
| EMPC = 0, ND = 0 | 0 | 0 | 0 |
| EMPC = 0, ND = DL / 2 | 1.63 | 1.92 | 1.86 |
| EMPC = 0, ND = DL | 3.26 | 3.83 | 3.71 |
| EMPC = 0, < J-level = 0 | 0 | 0 | 0 |
| | | | |
| EMPC = EMPC, ND = 0 | 0 | 0 | 0 |
| EMPC = EMPC, ND = DL / 2 | 1.63 | 1.92 | 1.86 |
| EMPC = EMPC, ND = DL | 3.26 | 3.83 | 3.71 |
| EMPC = EMPC, < J-level = 0 | 0 | 0 | 0 |

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# Sample ID: LPR-071811-RB

# Method 1613B

| Client Data | | Sample Data | | Laboratory Data | | | |
|---|---|---|---|---|---|---|---|
| Name: | Windward Environmental, LLC | Matrix: | Aqueous | Lab Project ID: | A3380 | Date Received: | 21-Jul-2011 |
| Project ID: | Passaic RI/FS Caged Bivalve Study | Weight/Volume: | 1.24 L | Lab Sample ID | A3380_8878_DF_001 | Date Extracted: | 27-Jul-2011 |
| Date Collected: | 18-Jul-2011 | pH: | 5 | QC Batch No: | 8878 | Date Analyzed: | 05-Aug-2011 |
| | | Split: | - | Dilution: | - | Time Analyzed: | 00:16:25 |

| Analyte | Conc. (pg/L) | DL (pg/L) | EMPC (pg/L) | Qualifiers | Standard | ES Recoveries | Qualifiers |
|---|---|---|---|---|---|---|---|
| 2378-TCDD | ND | 1.75 | | | ES 2378-TCDD | 42.9 | |
| 12378-PeCDD | ND | 1.12 | | | ES 12378-PeCDD | 72.9 | |
| 123478-HxCDD | ND | 0.628 | | | ES 123478-HxCDD | 79.4 | |
| 123678-HxCDD | ND | 0.639 | | | ES 123678-HxCDD | 82.6 | |
| 123789-HxCDD | ND | 0.738 | | | ES 123789-HxCDD | 81.5 | |
| 1234678-HpCDD | ND | 0.915 | | | ES 1234678-HpCDD | 82.7 | |
| OCDD | ND | 1.88 | | | ES OCDD | 72 | |
| | | | | | | | |
| 2378-TCDF | ND | 1.19 | | | ES 2378-TCDF | 47.9 | |
| 12378-PeCDF | ND | 0.694 | | | ES 12378-PeCDF | 69.8 | |
| 23478-PeCDF | ND | 0.641 | | | ES 23478-PeCDF | 75.4 | |
| 123478-HxCDF | ND | 0.518 | | | ES 123478-HxCDF | 74.5 | |
| 123678-HxCDF | ND | 0.51 | | | ES 123678-HxCDF | 76.8 | |
| 234678-HxCDF | ND | 0.537 | | | ES 234678-HxCDF | 75.4 | |
| 123789-HxCDF | ND | 0.918 | | | ES 123789-HxCDF | 69 | |
| 1234678-HpCDF | ND | 0.443 | | | ES 1234678-HpCDF | 77.5 | |
| 1234789-HpCDF | ND | 0.815 | | | ES 1234789-HpCDF | 76.5 | |
| OCDF | ND | 1.82 | | | ES OCDF | 69.9 | |
| **Totals** | | | | | **Standard** | **CS/AS Recoveries** | |
| | | | | | CS 37Cl-2378-TCDD | 49.3 | |
| Total TCDD | ND | 1.75 | ND | | CS 12347-PeCDD | 79.6 | |
| Total PeCDD | ND | 1.12 | ND | | CS 12346-PeCDF | 72.4 | |
| Total HxCDD | ND | 0.665 | ND | | CS 123469-HxCDF | 91.2 | |
| Total HpCDD | ND | 0.915 | ND | | CS 1234689-HpCDF | 93.2 | |
| | | | | | AS 1368-TCDD | 31 | |
| Total TCDF | ND | 1.19 | ND | | AS 1368-TCDF | 17.9 | |
| Total PeCDF | ND | 0.667 | ND | | | | |
| Total HxCDF | ND | 0.593 | ND | | | | |
| Total HpCDF | ND | 0.587 | ND | | | | |
| **Total PCDD/Fs** | **ND** | | **ND** | | | | |
| **ITEF TEQs** | | | | | | | |
| TEQ: ND=0 | 0 | | 0 | | | | |
| TEQ: ND=DL/2 | 1.63 | 1.63 | 1.63 | | | | |
| TEQ: ND=DL | 3.26 | 3.26 | 3.26 | | | | |

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# Sample ID: LPR-071811-RB — Method 1613B

| Client Data | | Sample Data | | Laboratory Data | | | |
|---|---|---|---|---|---|---|---|
| Name: | Windward Environmental, LLC | Matrix: | Aqueous | Lab Project ID: | A3380 | Date Received: | 21-Jul-2011 |
| Project ID: | Passaic RI/FS Caged Bivalve Study | Weight/Volume: | 1.24 L | Lab Sample ID: | A3380_8878_DF_001 | Date Extracted: | 27-Jul-2011 |
| Date Collected: | 18-Jul-2011 | pH: | 5 | QC Batch No.: | 8878 | Date Analyzed: | 05-Aug-2011 |
| | | Split: | - | Dilution: | - | Time Analyzed: | 00:16:25 |

| Tetra-Dioxins | Conc. (pg/L) | Qualifiers | Penta-Dioxins | Conc. (pg/L) | Qualifiers | Hexa-Dioxins | Conc (pg/L) | Qualifiers | Hepta-Dioxins | Conc (pg/L) | Qualifiers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1368D | (1.75) | | 12479/12468D | (1.12) | | 124679/124689D | (0.665) | | 1234679D | (0.915) | |
| 1379D | (1.75) | | 12469D | (1.12) | | 123468D | (0.665) | | 1234678D | (0.915) | |
| 1369D | (1.75) | | 12368D | (1.12) | | 123679/123689D | (0.665) | | | | |
| 1469D | (1.75) | | 12478D | (1.12) | | 123469D | (0.665) | | | | |
| 1247D...[4] | (1.75) | | 12379D | (1.12) | | 123478D | (0.628) | | | | |
| 1378D | (1.75) | | 12369D...[3] | (1.12) | | 123678D | (0.639) | | | | |
| 1268D | (1.75) | | 12346/12347D | (1.12) | | 123467D | (0.665) | | | | |
| 1478D | (1.75) | | 12378D | (1.12) | | 123789D | (0.738) | | Conc. | 0 | |
| 1279D | (1.75) | | 12367D | (1.12) | | | | | EMPC | 0 | |
| 1234/1269D | (1.75) | | 12389D | (1.12) | | | | | | | |
| 1236D | (1.75) | | | | | | | | Octa-Dioxin | Conc (pg/L) | Qualifiers |
| 1237/1238D | (1.75) | | | | | | | | | | |
| 1239D | (1.75) | | | | | | | | OCDD | (1.88) | |
| 2378D | (1.75) | | | | | | | | | | |
| 1278D | (1.75) | | | | | | | | | | |
| 1267D | (1.75) | | | | | | | | | | |
| 1289D | (1.75) | | | | | | | | | | |
| Conc. | 0 | | Conc. | 0 | | Conc. | 0 | | | | |
| EMPC | 0 | | EMPC | 0 | | EMPC | 0 | | | | |


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| ITEF TEQs | Conc. | EMPC |
|---|---|---|
| TEQ: ND=0 | 0 | 0 |
| TEQ: ND=DL/2 | 1.63 | 1.63 |
| TEQ: ND=DL | 3.26 | 3.26 |

| | Conc. | EMPC |
|---|---|---|
| Total PCDD/Fs | 0 | 0 |

Checkcode: 943-181-TDG

Report Created: 19-Aug-2011 14:27 Analyst: MC

# Sample ID: LPR-071811-RB — Method 1613B

| Client Data | | Sample Data | | Laboratory Data | | | |
|---|---|---|---|---|---|---|---|
| Name: | Windward Environmental, LLC | Matrix: | Aqueous | Lab Project ID: | A3380 | Date Received: | 21/Jul/2011 |
| Project ID: | Passaic RI/FS Caged Bivalve Study | Weight/Volume: | 1.24 L | Lab Sample ID: | A3380_8878_DF_001 | Date Extracted: | 27/Jul/2011 |
| Date Collected: | 18/Jul/2011 | pH: | 5 | QC Batch No.: | 8878 | Date Analyzed: | 05/Aug/2011 |
| | | Split: | - | Dilution: | - | Time Analyzed: | 00:16:25 |

| Tetra-Furans | Conc. (pg/L) | Qualifiers | Penta-Furans | Conc. (pg/L) | Qualifiers | Hexa-Furans | Conc (pg/L) | Qualifiers | Hepta-Furans | Conc (pg/L) | Qualifiers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1368F | (1.19) | | 13468/12468F | (0.771) | | 123468F | (0.593) | | 1234678F | (0.443) | |
| 1468F | (1.19) | | 13678F...[3] | (0.667) | | 124678/134678F | (0.593) | | 1234679F | (0.587) | |
| 2468F | (1.19) | | 12368F...[3] | (0.667) | | 134679F | (0.593) | | 1234689F | (0.587) | |
| 1346/1246F | (1.19) | | 14678F | (0.667) | | 124679F | (0.593) | | 1234789F | (0.815) | |
| 1347F...[3] | (1.19) | | 13479F | (0.667) | | 124689F | (0.593) | | | | |
| 1348F | (1.19) | | 13469/12479F | (0.667) | | 123467F | (0.593) | | | | |
| 1248F...[3] | (1.19) | | 12346F | (0.667) | | 123478F | (0.518) | | | | |
| 1268F | (1.19) | | 23468/12469F | (0.667) | | 123678F | (0.51) | | | | |
| 1467F | (1.19) | | 12347F | (0.667) | | 123479F | (0.593) | | | | |
| 1478F | (1.19) | | 12348F | (0.667) | | 123469F | (0.593) | | | | |
| 1369/1237F | (1.19) | | 12378F | (0.694) | | 123679F | (0.593) | | | | |
| 2467F | (1.19) | | 12678/12367F | (0.667) | | 234678F | (0.537) | | Conc. | 0 | |
| 2368F | (1.19) | | 12379F | (0.667) | | 234678/123689F | (0.537) | | EMPC | 0 | |
| 1238F...[5] | (1.19) | | 12679F | (0.667) | | 123689F | (0.593) | | | | |
| 1278F | (1.19) | | 23467/12369F | (0.667) | | 123789F | (0.918) | | Octa-Furan | Conc (pg/L) | Qualifiers |
| 1349F | (1.19) | | 23478F | (0.641) | | 123789/123489F | (0.918) | | | | |
| 1267F | (1.19) | | 23478/12489F | (0.641) | | 123489F | (0.593) | | OCDF | (1.82) | |
| 2346/1249F | (1.19) | | 12489F | (0.667) | | | | | | | |
| 2347/1279F | (1.19) | | 12349F | (0.667) | | | | | | | |
| 2348F | (1.19) | | 12389F | (0.667) | | | | | | | |
| 2378F | (1.19) | | | | | | | | | | |
| 2367/3467F | (1.19) | | | | | | | | | | |
| 1269F | (1.19) | | | | | | | | | | |
| 1239F | (1.19) | | | | | | | | | | |
| 1289F | (1.19) | | | | | | | | | | |
| Conc. | 0 | | Conc. | 0 | | Conc. | 0 | | | | |
| EMPC | 0 | | EMPC | 0 | | EMPC | 0 | | | | |

Checkcode: 943-181-TDG

Report Created: 19-Aug-2011 14:27 Analyst: MC

# Sample ID: LPR-071811-RB — TEQ Summary — Method 1613B

| | | | | | |
|---|---|---|---|---|---|
| Client Project Name: | Windward Environmental, LLC | Matrix: | Aqueous | Lab Sample ID: | A3380_8878_DF_001 |
| Cliend Project ID: | Passaic RI/FS Caged Bivalve Study | Weight/Volume: | 1.24 L | QC Batch No.: | 8878 |
| Date Collected: | 18-Jul-2011 | Split: | - | Date Extracted: | 27-Jul-2011 |
| Date Received: | 21-Jul-2011 | Dilution: | - | Date Analyzed: | 05-Aug-2011 00:16 |
| Lab Project No: | A3380 | Units | pg/L | | |

| Analyte | Result | Qualifiers | DLs | I-TEQ | WHO-1998 | WHO-2005 |
|---|---|---|---|---|---|---|
| 2378-TCDD | (1.75) | | 1.75 | (1.75) | (1.75) | (1.75) |
| 12378-PeCDD | (1.12) | | 1.12 | (0.56) | (1.12) | (1.12) |
| 123478-HxCDD | (0.628) | | 0.628 | (0.0628) | (0.0628) | (0.0628) |
| 123678-HxCDD | (0.639) | | 0.639 | (0.0639) | (0.0639) | (0.0639) |
| 123789-HxCDD | (0.738) | | 0.738 | (0.0738) | (0.0738) | (0.0738) |
| 1234678-HpCDD | (0.915) | | 0.915 | (0.00915) | (0.00915) | (0.00915) |
| OCDD | (1.88) | | 1.88 | (0.00188) | (0.000188) | (0.000564) |
| | | | | | | |
| 2378-TCDF | (1.19) | | 1.19 | (0.119) | (0.119) | (0.119) |
| 12378-PeCDF | (0.694) | | 0.694 | (0.0347) | (0.0347) | (0.0208) |
| 23478-PeCDF | (0.641) | | 0.641 | (0.321) | (0.321) | (0.192) |
| 123478-HxCDF | (0.518) | | 0.518 | (0.0518) | (0.0518) | (0.0518) |
| 123678-HxCDF | (0.51) | | 0.51 | (0.051) | (0.051) | (0.051) |
| 234678-HxCDF | (0.537) | | 0.537 | (0.0537) | (0.0537) | (0.0537) |
| 123789-HxCDF | (0.918) | | 0.918 | (0.0918) | (0.0918) | (0.0918) |
| 1234678-HpCDF | (0.443) | | 0.443 | (0.00443) | (0.00443) | (0.00443) |
| 1234789-HpCDF | (0.815) | | 0.815 | (0.00815) | (0.00815) | (0.00815) |
| OCDF | (1.82) | | 1.82 | (0.00182) | (0.000182) | (0.000546) |

| TEQ Summaries | | | |
|---|---|---|---|
| EMPC = 0, ND = 0 | 0 | 0 | 0 |
| EMPC = 0, ND = DL / 2 | 1.63 | 1.91 | 1.84 |
| EMPC = 0, ND = DL | 3.26 | 3.82 | 3.67 |
| EMPC = 0, < J-level = 0 | 0 | 0 | 0 |
| | | | |
| EMPC = EMPC, ND = 0 | 0 | 0 | 0 |
| EMPC = EMPC, ND = DL / 2 | 1.63 | 1.91 | 1.84 |
| EMPC = EMPC, ND = DL | 3.26 | 3.82 | 3.67 |
| EMPC = EMPC, < J-level = 0 | 0 | 0 | 0 |

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A3380
Project ID: Passaic RI/FS Caged Bivalve Study

# Sample Summary

ANALYTICAL PERSPECTIVES

| Analyte | Method Blank<br>Conc. pg/L | LPR-071811-RB<br>Conc. pg/L |
|---|---|---|
| PCB-77 | (1.91) | (1.19) |
| PCB-81 | (1.9) | (1.2) |
| PCB-105 | (1.43) | 2.31 |
| PCB-114 | (1.42) | (1.06) |
| PCB-118 | (1.35) | 4.96 |
| PCB-123 | (1.52) | (1.04) |
| PCB-126 | (1.4) | (1.12) |
| PCB-156/157 | (2.11) | (1.54) |
| PCB-167 | (1.57) | (1.1) |
| PCB-169 | (1.84) | (1.38) |
| PCB-189 | (1.37) | (0.864) |
| | | |
| Total Mono-CBs | (1.39) | 13 |
| Total Di-CBs | 16.8 | 31.8 |
| Total Tri-CBs | 17.7 | 17.9 |
| Total Tetra-CBs | 2.76 | 20.2 |
| Total Penta-CBs | (1.35) | 16.5 |
| Total Hexa-CBs | (1.62) | 10.3 |
| Total Hepta-CBs | (1.51) | 1.81 |
| Total Octa-CBs | (1.46) | (0.938) |
| Total Nona-CBs | (2.6) | (1.61) |
| PCB-209 | (1.38) | 3.12 |
| | | |
| TEQs (WHO 2005 M/H) | | |
| ND = 0; EMPC = 0 | 0.00 | 0.000218 |
| ND = 0; EMPC = EMPC | 0.00 | 0.000218 |
| | | |
| ND = DL/2; EMPC = 0 | 0.0979 | 0.0773 |
| ND = DL/2; EMPC = EMPC | 0.0979 | 0.0773 |
| | | |
| ND = DL; EMPC = 0 | 0.196 | 0.154 |
| ND = DL; EMPC = EMPC | 0.196 | 0.154 |

Checkcode 532-787-WQD 569-676-GGW

() = DL
[] = EMPC

A3380
Project ID: Passaic RI/FS Caged Bivalve Study

# PCB Recoveries

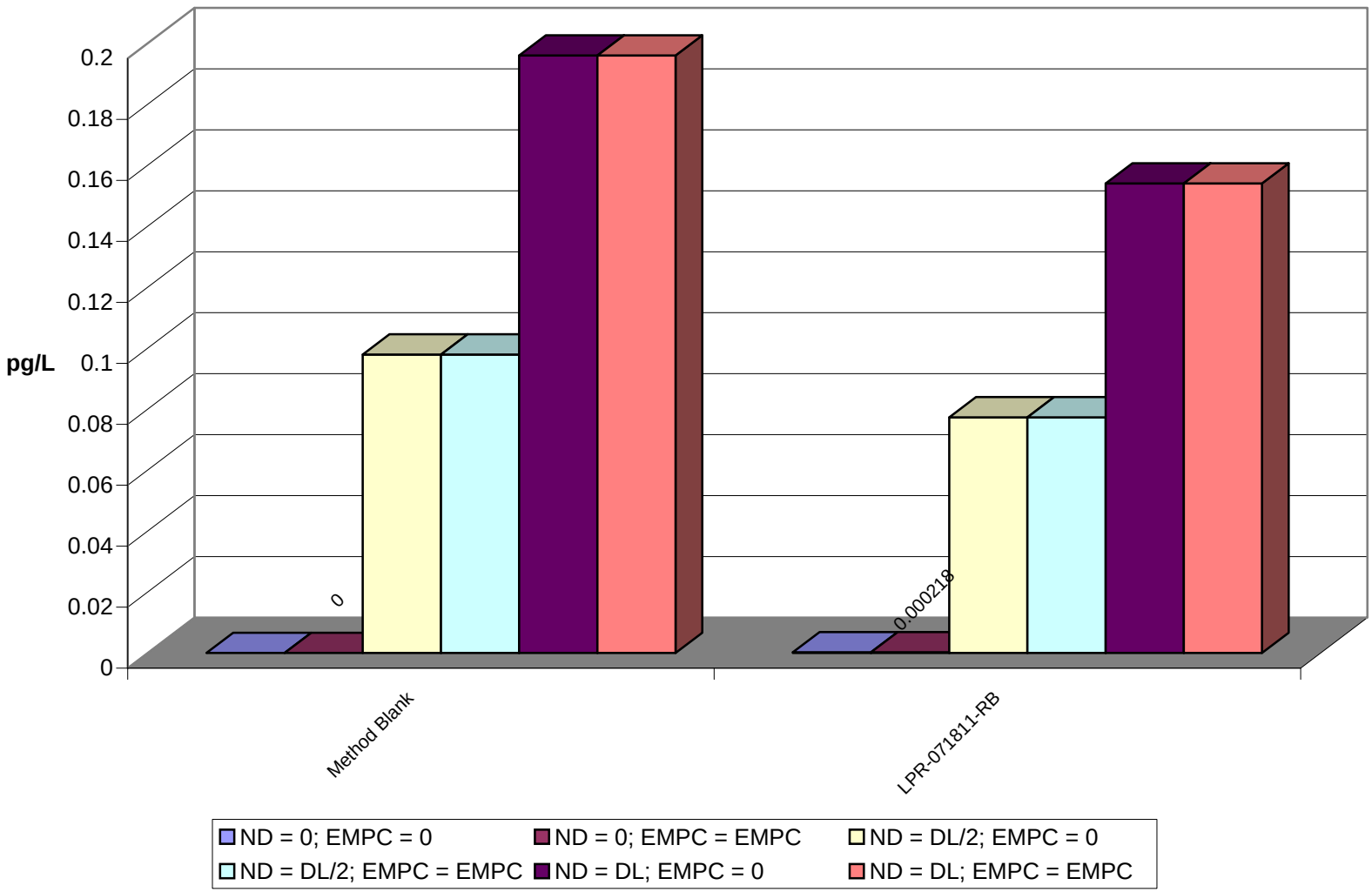
ANALYTICAL PERSPECTIVES

| Standard | Method Blank | LPR-071811-RB |
|---|---|---|
| ES PCB-1 | 85.4 | 91.7 |
| ES PCB-3 | 91.9 | 99 |
| ES PCB-4 | 91.7 | 94.5 |
| ES PCB-15 | 99.6 | 104 |
| ES PCB-19 | 94.3 | 98.3 |
| ES PCB-37 | 105 | 109 |
| ES PCB-54 | 94.2 | 96.3 |
| ES PCB-77 | 104 | 114 |
| ES PCB-81 | 103 | 109 |
| ES PCB-104 | 91 | 91.4 |
| ES PCB-105 | 101 | 102 |
| ES PCB-114 | 98.7 | 101 |
| ES PCB-118 | 99.6 | 100 |
| ES PCB-123 | 98 | 102 |
| ES PCB-126 | 101 | 97.5 |
| ES PCB-153 | 98.7 | 96 |
| ES PCB-155 | 95 | 90.7 |
| ES PCB-156/157 | 99 | 96 |
| ES PCB-167 | 97.2 | 94.4 |
| ES PCB-169 | 93.7 | 86.3 |
| ES PCB-170 | 91 | 92.8 |
| ES PCB-180 | 92.7 | 89.2 |
| ES PCB-188 | 97.5 | 95.6 |
| ES PCB-189 | 94.4 | 93.1 |
| ES PCB-202 | 97.3 | 93.5 |
| ES PCB-205 | 97.5 | 94.8 |
| ES PCB-206 | 89.9 | 93.4 |
| ES PCB-208 | 88.6 | 91.5 |
| ES PCB-209 | 103 | 98.8 |

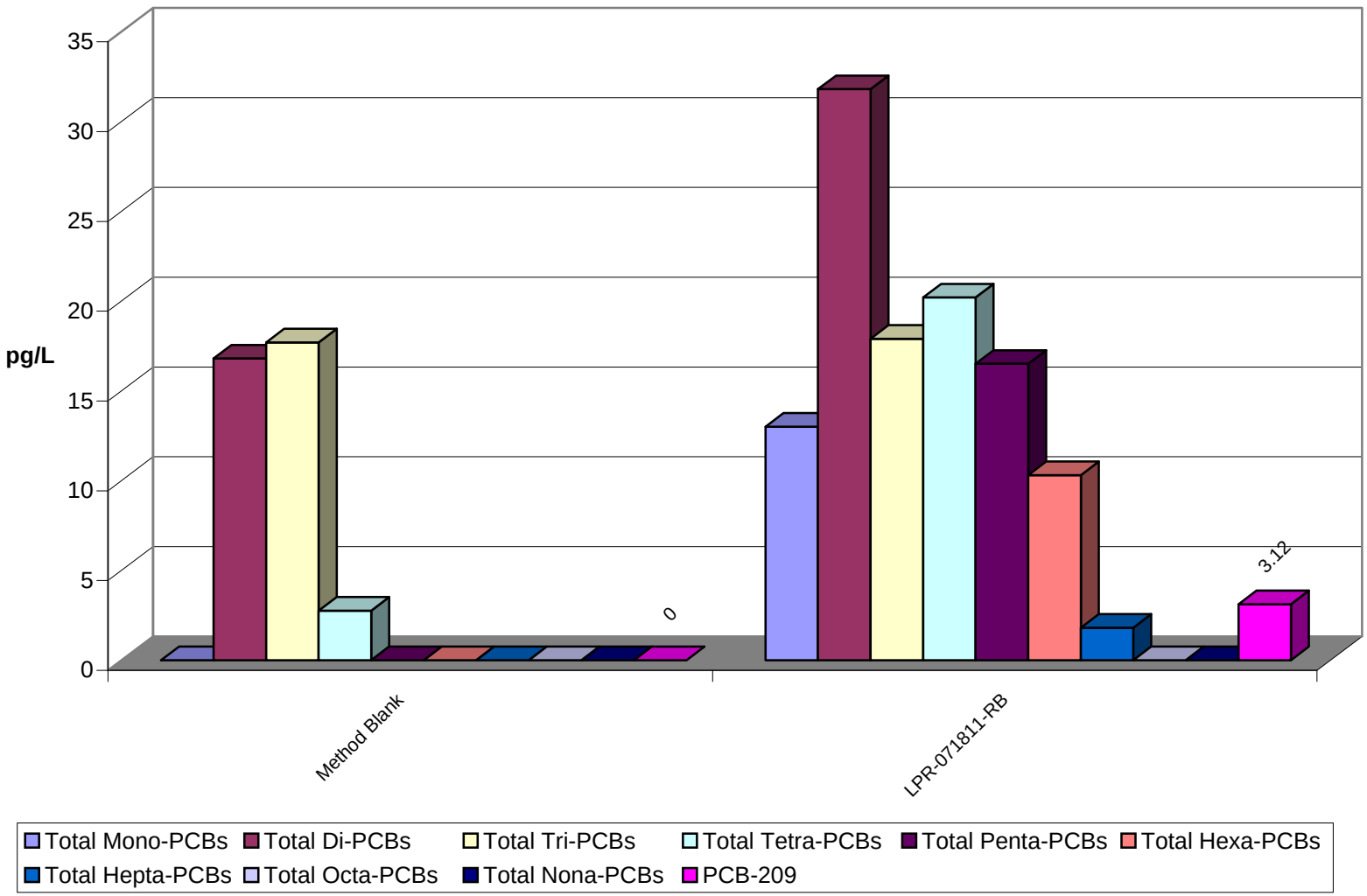
Checkcode 532-787-WQD 569-676-GGW

() = DL
[] = EMPC

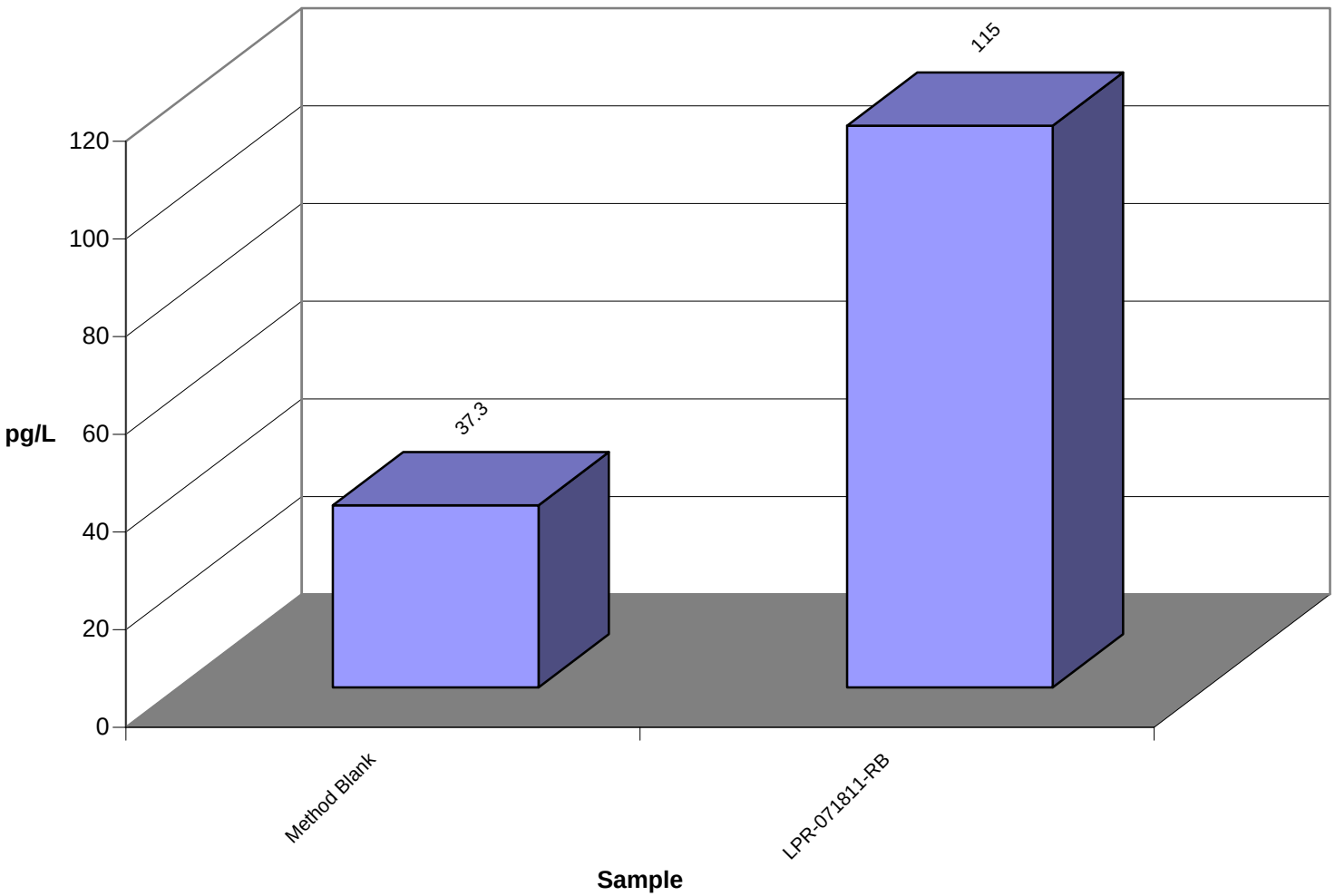
**PCB TEQ**
**Project ID: Passaic RI/FS Caged Bivalve Study**
**A3380**



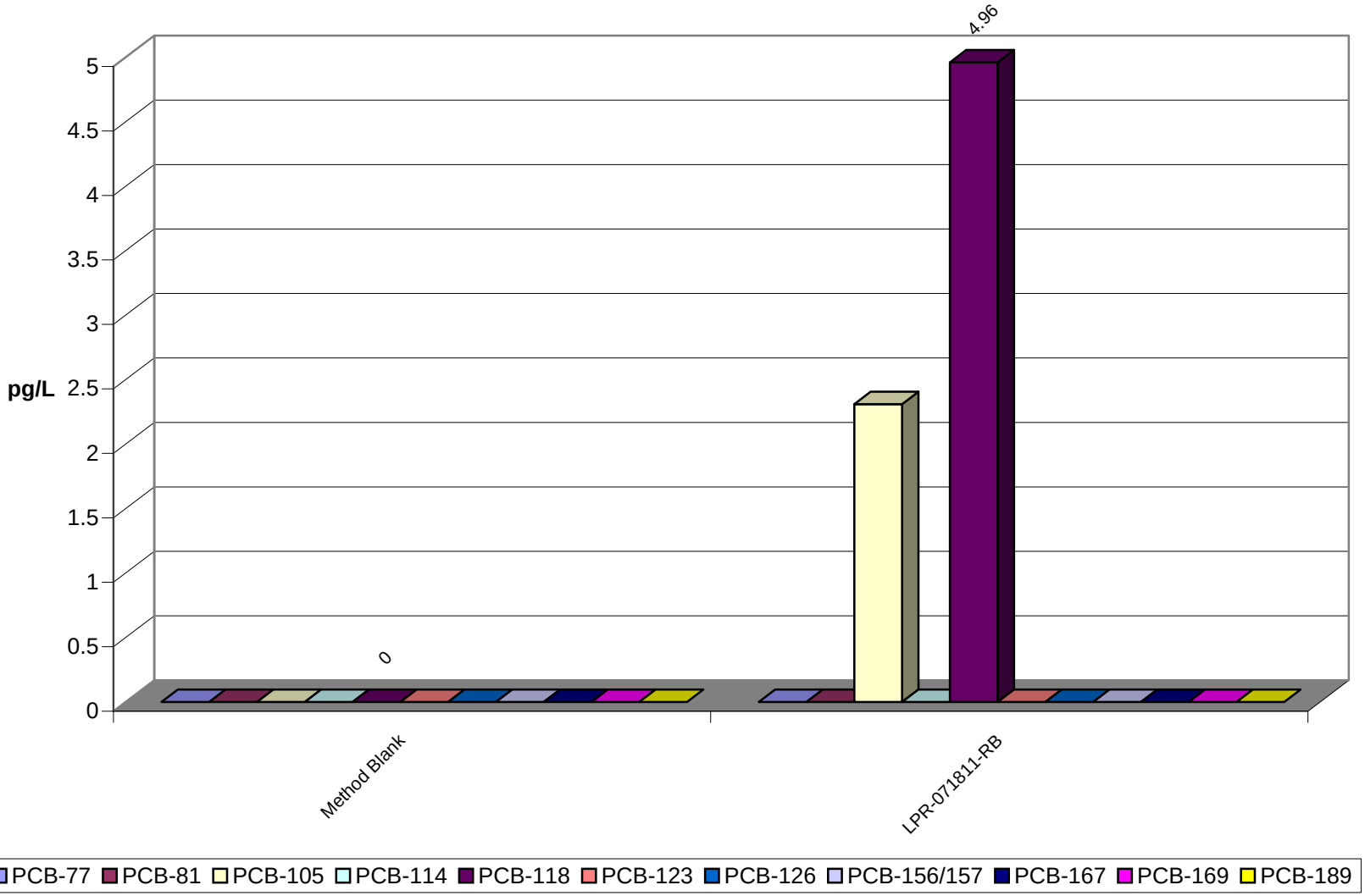
**PCB Homologues**
**Project ID: Passaic RI/FS Caged Bivalve Study**
**A3380**



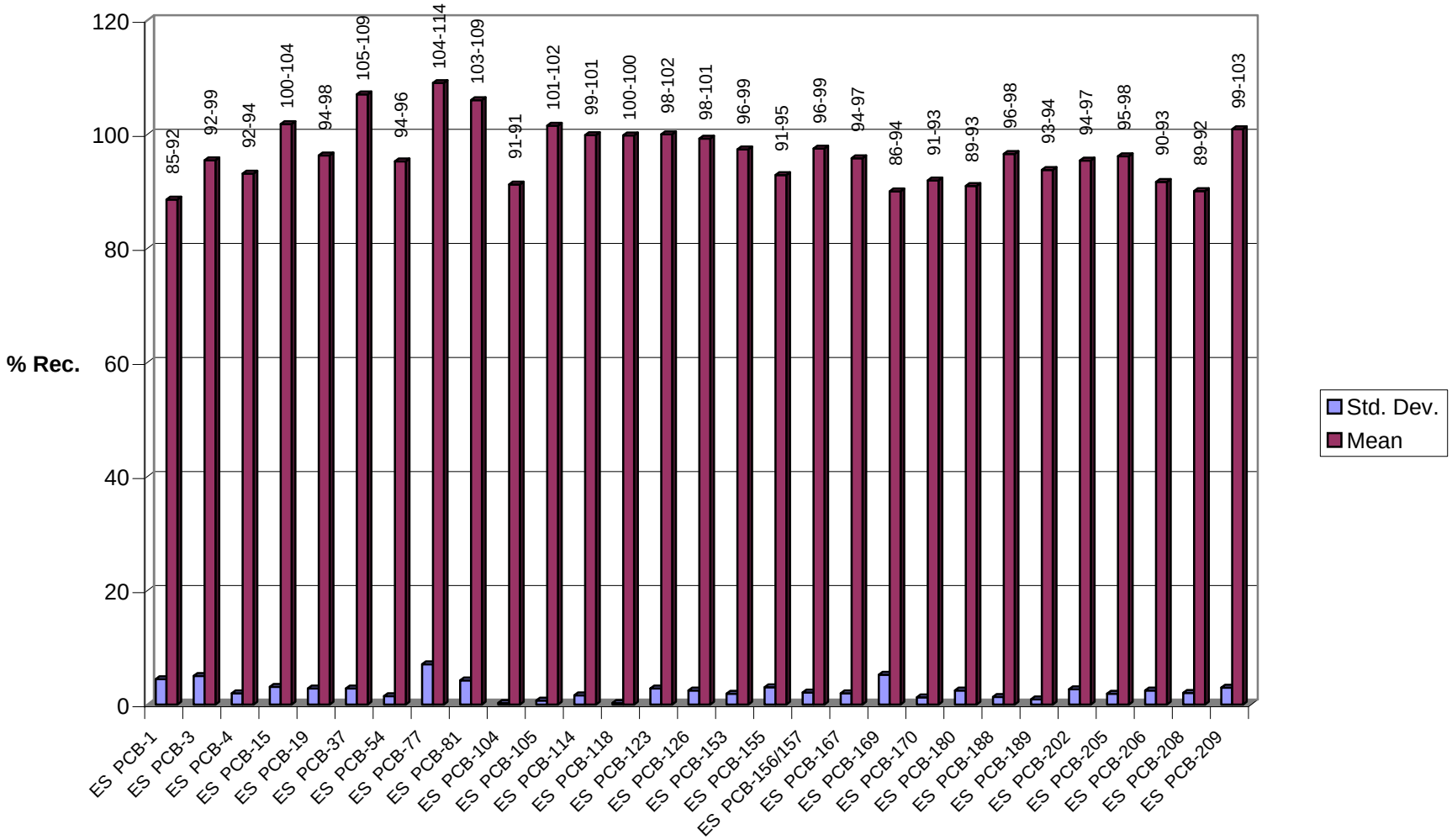
**PCB Totals**
**Project ID: Passaic RI/FS Caged Bivalve Study**
**A3380**



**PCB WHO**
**Project ID: Passaic RI/FS Caged Bivalve Study**
**A3380**



**Mean Recoveries of Extraction Standards (N=2)**
**Project ID: Passaic RI/FS Caged Bivalve Study**
**A3380**



# Sample ID: Method Blank

# Method 1668B

| Client Data | | Sample Data | | Laboratory Data | | | |
|---|---|---|---|---|---|---|---|
| Name: | Windward Environmental, LLC | Matrix: | Aqueous | Project No.: | A3380 | Date Received: | n/a |
| Project ID: | Passaic RI/FS Caged Bivalve Study | Weight/Volume: | 1.00 L | Sample ID: | MB1_8878_PCB_TLX | Date Extracted: | 27-Jul-2011 |
| Date Collected: | n/a | pH | 5 | QC Batch No.: | 8878 | Date Analyzed: | 01-Aug-2011 |

| Analyte | Conc. | DL | EMPC | Qualifier | Standard | Recovery |
|---|---|---|---|---|---|---|
| | pg/L | pg/L | pg/L | | | % |
| PCB-77 33'44'-TeCB | ND | 1.91 | | | ES PCB-1 | 85.4 |
| PCB-81 344'5-TeCB | ND | 1.9 | | | ES PCB-3 | 91.9 |
| PCB-105 233'44'-PeCB | ND | 1.43 | | | ES PCB-4 | 91.7 |
| PCB-114 2344'5-PeCB | ND | 1.42 | | | ES PCB-15 | 99.6 |
| PCB-118 23'44'5-PeCB | ND | 1.35 | | | ES PCB-19 | 94.3 |
| PCB-123 23'44'5'-PeCB | ND | 1.52 | | | ES PCB-37 | 105 |
| PCB-126 33'44'5-PeCB | ND | 1.4 | | | ES PCB-54 | 94.2 |
| PCB-156/157 233'44'5/233'44'5'-HxCB | ND | 2.11 | | C | ES PCB-77 | 104 |
| PCB-167 23'44'55'-HxCB | ND | 1.57 | | | ES PCB-81 | 103 |
| PCB-169 33'44'55'-HxCB | ND | 1.84 | | | ES PCB-104 | 91 |
| PCB-189 233'44'55'-HpCB | ND | 1.37 | | | ES PCB-105 | 101 |
| | | | | | ES PCB-114 | 98.7 |
| **TEQs (WHO M/H)** | | | | | ES PCB-118 | 99.6 |
| | | | | | ES PCB-123 | 98 |
| ND = 0 | 0 | | 0 | | ES PCB-126 | 101 |
| ND = 0.5 x DL | 0.0979 | | 0.0979 | | ES PCB-153 | 98.7 |
| | | | | | ES PCB-155 | 95 |
| **Totals** | | | | | ES PCB-156/157 | 99 |
| | | | | | ES PCB-167 | 97.2 |
| Mono-CBs | ND | 1.39 | | | ES PCB-169 | 93.7 |
| Di-CBs | 16.8 | | | | ES PCB-170 | 91 |
| Tri-CBs | 17.7 | | | | ES PCB-180 | 92.7 |
| Tetra-CBs | 2.76 | | 4.87 | | ES PCB-188 | 97.5 |
| Penta-CBs | ND | 1.35 | | | ES PCB-189 | 94.4 |
| Hexa-CBs | ND | 1.62 | | | ES PCB-202 | 97.3 |
| Hepta-CBs | ND | 1.51 | | | ES PCB-205 | 97.5 |
| Octa-CBs | ND | 1.46 | | | ES PCB-206 | 89.9 |
| Nona-CBs | ND | 2.6 | | | ES PCB-208 | 88.6 |
| Deca-CB | ND | 1.38 | | | ES PCB-209 | 103 |
| | | | | | CS PCB-28 | 102 |
| Mono-Deca | 37.3 | | 39.4 | | CS PCB-111 | 105 |
| | | | | | CS PCB-178 | 102 |

Checkcode: 532-787-WQD AP PCB 2011 Rev. A Report Created: 16-Aug-2011 10:30 Analyst: CM

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# Sample ID: Method Blank — Method 1668B

| Client Data | | Sample Data | | Laboratory Data | | | |
|---|---|---|---|---|---|---|---|
| Name: | Windward Environmental, LLC | Matrix: | Aqueous | Project No.: | A3380 | Date Received: | n/a |
| Project ID: | Passaic RI/FS Caged Bivalve Study | Weight/Volume: | 1.00 L | Sample ID: | MB1_8878_PCB_TLX | Date Extracted: | 27-Jul-2011 |
| Date Collected: | n/a | pH | 5 | QC Batch No.: | 8878 | Date Analyzed: | 01-Aug-2011 |
| | | Units | pg/L | Checkcode: | 532-787-WQD | Time Analyzed: | 12:39:21 |

| Mono | Conc. | Qualifiers | Tri | Conc. | Qualifiers | Tetra | Conc. | Qualifiers | Tetra | Conc. | Qualifiers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PCB-1 | (1.29) | | PCB-19 | (1.82) | | PCB-54 | (0.935) | | PCB-72 | (1.54) | |
| PCB-2 | (1.43) | | PCB-30/18 | 2.45 | J B C | PCB-50/53 | (1.59) | C | PCB-68 | (1.39) | |
| PCB-3 | (1.48) | | PCB-17 | 2.94 | J B | PCB-45 | (2.06) | | PCB-57 | (1.6) | |
| | | | PCB-27 | (1.34) | | PCB-51 | (1.37) | | PCB-58 | (1.47) | |
| **Conc.** | 0 | | PCB-24 | (1.33) | | PCB-46 | (1.78) | | PCB-67 | (1.34) | |
| **EMPC** | 0 | | PCB-16 | (2.07) | | PCB-52 | 2.76 | J B | PCB-63 | (1.47) | |
| | | | PCB-32 | 3.89 | J B | PCB-73 | (1.19) | | PCB-61/70/74/76 | (1.53) | C |
| **Di** | **Conc.** | **Qualifiers** | PCB-34 | (1.87) | | PCB-43 | (1.74) | | PCB-66 | (1.48) | |
| PCB-4 | 8.15 | J B | PCB-23 | (1.78) | | PCB-69/49 | (1.36) | C | PCB-55 | (1.55) | |
| PCB-10 | (4.75) | | PCB-26/29 | (1.77) | C | PCB-48 | (1.49) | | PCB-56 | (1.57) | |
| PCB-9 | (5.14) | | PCB-25 | (1.64) | | PCB-44/47/65 | [2.1] | J B EMPC C | PCB-60 | (1.59) | |
| PCB-7 | (4.97) | | PCB-31 | 2.12 | J B | PCB-59/62/75 | (1.18) | C | PCB-80 | (1.38) | |
| PCB-6 | (5.28) | | PCB-28/20 | 6.34 | J B C | PCB-42 | (1.63) | | PCB-79 | (1.46) | |
| PCB-5 | (5.38) | | PCB-21/33 | (1.81) | C | PCB-41 | (2.02) | | PCB-78 | (1.75) | |
| PCB-8 | (5.24) | | PCB-22 | (1.76) | | PCB-71/40 | (1.4) | C | PCB-81 | (1.9) | |
| PCB-14 | (5.46) | | PCB-36 | (1.74) | | PCB-64 | (1.12) | | PCB-77 | (1.91) | |
| PCB-11 | 8.65 | J B | PCB-39 | (1.58) | | | | | | | |
| PCB-13/12 | (5.33) | C | PCB-38 | (1.89) | | | | | | | |
| PCB-15 | (5.61) | | PCB-35 | (1.93) | | | | | | | |
| | | | PCB-37 | (2.15) | | | | | | | |
| **Conc.** | 16.8 | | **Conc.** | 17.7 | | | | | **Conc.** | 2.76 | |
| **EMPC** | 16.8 | | **EMPC** | 17.7 | | | | | **EMPC** | 4.87 | |

| Totals | Conc. | EMPC |
|---|---|---|
| Mono-Tri | 34.5 | 34.5 |
| Tetra-Hexa | 2.76 | 4.87 |
| Hepta-Deca | 0 | 0 |
| Mono-Deca | 37.3 | 39.4 |

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# Sample ID: Method Blank — Method 1668B

| Penta | Conc. | Qualifiers | Penta | Conc. | Qualifiers | Hexa | Conc. | Qualifiers | Hexa | Conc. | Qualifiers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PCB-104 | (1.01) | | PCB-109/119/86… | (1.52) | C | PCB-155 | (0.942) | | PCB-165 | (1.2) | |
| PCB-96 | (1.06) | | PCB-117 | (1.22) | | PCB-152 | (1.02) | | PCB-146 | (1.28) | |
| PCB-103 | (1.61) | | PCB-116/85 | (1.57) | C | PCB-150 | (0.937) | | PCB-161 | (1.21) | |
| PCB-94 | (1.77) | | PCB-110 | (1.34) | | PCB-136 | (1.03) | | PCB-153/168 | (1.05) | C |
| PCB-95 | (1.7) | | PCB-115 | (1.2) | | PCB-145 | (0.953) | | PCB-141 | (1.45) | |
| PCB-100/93 | (1.67) | C | PCB-82 | (1.92) | | PCB-148 | (1.49) | | PCB-130 | (1.77) | |
| PCB-102 | (1.48) | | PCB-111 | (1.21) | | PCB-151/135 | (1.49) | C | PCB-137 | (1.52) | |
| PCB-98 | (1.86) | | PCB-120 | (1.28) | | PCB-154 | (1.21) | | PCB-164 | (1.18) | |
| PCB-88 | (1.91) | | PCB-108/124 | (1.4) | C | PCB-144 | (1.44) | | PCB-163/138/129 | (1.48) | C |
| PCB-91 | (1.62) | | PCB-107 | (1.32) | | PCB-147/149 | (1.37) | C | PCB-160 | (1.18) | |
| PCB-84 | (1.88) | | PCB-123 | (1.52) | | PCB-134 | (1.74) | | PCB-158 | (1.08) | |
| PCB-89 | (1.93) | | PCB-106 | (1.41) | | PCB-143 | (1.51) | | PCB-128/166 | (1.78) | C |
| PCB-121 | (1.22) | | PCB-118 | (1.35) | | PCB-139/140 | (1.36) | C | PCB-159 | (1.48) | |
| PCB-92 | (1.82) | | PCB-122 | (1.5) | | PCB-131 | (1.66) | | PCB-162 | (1.52) | |
| PCB-113/90/101 | (1.54) | C | PCB-114 | (1.42) | | PCB-142 | (1.7) | | PCB-167 | (1.57) | |
| PCB-83 | (2.13) | | PCB-105 | (1.43) | | PCB-132 | (1.47) | | PCB-156/157 | (2.11) | C |
| PCB-99 | (1.43) | | PCB-127 | (1.4) | | PCB-133 | (1.6) | | PCB-169 | (1.84) | |
| PCB-112 | (1.31) | | PCB-126 | (1.4) | | | | | | | |
| | | | **Conc.** | 0 | | | | | **Conc.** | 0 | |
| | | | **EMPC** | 0 | | | | | **EMPC** | 0 | |

| Hepta | Conc. | Qualifiers | Hepta | Conc. | Qualifiers | Octa | Conc. | Qualifiers | Nona | Conc. | Qualifiers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PCB-188 | (0.971) | | PCB-174 | (1.79) | | PCB-202 | (1.22) | | PCB-208 | (2.33) | |
| PCB-179 | (1.06) | | PCB-177 | (2.04) | | PCB-201 | (1.13) | | PCB-207 | (2.28) | |
| PCB-184 | (0.972) | | PCB-181 | (1.84) | | PCB-204 | (1.17) | | PCB-206 | (2.87) | |
| PCB-176 | (1.1) | | PCB-171/173 | (2.07) | C | PCB-197 | (1.13) | | | | |
| PCB-186 | (1.04) | | PCB-172 | (1.92) | | PCB-200 | (1.16) | | **Conc.** | 0 | |
| PCB-178 | (1.4) | | PCB-192 | (1.56) | | PCB-198/199 | (1.5) | C | **EMPC** | 0 | |
| PCB-175 | (1.78) | | PCB-180/193 | (1.42) | C | PCB-196 | (1.53) | | | | |
| PCB-187 | (1.66) | | PCB-191 | (1.61) | | PCB-203 | (1.41) | | **Deca** | **Conc.** | **Qualifiers** |
| PCB-182 | (1.74) | | PCB-170 | (1.89) | | PCB-195 | (2.87) | | PCB-209 | (1.38) | |
| PCB-183 | (1.79) | | PCB-190 | (1.6) | | PCB-194 | (2.66) | | | | |
| PCB-185 | (1.91) | | PCB-189 | (1.37) | | PCB-205 | (1.7) | | | | |
| | | | **Conc.** | 0 | | **Conc.** | 0 | | | | |
| | | | **EMPC** | 0 | | **EMPC** | 0 | | | | |

# Sample ID: LPR-071811-RB

# Method 1668B

| Client Data | | Sample Data | | Laboratory Data | | | |
|---|---|---|---|---|---|---|---|
| Name: | Windward Environmental, LLC | Matrix: | Aqueous | Project No.: | A3380 | Date Received: | 21-Jul-2011 |
| Project ID: | Passaic RI/FS Caged Bivalve Study | Weight/Volume: | 1.24 L | Sample ID: | A3380_8878_PCB_001 | Date Extracted: | 27-Jul-2011 |
| Date Collected: | 18-Jul-2011 | pH | 5 | QC Batch No.: | 8878 | Date Analyzed: | 01-Aug-2011 |

| Analyte | Conc. | DL | EMPC | Qualifier | Standard | Recovery |
|---|---|---|---|---|---|---|
| | pg/L | pg/L | pg/L | | | % |
| PCB-77 33'44'-TeCB | ND | 1.19 | | | ES PCB-1 | 91.7 |
| PCB-81 344'5-TeCB | ND | 1.2 | | | ES PCB-3 | 99 |
| PCB-105 233'44'-PeCB | 2.31 | | | J | ES PCB-4 | 94.5 |
| PCB-114 2344'5-PeCB | ND | 1.06 | | | ES PCB-15 | 104 |
| PCB-118 23'44'5-PeCB | 4.96 | | | J | ES PCB-19 | 98.3 |
| PCB-123 23'44'5'-PeCB | ND | 1.04 | | | ES PCB-37 | 109 |
| PCB-126 33'44'5-PeCB | ND | 1.12 | | | ES PCB-54 | 96.3 |
| PCB-156/157 233'44'5/233'44'5'-HxCB | ND | 1.54 | | C | ES PCB-77 | 114 V |
| PCB-167 23'44'55'-HxCB | ND | 1.1 | | | ES PCB-81 | 109 |
| PCB-169 33'44'55'-HxCB | ND | 1.38 | | | ES PCB-104 | 91.4 |
| PCB-189 233'44'55'-HpCB | ND | 0.864 | | | ES PCB-105 | 102 |
| | | | | | ES PCB-114 | 101 |
| **TEQs (WHO M/H)** | | | | | ES PCB-118 | 100 |
| | | | | | ES PCB-123 | 102 |
| ND = 0 | 0.000218 | | 0.000218 | | ES PCB-126 | 97.5 |
| ND = 0.5 x DL | 0.0773 | | 0.0773 | | ES PCB-153 | 96 |
| | | | | | ES PCB-155 | 90.7 |
| **Totals** | | | | | ES PCB-156/157 | 96 |
| | | | | | ES PCB-167 | 94.4 |
| Mono-CBs | 13 | | | | ES PCB-169 | 86.3 |
| Di-CBs | 31.8 | | | | ES PCB-170 | 92.8 |
| Tri-CBs | 17.9 | | 27.4 | | ES PCB-180 | 89.2 |
| Tetra-CBs | 20.2 | | 22.2 | | ES PCB-188 | 95.6 |
| Penta-CBs | 16.5 | | 25.7 | | ES PCB-189 | 93.1 |
| Hexa-CBs | 10.3 | | 13 | | ES PCB-202 | 93.5 |
| Hepta-CBs | 1.81 | | 5.21 | | ES PCB-205 | 94.8 |
| Octa-CBs | ND | 0.938 | | | ES PCB-206 | 93.4 |
| Nona-CBs | ND | 1.61 | | | ES PCB-208 | 91.5 |
| Deca-CB | 3.12 | | | J | ES PCB-209 | 98.8 |
| | | | | | CS PCB-28 | 106 |
| Mono-Deca | 115 | | 142 | | CS PCB-111 | 109 |
| | | | | | CS PCB-178 | 99.4 |

Checkcode: 569-676-GGW AP PCB 2011 Rev. A Report Created: 16-Aug-2011 10:31 Analyst: CM

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# Sample ID: LPR-071811-RB

# Method 1668B

| Client Data | | Sample Data | | Laboratory Data | | | |
|---|---|---|---|---|---|---|---|
| Name: | Windward Environmental, LLC | Matrix: | Aqueous | Project No.: | A3380 | Date Received: | 21-Jul-2011 |
| Project ID: | Passaic RI/FS Caged Bivalve Study | Weight/Volume: | 1.24 L | Sample ID: | A3380_8878_PCB_001 | Date Extracted: | 27-Jul-2011 |
| Date Collected: | 18-Jul-2011 | pH | 5 | QC Batch No.: | 8878 | Date Analyzed: | 01-Aug-2011 |
| | | Units | pg/L | Checkcode: | 569-676-GGW | Time Analyzed: | 13:34:21 |

| Mono | Conc. | Qualifiers | Tri | Conc. | Qualifiers | Tetra | Conc. | Qualifiers | Tetra | Conc. | Qualifiers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PCB-1 | 6.01 | J | PCB-19 | 3.2 | J | PCB-54 | (0.681) | | PCB-72 | (0.978) | |
| PCB-2 | (0.899) | | PCB-30/18 | 3.5 | J B C | PCB-50/53 | (0.954) | C | PCB-68 | (0.88) | |
| PCB-3 | 7.03 | J | PCB-17 | [3.3] | J B EMPC | PCB-45 | (1.24) | | PCB-57 | (1.01) | |
| | | | PCB-27 | (0.924) | | PCB-51 | (0.822) | | PCB-58 | (0.929) | |
| **Conc.** | 13 | | PCB-24 | (0.92) | | PCB-46 | (1.06) | | PCB-67 | (0.848) | |
| **EMPC** | 13 | | PCB-16 | (1.42) | | PCB-52 | 3.95 | J B | PCB-63 | (0.931) | |
| | | | PCB-32 | 3.67 | J B | PCB-73 | (0.715) | | PCB-61/70/74/76 | 6.66 | J C |
| **Di** | **Conc.** | **Qualifiers** | PCB-34 | (1.27) | | PCB-43 | (1.04) | | PCB-66 | 3.89 | J |
| PCB-4 | 7.89 | J B | PCB-23 | (1.2) | | PCB-69/49 | [2.08] | J EMPC C | PCB-55 | (0.98) | |
| PCB-10 | (3.29) | | PCB-26/29 | (1.19) | C | PCB-48 | (0.893) | | PCB-56 | (0.997) | |
| PCB-9 | (3.79) | | PCB-25 | (1.1) | | PCB-44/47/65 | 4.29 | J B C | PCB-60 | (1.01) | |
| PCB-7 | (3.66) | | PCB-31 | [3.92] | J B EMPC | PCB-59/62/75 | (0.71) | C | PCB-80 | (0.872) | |
| PCB-6 | (3.89) | | PCB-28/20 | 7.57 | J B C | PCB-42 | (0.979) | | PCB-79 | (0.926) | |
| PCB-5 | (3.96) | | PCB-21/33 | [1.36] | J EMPC C | PCB-41 | (1.21) | | PCB-78 | (1.11) | |
| PCB-8 | 4.53 | J | PCB-22 | (1.19) | | PCB-71/40 | (0.841) | C | PCB-81 | (1.2) | |
| PCB-14 | (4.02) | | PCB-36 | (1.17) | | PCB-64 | 1.36 | J | PCB-77 | (1.19) | |
| PCB-11 | 19.4 | B | PCB-39 | [0.89] | EMPC | | | | | | |
| PCB-13/12 | (3.93) | C | PCB-38 | (1.28) | | | | | | | |
| PCB-15 | (4.13) | | PCB-35 | (1.3) | | | | | | | |
| | | | PCB-37 | (1.45) | | | | | | | |
| **Conc.** | 31.8 | | **Conc.** | 17.9 | | | | | **Conc.** | 20.2 | |
| **EMPC** | 31.8 | | **EMPC** | 27.4 | | | | | **EMPC** | 22.2 | |


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| Totals | Conc. | EMPC |
|---|---|---|
| Mono-Tri | 62.8 | 72.3 |
| Tetra-Hexa | 46.9 | 61 |
| Hepta-Deca | 4.93 | 8.33 |
| Mono-Deca | 115 | 142 |

# Sample ID: LPR-071811-RB

# Method 1668B

| Penta | Conc. | Qualifiers | Penta | Conc. | Qualifiers | Hexa | Conc. | Qualifiers | Hexa | Conc. | Qualifiers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PCB-104 | (0.687) | | PCB-109/119/86… | 3.59 | J C | PCB-155 | (0.743) | | PCB-165 | (0.859) | |
| PCB-96 | (0.716) | | PCB-117 | (0.835) | | PCB-152 | (0.808) | | PCB-146 | (0.91) | |
| PCB-103 | (1.1) | | PCB-116/85 | (1.08) | C | PCB-150 | (0.74) | | PCB-161 | (0.863) | |
| PCB-94 | (1.21) | | PCB-110 | 5.59 | J | PCB-136 | (0.815) | | PCB-153/168 | 3.94 | J C |
| PCB-95 | [2.71] | J EMPC | PCB-115 | (0.818) | | PCB-145 | (0.752) | | PCB-141 | (1.04) | |
| PCB-100/93 | (1.15) | C | PCB-82 | (1.31) | | PCB-148 | (1.07) | | PCB-130 | (1.27) | |
| PCB-102 | (1.01) | | PCB-111 | (0.83) | | PCB-151/135 | (1.07) | C | PCB-137 | (1.08) | |
| PCB-98 | (1.27) | | PCB-120 | (0.876) | | PCB-154 | (0.864) | | PCB-164 | (0.845) | |
| PCB-88 | (1.31) | | PCB-108/124 | (0.957) | C | PCB-144 | (1.02) | | PCB-163/138/129 | 6.32 | J C |
| PCB-91 | (1.11) | | PCB-107 | (0.903) | | PCB-147/149 | [2.72] | J EMPC C | PCB-160 | (0.843) | |
| PCB-84 | (1.28) | | PCB-123 | (1.04) | | PCB-134 | (1.24) | | PCB-158 | (0.771) | |
| PCB-89 | (1.32) | | PCB-106 | (0.965) | | PCB-143 | (1.08) | | PCB-128/166 | (1.24) | C |
| PCB-121 | (0.837) | | PCB-118 | 4.96 | J | PCB-139/140 | (0.973) | C | PCB-159 | (1.03) | |
| PCB-92 | (1.25) | | PCB-122 | (1.11) | | PCB-131 | (1.18) | | PCB-162 | (1.06) | |
| PCB-113/90/101 | [4.26] | J EMPC C | PCB-114 | (1.06) | | PCB-142 | (1.22) | | PCB-167 | (1.1) | |
| PCB-83 | (1.46) | | PCB-105 | 2.31 | J | PCB-132 | (1.05) | | PCB-156/157 | (1.54) | C |
| PCB-99 | [2.32] | J EMPC | PCB-127 | (1.05) | | PCB-133 | (1.14) | | PCB-169 | (1.38) | |
| PCB-112 | (0.899) | | PCB-126 | (1.12) | | | | | | | |
| | | | **Conc.** | 16.5 | | | | | **Conc.** | 10.3 | |
| | | | **EMPC** | 25.7 | | | | | **EMPC** | 13 | |

| Hepta | Conc. | Qualifiers | Hepta | Conc. | Qualifiers | Octa | Conc. | Qualifiers | Nona | Conc. | Qualifiers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PCB-188 | (0.614) | | PCB-174 | (1.15) | | PCB-202 | (0.729) | | PCB-208 | (1.43) | |
| PCB-179 | (0.671) | | PCB-177 | (1.32) | | PCB-201 | (0.675) | | PCB-207 | (1.4) | |
| PCB-184 | (0.614) | | PCB-181 | (1.19) | | PCB-204 | (0.698) | | PCB-206 | (1.79) | |
| PCB-176 | (0.696) | | PCB-171/173 | (1.33) | C | PCB-197 | (0.675) | | | | |
| PCB-186 | (0.66) | | PCB-172 | (1.24) | | PCB-200 | (0.693) | | **Conc.** | 0 | |
| PCB-178 | (0.882) | | PCB-192 | (1.01) | | PCB-198/199 | (0.892) | C | **EMPC** | 0 | |
| PCB-175 | (1.15) | | PCB-180/193 | [2.07] | J EMPC C | PCB-196 | (0.909) | | | | |
| PCB-187 | 1.81 | J | PCB-191 | (1.04) | | PCB-203 | (0.837) | | **Deca** | **Conc.** | **Qualifiers** |
| PCB-182 | (1.12) | | PCB-170 | [1.32] | J EMPC | PCB-195 | (1.94) | | PCB-209 | 3.12 | J |
| PCB-183 | (1.16) | | PCB-190 | (1.01) | | PCB-194 | (1.8) | | | | |
| PCB-185 | (1.23) | | PCB-189 | (0.864) | | PCB-205 | (1.15) | | | | |
| | | | **Conc.** | 1.81 | | **Conc.** | 0 | | | | |
| | | | **EMPC** | 5.21 | | **EMPC** | 0 | | | | |

# A3406 - TEQ

**Project ID: Passaic RI/FS Caged Bivalve Study**

## Sample Summary
**Part 1**

ANALYTICAL PERSPECTIVES

**Method 1613B**

| Analyte | Method Blank | LPR6-ECST-Comp01 | LPRBG-ECST-Comp01 | LPR6-ECST-Comp02 | LPR6-ECST-Comp02-DUP | LPR7-ECST-Comp03 | LPR7-ECST-Comp04 | LPR8-ECST-Comp05 | LPR1-GDST-Comp01 | LPRBG-GDST-Comp01 | LPR2-GDST-Comp02 | LPR3-GDST-Comp03 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | pg/g | pg/g | pg/g | pg/g | pg/g | pg/g | pg/g | pg/g | pg/g | pg/g | pg/g | pg/g |
| 2,3,7,8-TCDD | (0.0286) | 2.12 | (0.0471) | 2.83 | 3.24 | 3.6 | [0.182] | [0.0765] | 1.21 | [0.0311] | 0.54 | 0.252 |
| 1,2,3,7,8-PeCDD | (0.0253) | 0.0581 | [0.0317] | [0.0503] | 0.0679 | 0.0712 | 0.0579 | 0.0624 | [0.0457] | 0.0587 | (0.0443) | 0.0452 |
| 1,2,3,4,7,8-HxCDD | (0.0264) | (0.0667) | (0.0354) | (0.0576) | (0.0479) | (0.0504) | (0.0424) | 0.0353 | (0.0397) | (0.0355) | (0.0518) | (0.0438) |
| 1,2,3,6,7,8-HxCDD | (0.0268) | 0.101 | [0.0549] | 0.107 | 0.115 | 0.0957 | 0.119 | [0.0809] | 0.0794 | 0.0659 | (0.0519) | (0.0428) |
| 1,2,3,7,8,9-HxCDD | 0.0913 | 0.127 | [0.0873] | 0.128 | 0.121 | 0.119 | [0.108] | 0.113 | 0.109 | [0.123] | 0.112 | 0.107 |
| 1,2,3,4,6,7,8-HpCDD | (0.0307) | 0.508 | 0.369 | 0.617 | 0.965 | 0.654 | 0.852 | 0.559 | [0.275] | 0.359 | [0.248] | 0.303 |
| OCDD | 0.196 | 4.08 | 5.44 | 5.39 | 8.13 | 6.09 | 12 | 4.92 | 3.85 | 3.32 | 2.98 | 3.87 |
| 2,3,7,8-TCDF | (0.032) | 0.366 | (0.057) | 0.43 | 0.482 | 0.356 | 0.439 | 0.379 | 0.219 | 0.0494 | 0.0913 | 0.0652 |
| 1,2,3,7,8-PeCDF | (0.0181) | (0.0404) | (0.026) | 0.0661 | 0.0662 | [0.0577] | 0.0585 | 0.0428 | (0.0261) | (0.0206) | (0.04) | (0.0275) |
| 2,3,4,7,8-PeCDF | (0.0171) | 0.185 | [0.0347] | 0.213 | 0.257 | [0.192] | 0.17 | [0.153] | 0.172 | (0.0193) | (0.0369) | (0.0248) |
| 1,2,3,4,7,8-HxCDF | (0.0174) | 0.101 | 0.0273 | 0.134 | 0.145 | 0.102 | 0.0488 | 0.052 | [0.0767] | [0.0149] | 0.0687 | 0.0605 |
| 1,2,3,6,7,8-HxCDF | (0.0162) | 0.054 | (0.0208) | [0.0622] | [0.0707] | 0.0541 | 0.0464 | 0.0499 | 0.0356 | 0.0126 | [0.027] | [0.0231] |
| 2,3,4,6,7,8-HxCDF | (0.0174) | [0.0501] | [0.0269] | 0.0762 | 0.0854 | 0.0721 | [0.0502] | 0.0648 | 0.0473 | 0.0183 | 0.0328 | (0.0254) |
| 1,2,3,7,8,9-HxCDF | (0.0229) | (0.0475) | (0.0286) | (0.0416) | (0.0322) | (0.0332) | (0.0291) | (0.0212) | (0.0317) | (0.0163) | (0.0327) | (0.0333) |
| 1,2,3,4,6,7,8-HpCDF | 0.0262 | 0.258 | 0.0863 | 0.507 | 0.504 | 0.334 | 0.28 | 0.197 | 0.371 | 0.0289 | 0.265 | [0.197] |
| 1,2,3,4,7,8,9-HpCDF | (0.0201) | (0.0536) | (0.0231) | (0.0448) | (0.0362) | (0.0379) | (0.0329) | (0.0262) | (0.0312) | (0.0268) | (0.0335) | (0.0312) |
| OCDF | [0.0564] | 0.372 | 0.105 | 0.618 | 0.672 | 0.465 | 0.393 | 0.291 | 0.582 | [0.0634] | 0.435 | 0.353 |
| **ITEF TEQ (ND=0; EMPC=0)** | **0.00958** | **2.33** | **0.0128** | **3.04** | **3.53** | **3.73** | **0.206** | **0.116** | **1.35** | **0.0512** | **0.576** | **0.305** |
| **ITEF TEQ (ND=0; EMPC=EMPC)** | **0.00964** | **2.33** | **0.0629** | **3.07** | **3.54** | **3.83** | **0.404** | **0.276** | **1.39** | **0.0961** | **0.582** | **0.309** |
| **ITEF TEQ (ND=DL/2; EMPC=0)** | **0.0432** | **2.34** | **0.0646** | **3.06** | **3.53** | **3.74** | **0.236** | **0.139** | **1.37** | **0.0779** | **0.606** | **0.321** |
| **ITEF TEQ (ND=DL/2; EMPC=EMPC)** | **0.0432** | **2.34** | **0.0943** | **3.08** | **3.54** | **3.83** | **0.408** | **0.278** | **1.39** | **0.104** | **0.61** | **0.324** |
| **ITEF TEQ (ND=DL; EMPC=EMPC)** | **0.0768** | **2.35** | **0.126** | **3.08** | **3.54** | **3.84** | **0.412** | **0.279** | **1.4** | **0.112** | **0.638** | **0.338** |
| Checkcode | 609-462-TFS | 846-088-JWM | 862-387-YHY | 174-590-RDW | 012-699-RNC | 620-950-RLZ | 709-888-PKX | 924-046-MYW | 280-302-MHQ | 241-820-BDS | 971-730-NPW | 155-627-DYJ |
| Lab ID | MB1_8929_DF_SDS | A3406_8929_DF_001 | A3406_8929_DF_002 | A3406_8929_DF_003 | A3406_8929_DF_003DUP | A3406_8929_DF_004 | A3406_8929_DF_005 | A3406_8929_DF_006 | A3406_8929_DF_007 | A3406_8929_DF_008 | A3406_8929_DF_009 | A3406_8929_DF_010 |

( ) = DL
[ ] = EMPC

# A3406 - WHO-2005-TEQ

**Project ID: Passaic RI/FS Caged Bivalve Study**

## Sample Summary
## Part 1

ANALYTICAL PERSPECTIVES

**Method 1613B**

| Analyte | Method Blank | LPR6-ECST-Comp01 | LPRBG-ECST-Comp01 | LPR6-ECST-Comp02 | LPR6-ECST-Comp02-DUP | LPR7-ECST-Comp03 | LPR7-ECST-Comp04 | LPR8-ECST-Comp05 | LPR1-GDST-Comp01 | LPRBG-GDST-Comp01 | LPR2-GDST-Comp02 | LPR3-GDST-Comp03 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | pg/g | pg/g | pg/g | pg/g | pg/g | pg/g | pg/g | pg/g | pg/g | pg/g | pg/g | pg/g |
| 2,3,7,8-TCDD | (0.0286) | 2.12 | (0.0471) | 2.83 | 3.24 | 3.6 | [0.182] | [0.0765] | 1.21 | [0.0311] | 0.54 | 0.252 |
| 1,2,3,7,8-PeCDD | (0.0253) | 0.0581 | [0.0317] | [0.0503] | 0.0679 | 0.0712 | 0.0579 | 0.0624 | [0.0457] | 0.0587 | (0.0443) | 0.0452 |
| 1,2,3,4,7,8-HxCDD | (0.0264) | (0.0667) | (0.0354) | (0.0576) | (0.0479) | (0.0504) | (0.0424) | 0.0353 | (0.0397) | (0.0355) | (0.0518) | (0.0438) |
| 1,2,3,6,7,8-HxCDD | (0.0268) | 0.101 | [0.0549] | 0.107 | 0.115 | 0.0957 | 0.119 | [0.0809] | 0.0794 | 0.0659 | (0.0519) | (0.0428) |
| 1,2,3,7,8,9-HxCDD | 0.0913 | 0.127 | [0.0873] | 0.128 | 0.121 | 0.119 | [0.108] | 0.113 | 0.109 | [0.123] | 0.112 | 0.107 |
| 1,2,3,4,6,7,8-HpCDD | (0.0307) | 0.508 | 0.369 | 0.617 | 0.965 | 0.654 | 0.852 | 0.559 | [0.275] | 0.359 | [0.248] | 0.303 |
| OCDD | 0.196 | 4.08 | 5.44 | 5.39 | 8.13 | 6.09 | 12 | 4.92 | 3.85 | 3.32 | 2.98 | 3.87 |
| 2,3,7,8-TCDF | (0.032) | 0.366 | (0.057) | 0.43 | 0.482 | 0.356 | 0.439 | 0.379 | 0.219 | 0.0494 | 0.0913 | 0.0652 |
| 1,2,3,7,8-PeCDF | (0.0181) | (0.0404) | (0.026) | 0.0661 | 0.0662 | [0.0577] | 0.0585 | 0.0428 | (0.0261) | (0.0206) | (0.04) | (0.0275) |
| 2,3,4,7,8-PeCDF | (0.0171) | 0.185 | [0.0347] | 0.213 | 0.257 | [0.192] | 0.17 | [0.153] | 0.172 | (0.0193) | (0.0369) | (0.0248) |
| 1,2,3,4,7,8-HxCDF | (0.0174) | 0.101 | 0.0273 | 0.134 | 0.145 | 0.102 | 0.0488 | 0.052 | [0.0767] | [0.0149] | 0.0687 | 0.0605 |
| 1,2,3,6,7,8-HxCDF | (0.0162) | 0.054 | (0.0208) | [0.0622] | [0.0707] | 0.0541 | 0.0464 | 0.0499 | 0.0356 | 0.0126 | [0.027] | [0.0231] |
| 2,3,4,6,7,8-HxCDF | (0.0174) | [0.0501] | [0.0269] | 0.0762 | 0.0854 | 0.0721 | [0.0502] | 0.0648 | 0.0473 | 0.0183 | 0.0328 | (0.0254) |
| 1,2,3,7,8,9-HxCDF | (0.0229) | (0.0475) | (0.0286) | (0.0416) | (0.0322) | (0.0332) | (0.0291) | (0.0212) | (0.0317) | (0.0163) | (0.0327) | (0.0333) |
| 1,2,3,4,6,7,8-HpCDF | 0.0262 | 0.258 | 0.0863 | 0.507 | 0.504 | 0.334 | 0.28 | 0.197 | 0.371 | 0.0289 | 0.265 | [0.197] |
| 1,2,3,4,7,8,9-HpCDF | (0.0201) | (0.0536) | (0.0231) | (0.0448) | (0.0362) | (0.0379) | (0.0329) | (0.0262) | (0.0312) | (0.0268) | (0.0335) | (0.0312) |
| OCDF | [0.0564] | 0.372 | 0.105 | 0.618 | 0.672 | 0.465 | 0.393 | 0.291 | 0.582 | [0.0634] | 0.435 | 0.353 |
| **WHO-2005 TEQ (ND=0; EMPC=0)** | **0.00945** | **2.32** | **0.00895** | **2.99** | **3.5** | **3.76** | **0.191** | **0.142** | **1.32** | **0.0782** | **0.574** | **0.325** |
| **WHO-2005 TEQ (ND=0; EMPC=EMPC)** | **0.00946** | **2.32** | **0.068** | **3.05** | **3.51** | **3.82** | **0.389** | **0.273** | **1.37** | **0.123** | **0.579** | **0.329** |
| **WHO-2005 TEQ (ND=DL/2; EMPC=0)** | **0.0475** | **2.32** | **0.0677** | **3.03** | **3.51** | **3.77** | **0.221** | **0.163** | **1.34** | **0.103** | **0.611** | **0.338** |
| **WHO-2005 TEQ (ND=DL/2; EMPC=EMPC)** | **0.0475** | **2.33** | **0.0991** | **3.05** | **3.51** | **3.82** | **0.393** | **0.274** | **1.38** | **0.129** | **0.614** | **0.341** |
| **WHO-2005 TEQ (ND=DL; EMPC=EMPC)** | **0.0855** | **2.33** | **0.13** | **3.06** | **3.52** | **3.83** | **0.397** | **0.275** | **1.38** | **0.135** | **0.65** | **0.352** |
| Checkcode | 609-462-TFS | 846-088-JWM | 862-387-YHY | 174-590-RDW | 012-699-RNC | 620-950-RLZ | 709-888-PKX | 924-046-MYW | 280-302-MHQ | 241-820-BDS | 971-730-NPW | 155-627-DYJ |
| Lab ID | MB1_8929_DF_SDS | A3406_8929_DF_001 | A3406_8929_DF_002 | A3406_8929_DF_003 | A3406_8929_DF_003DUP | A3406_8929_DF_004 | A3406_8929_DF_005 | A3406_8929_DF_006 | A3406_8929_DF_007 | A3406_8929_DF_008 | A3406_8929_DF_009 | A3406_8929_DF_010 |

( ) = DL
[ ] = EMPC

# A3406 - Totals

**Project ID: Passaic RI/FS Caged Bivalve Study**

## Sample Summary
## Part 2

ANALYTICAL PERSPECTIVES

**Method 1613B**

| Analyte | Method Blank | LPR6-ECST-Comp01 | LPRBG-ECST-Comp01 | LPR6-ECST-Comp02 | LPR6-ECST-Comp02-DUP | LPR7-ECST-Comp03 | LPR7-ECST-Comp04 | LPR8-ECST-Comp05 | LPR1-GDST-Comp01 | LPRBG-GDST-Comp01 | LPR2-GDST-Comp02 | LPR3-GDST-Comp03 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | pg/g | pg/g | pg/g | pg/g | pg/g | pg/g | pg/g | pg/g | pg/g | pg/g | pg/g | pg/g |
| **Totals** | | | | | | | | | | | | |
| TCDDs | 0.0576 | 4.65 | 0.115 | 5.8 | 6.84 | 7.01 | 3.95 | 3.07 | 5.08 | 3.29 | 3.37 | 2.22 |
| PeCDDs | 0 | 0.0581 | 0.0779 | 0.384 | 0.564 | 0.255 | 0.326 | 0.228 | 1.44 | 2.47 | 1.43 | 1.56 |
| HxCDDs | 0.0913 | 0.595 | 0.282 | 0.653 | 0.809 | 0.642 | 0.613 | 0.513 | 2.98 | 5.09 | 3.59 | 3.92 |
| HpCDDs | 0.0327 | 1.06 | 0.765 | 1.23 | 1.96 | 1.31 | 1.82 | 1.12 | 0.546 | 1.82 | 0.613 | 1.05 |
| OCDD | 0.196 | 4.08 | 5.44 | 5.39 | 8.13 | 6.09 | 12 | 4.92 | 3.85 | 3.32 | 2.98 | 3.87 |
| TCDFs | 0 | 5.37 | 0.262 | 7.34 | 9.43 | 8.75 | 4.9 | 4.27 | 6.69 | 1.31 | 2.58 | 0.968 |
| PeCDFs | 0 | 2.06 | 0.129 | 2.26 | 3.25 | 2.41 | 1.89 | 1.37 | 1.91 | 0.271 | 0.75 | 0.359 |
| HxCDFs | 0.028 | 0.598 | 0.0712 | 0.906 | 1.17 | 0.862 | 0.778 | 0.719 | 0.538 | 0.0581 | 0.219 | 0.135 |
| HpCDFs | 0.0262 | 0.485 | 0.142 | 0.802 | 0.895 | 0.642 | 0.569 | 0.425 | 0.492 | 0.0289 | 0.375 | 0.101 |
| OCDF | 0 | 0.372 | 0.105 | 0.618 | 0.672 | 0.465 | 0.393 | 0.291 | 0.582 | 0 | 0.435 | 0.353 |
| **Total PCDD/Fs (ND=0; EMPC=0)** | **0.432** | **19.3** | **7.39** | **25.4** | **33.7** | **28.4** | **27.2** | **16.9** | **24.1** | **17.7** | **16.3** | **14.5** |
| **Total PCDD/Fs (ND=0; EMPC=EMPC)** | **0.488** | **20.9** | **7.97** | **26.8** | **34.1** | **29.5** | **28.2** | **17.9** | **24.8** | **18.3** | **17.3** | **15.9** |
| **Total PCDD/Fs (2378-X ND=DL; EMPC=EMPC)** | **0.787** | **21.1** | **8.2** | **26.9** | **34.2** | **29.6** | **28.3** | **17.9** | **24.9** | **18.4** | **17.6** | **16.1** |
| **Total 2378s (ND=0; EMPC=0)** | **0.314** | **8.33** | **6.03** | **11.1** | **14.9** | **12** | **14.4** | **6.77** | **6.67** | **3.91** | **4.53** | **5.06** |
| **Total 2378s (ND=0.5; EMPC=0)** | **0.492** | **8.45** | **6.23** | **11.2** | **14.9** | **12.1** | **14.6** | **6.83** | **6.79** | **4.04** | **4.7** | **5.2** |
| **Total 2378s (ND=1; EMPC=0)** | **0.671** | **8.57** | **6.43** | **11.3** | **15** | **12.2** | **14.7** | **6.9** | **6.9** | **4.17** | **4.88** | **5.33** |
| **Total 2378s (ND=0; EMPC=1)** | **0.37** | **8.38** | **6.27** | **11.2** | **14.9** | **12.3** | **14.8** | **7.08** | **7.07** | **4.15** | **4.8** | **5.28** |
| **Total 2378s (ND=0.5; EMPC=1)** | **0.52** | **8.49** | **6.39** | **11.3** | **15** | **12.3** | **14.8** | **7.1** | **7.14** | **4.2** | **4.95** | **5.39** |
| **Total 2378s (ND=1; EMPC=1)** | **0.669** | **8.59** | **6.51** | **11.4** | **15** | **12.4** | **14.9** | **7.13** | **7.2** | **4.26** | **5.09** | **5.51** |
| Checkcode | 609-462-TFS | 846-088-JWM | 862-387-YHY | 174-590-RDW | 012-699-RNC | 620-950-RLZ | 709-888-PKX | 924-046-MYW | 280-302-MHQ | 241-820-BDS | 971-730-NPW | 155-627-DYJ |
| Lab ID | MB1_8929_DF_SDS | A3406_8929_DF_001 | A3406_8929_DF_002 | A3406_8929_DF_003 | A3406_8929_DF_003DUP | A3406_8929_DF_004 | A3406_8929_DF_005 | A3406_8929_DF_006 | A3406_8929_DF_007 | A3406_8929_DF_008 | A3406_8929_DF_009 | A3406_8929_DF_010 |

( ) = DL
[ ] = EMPC

# A3406 - Others

**Project ID: Passaic RI/FS Caged Bivalve Study**

## Sample Summary
**Part 3**

ANALYTICAL PERSPECTIVES

**Method 1613B**

| Analyte | Method Blank | LPR6-ECST-Comp01 | LPRBG-ECST-Comp01 | LPR6-ECST-Comp02 | LPR6-ECST-Comp02-DUP | LPR7-ECST-Comp03 | LPR7-ECST-Comp04 | LPR8-ECST-Comp05 | LPR1-GDST-Comp01 | LPRBG-GDST-Comp01 | LPR2-GDST-Comp02 | LPR3-GDST-Comp03 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | pg/g | pg/g | pg/g | pg/g | pg/g | pg/g | pg/g | pg/g | pg/g | pg/g | pg/g | pg/g |
| **Other PCDD/Fs (ND=0, EMPC=0)** | | | | | | | | | | | | |
| Other TCDD | 0.0576 | 2.53 | 0.115 | 2.98 | 3.6 | 3.42 | 3.95 | 3.07 | 3.87 | 3.29 | 2.83 | 1.97 |
| Other PeCDD | 0 | 0 | 0.0779 | 0.384 | 0.496 | 0.184 | 0.268 | 0.166 | 1.44 | 2.41 | 1.43 | 1.51 |
| Other HxCDD | 0 | 0.366 | 0.282 | 0.419 | 0.573 | 0.427 | 0.494 | 0.365 | 2.79 | 5.02 | 3.48 | 3.81 |
| Other HpCDD | 0.0327 | 0.554 | 0.396 | 0.61 | 1 | 0.659 | 0.969 | 0.558 | 0.546 | 1.46 | 0.613 | 0.748 |
| Other TCDF | 0 | 5 | 0.262 | 6.91 | 8.95 | 8.39 | 4.46 | 3.89 | 6.47 | 1.26 | 2.48 | 0.903 |
| Other PeCDF | 0 | 1.88 | 0.129 | 1.99 | 2.93 | 2.41 | 1.66 | 1.33 | 1.74 | 0.271 | 0.75 | 0.359 |
| Other HxCDF | 0.028 | 0.443 | 0.0439 | 0.696 | 0.944 | 0.633 | 0.683 | 0.553 | 0.455 | 0.0272 | 0.118 | 0.0746 |
| Other HpCDF | 0 | 0.228 | 0.0557 | 0.295 | 0.391 | 0.308 | 0.289 | 0.228 | 0.121 | 0 | 0.11 | 0.101 |
| **Other PCDD/Fs (ND=0, EMPC=EMPC)** | | | | | | | | | | | | |
| Other TCDD | 0.0576 | 2.65 | 0.115 | 2.98 | 3.67 | 3.55 | 3.95 | 3.11 | 3.98 | 3.42 | 3.01 | 2.34 |
| Other PeCDD | 0 | 0.217 | 0.136 | 0.384 | 0.544 | 0.356 | 0.387 | 0.357 | 1.44 | 2.45 | 1.43 | 1.56 |
| Other HxCDD | 0 | 0.366 | 0.282 | 0.419 | 0.573 | 0.427 | 0.494 | 0.365 | 2.79 | 5.02 | 3.48 | 3.81 |
| Other HpCDD | 0.0327 | 0.554 | 0.396 | 0.61 | 1 | 0.659 | 0.969 | 0.558 | 0.546 | 1.46 | 0.613 | 0.748 |
| Other TCDF | 0 | 6.06 | 0.338 | 7.84 | 9.01 | 8.56 | 4.86 | 4.23 | 6.47 | 1.44 | 2.86 | 1.45 |
| Other PeCDF | 0 | 1.93 | 0.27 | 2.33 | 2.99 | 2.65 | 1.73 | 1.41 | 1.87 | 0.325 | 0.75 | 0.419 |
| Other HxCDF | 0.028 | 0.537 | 0.106 | 0.696 | 0.981 | 0.723 | 0.683 | 0.553 | 0.48 | 0.0745 | 0.225 | 0.159 |
| Other HpCDF | 0 | 0.228 | 0.0557 | 0.295 | 0.391 | 0.308 | 0.289 | 0.228 | 0.121 | 0 | 0.11 | 0.101 |
| Checkcode | 609-462-TFS | 846-088-JWM | 862-387-YHY | 174-590-RDW | 012-699-RNC | 620-950-RLZ | 709-888-PKX | 924-046-MYW | 280-302-MHQ | 241-820-BDS | 971-730-NPW | 155-627-DYJ |
| Lab ID | MB1_8929_DF_SDS | A3406_8929_DF_001 | A3406_8929_DF_002 | A3406_8929_DF_003 | A3406_8929_DF_003DUP | A3406_8929_DF_004 | A3406_8929_DF_005 | A3406_8929_DF_006 | A3406_8929_DF_007 | A3406_8929_DF_008 | A3406_8929_DF_009 | A3406_8929_DF_010 |

( ) = DL
[ ] = EMPC

# A3406 - DLs

**Project ID: Passaic RI/FS Caged Bivalve Study**

## Sample Summary
### Part 5 (DLs)

ANALYTICAL PERSPECTIVES

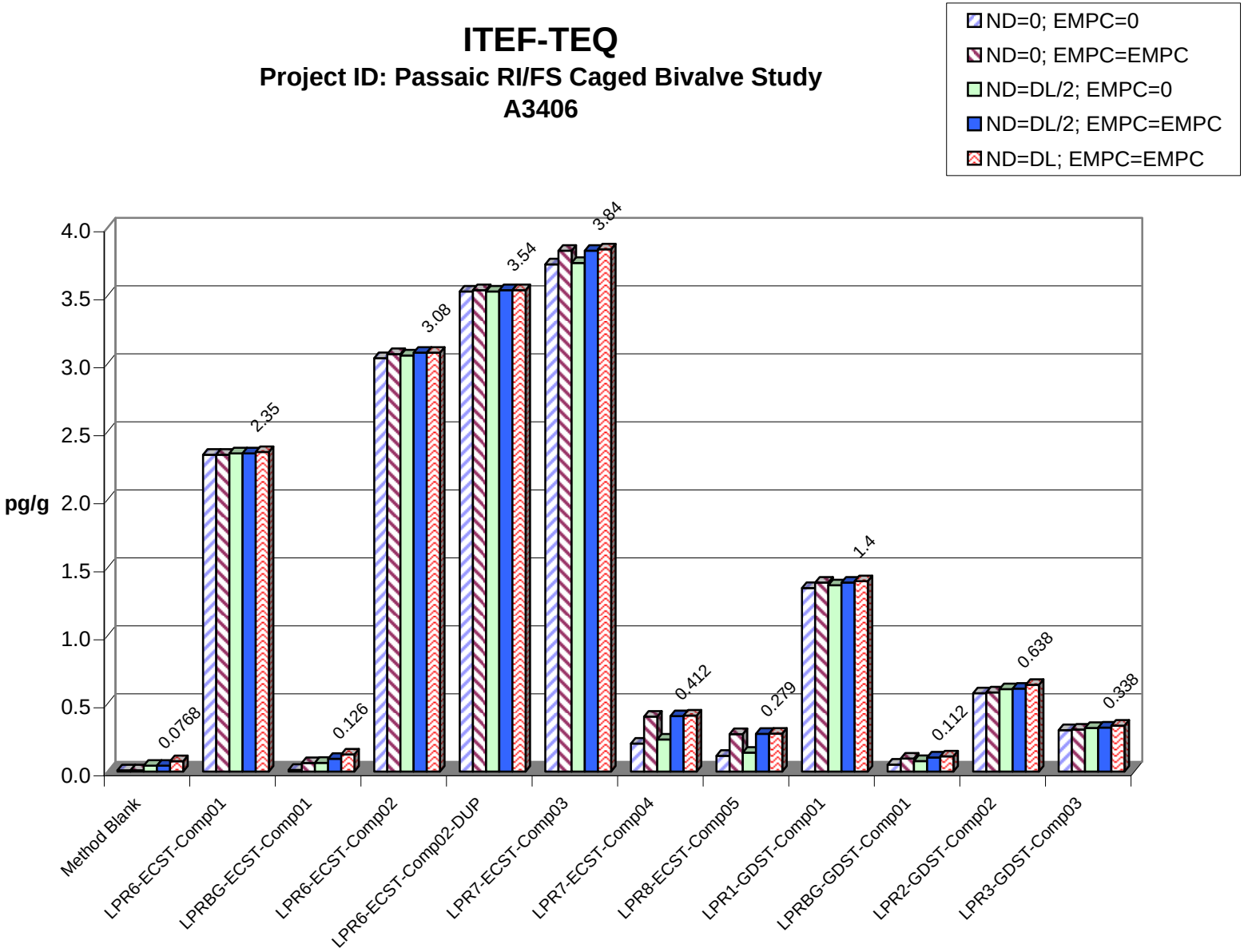
**Method 1613B**

| Analyte | Method Blank | LPR6-ECST-Comp01 | LPRBG-ECST-Comp01 | LPR6-ECST-Comp02 | LPR6-ECST-Comp02-DUP | LPR7-ECST-Comp03 | LPR7-ECST-Comp04 | LPR8-ECST-Comp05 | LPR1-GDST-Comp01 | LPRBG-GDST-Comp01 | LPR2-GDST-Comp02 | LPR3-GDST-Comp03 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | pg/g | pg/g | pg/g | pg/g | pg/g | pg/g | pg/g | pg/g | pg/g | pg/g | pg/g | pg/g |
| 2,3,7,8-TCDD | 0.0286 | 0.0694 | 0.0471 | 0.0614 | 0.0429 | 0.041 | 0.0461 | 0.0306 | 0.0437 | 0.0318 | 0.0463 | 0.0437 |
| 1,2,3,7,8-PeCDD | 0.0253 | 0.049 | 0.0385 | 0.0579 | 0.0369 | 0.0418 | 0.0407 | 0.0271 | 0.0383 | 0.033 | 0.0443 | 0.0419 |
| 1,2,3,4,7,8-HxCDD | 0.0264 | 0.0667 | 0.0354 | 0.0576 | 0.0479 | 0.0504 | 0.0424 | 0.0306 | 0.0397 | 0.0355 | 0.0518 | 0.0438 |
| 1,2,3,6,7,8-HxCDD | 0.0268 | 0.0676 | 0.0357 | 0.0587 | 0.0495 | 0.0497 | 0.0427 | 0.0303 | 0.0424 | 0.0348 | 0.0519 | 0.0428 |
| 1,2,3,7,8,9-HxCDD | 0.0311 | 0.0772 | 0.0409 | 0.0618 | 0.0555 | 0.0583 | 0.0503 | 0.0355 | 0.0469 | 0.0414 | 0.0604 | 0.0478 |
| 1,2,3,4,6,7,8-HpCDD | 0.0307 | 0.068 | 0.0411 | 0.0754 | 0.0483 | 0.0624 | 0.0414 | 0.0375 | 0.0351 | 0.039 | 0.0436 | 0.0491 |
| OCDD | 0.0585 | 0.124 | 0.0838 | 0.124 | 0.0962 | 0.0935 | 0.0701 | 0.0728 | 0.0756 | 0.0501 | 0.0765 | 0.0803 |
| 2,3,7,8-TCDF | 0.032 | 0.0742 | 0.057 | 0.066 | 0.0336 | 0.0421 | 0.0396 | 0.0282 | 0.0339 | 0.0301 | 0.0412 | 0.0408 |
| 1,2,3,7,8-PeCDF | 0.0181 | 0.0404 | 0.026 | 0.0326 | 0.0282 | 0.0327 | 0.0238 | 0.0227 | 0.0261 | 0.0206 | 0.04 | 0.0275 |
| 2,3,4,7,8-PeCDF | 0.0171 | 0.0375 | 0.0234 | 0.0313 | 0.027 | 0.0293 | 0.0221 | 0.0209 | 0.0246 | 0.0193 | 0.0369 | 0.0248 |
| 1,2,3,4,7,8-HxCDF | 0.0174 | 0.0357 | 0.0216 | 0.0322 | 0.0243 | 0.0267 | 0.022 | 0.016 | 0.0228 | 0.0128 | 0.0256 | 0.0263 |
| 1,2,3,6,7,8-HxCDF | 0.0162 | 0.0347 | 0.0208 | 0.0293 | 0.0224 | 0.0238 | 0.0204 | 0.0148 | 0.0227 | 0.012 | 0.0237 | 0.0244 |
| 2,3,4,6,7,8-HxCDF | 0.0174 | 0.0335 | 0.021 | 0.0306 | 0.0239 | 0.0249 | 0.0218 | 0.0154 | 0.0226 | 0.0121 | 0.0239 | 0.0254 |
| 1,2,3,7,8,9-HxCDF | 0.0229 | 0.0475 | 0.0286 | 0.0416 | 0.0322 | 0.0332 | 0.0291 | 0.0212 | 0.0317 | 0.0163 | 0.0327 | 0.0333 |
| 1,2,3,4,6,7,8-HpCDF | 0.0137 | 0.0356 | 0.0162 | 0.0313 | 0.0246 | 0.0262 | 0.0236 | 0.0179 | 0.0216 | 0.0188 | 0.0241 | 0.0216 |
| 1,2,3,4,7,8,9-HpCDF | 0.0201 | 0.0536 | 0.0231 | 0.0448 | 0.0362 | 0.0379 | 0.0329 | 0.0262 | 0.0312 | 0.0268 | 0.0335 | 0.0312 |
| OCDF | 0.0583 | 0.108 | 0.0576 | 0.112 | 0.0731 | 0.0809 | 0.0643 | 0.0495 | 0.07 | 0.0485 | 0.0735 | 0.0775 |
| Total TCDD | 0.0286 | 0.0694 | 0.0471 | 0.0614 | 0.0429 | 0.041 | 0.0461 | 0.0306 | 0.0437 | 0.0318 | 0.0463 | 0.0437 |
| Total PeCDD | 0.0253 | 0.049 | 0.0385 | 0.0579 | 0.0369 | 0.0418 | 0.0407 | 0.0271 | 0.0383 | 0.033 | 0.0443 | 0.0419 |
| Total HxCDD | 0.028 | 0.0702 | 0.0372 | 0.0592 | 0.0508 | 0.0526 | 0.045 | 0.032 | 0.0429 | 0.0371 | 0.0545 | 0.0446 |
| Total HpCDD | 0.0307 | 0.068 | 0.0411 | 0.0754 | 0.0483 | 0.0624 | 0.0414 | 0.0375 | 0.0351 | 0.039 | 0.0436 | 0.0491 |
| Total TCDF | 0.032 | 0.0742 | 0.057 | 0.066 | 0.0336 | 0.0421 | 0.0396 | 0.0282 | 0.0339 | 0.0301 | 0.0412 | 0.0408 |
| Total PeCDF | 0.0176 | 0.0389 | 0.0247 | 0.0319 | 0.0276 | 0.0309 | 0.0229 | 0.0217 | 0.0253 | 0.0199 | 0.0384 | 0.0261 |
| Total HxCDF | 0.0182 | 0.0374 | 0.0228 | 0.0331 | 0.0254 | 0.0269 | 0.0231 | 0.0166 | 0.0247 | 0.0132 | 0.0262 | 0.0271 |
| Total HpCDF | 0.0165 | 0.0435 | 0.0192 | 0.0373 | 0.0298 | 0.0314 | 0.0278 | 0.0216 | 0.0259 | 0.0224 | 0.0283 | 0.0258 |
| Checkcode | 609-462-TFS | 846-088-JWM | 862-387-YHY | 174-590-RDW | 012-699-RNC | 620-950-RLZ | 709-888-PKX | 924-046-MYW | 280-302-MHQ | 241-820-BDS | 971-730-NPW | 155-627-DYJ |
| Lab ID | MB1_8929_DF_SDS | A3406_8929_DF_001 | A3406_8929_DF_002 | A3406_8929_DF_003 | A3406_8929_DF_003DUP | A3406_8929_DF_004 | A3406_8929_DF_005 | A3406_8929_DF_006 | A3406_8929_DF_007 | A3406_8929_DF_008 | A3406_8929_DF_009 | A3406_8929_DF_010 |

# ITEF-TEQ

**Project ID: Passaic RI/FS Caged Bivalve Study**

**A3406**



# WHO-2005-TEQ

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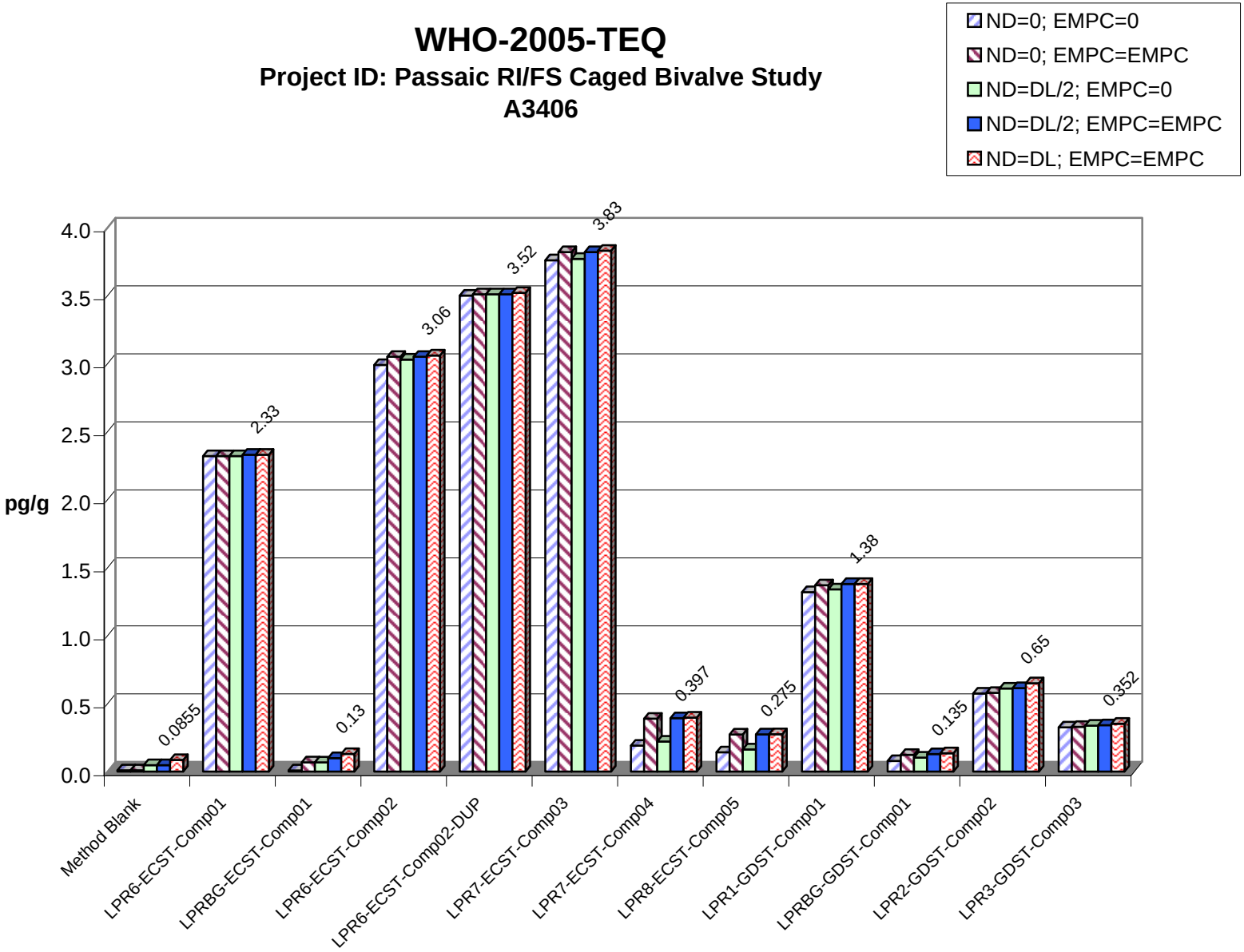
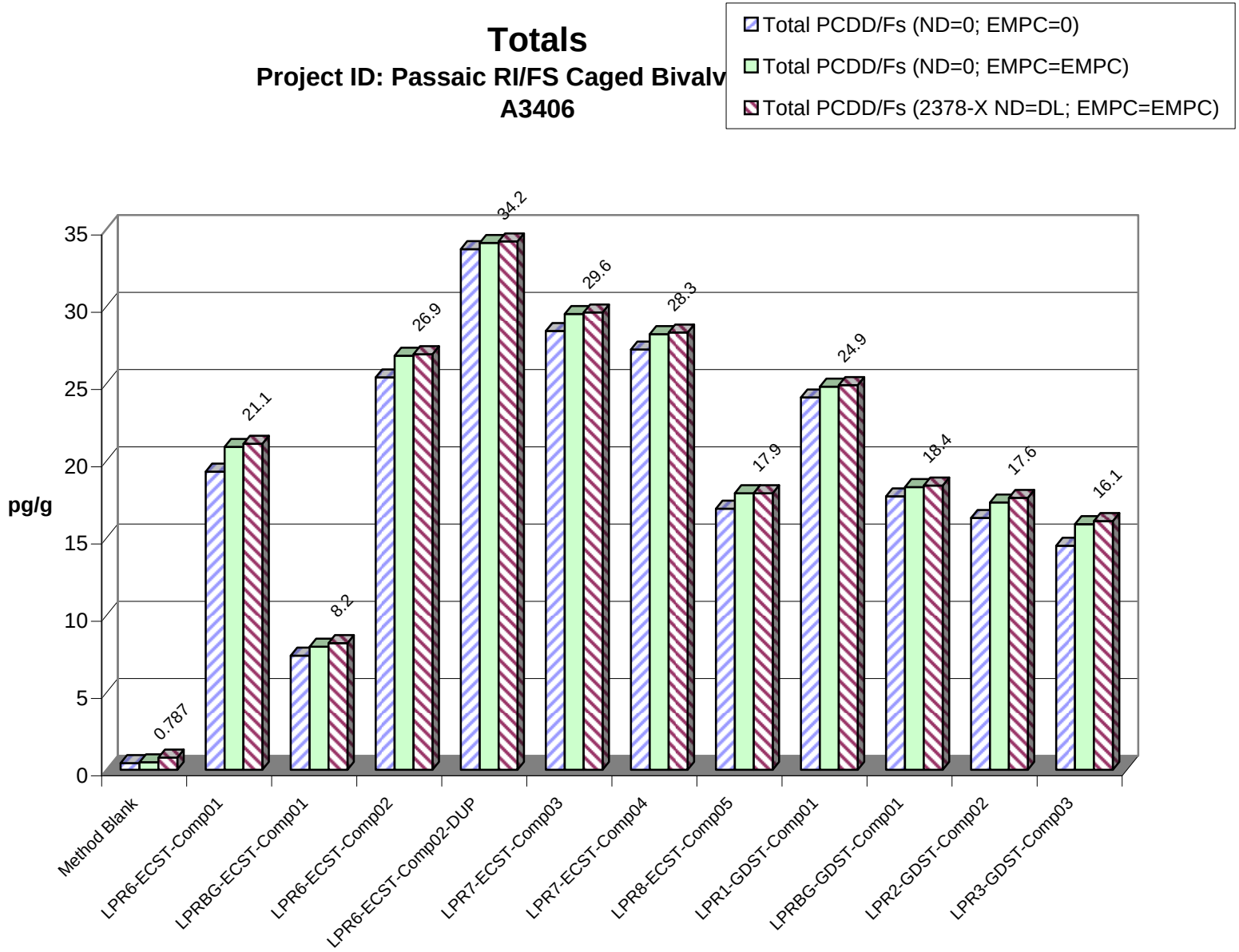
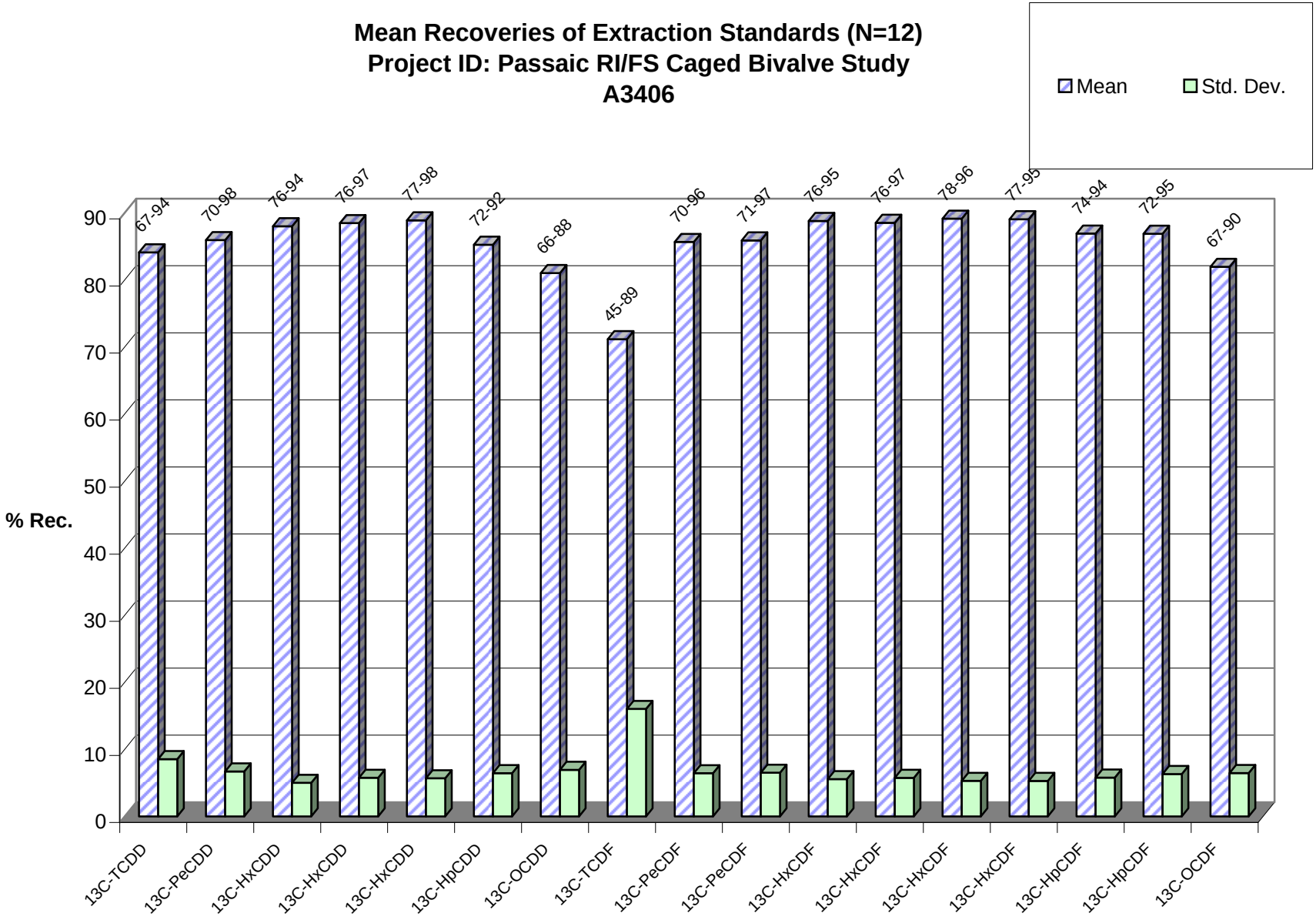


# Totals

**Project ID: Passaic RI/FS Caged Bivalv**

**A3406**




Mean Recoveries of Extraction Standards (N=12)
Project ID: Passaic RI/FS Caged Bivalve Study
A3406
Mean
Std. Dev.
% Rec.
0
10
20
30
40
50
60
70
80
90
67-94
70-98
76-94
76-97
77-98
72-92
66-88
45-89
70-96
71-97
76-95
76-97
78-96
77-95
74-94
72-95
67-90
13C-TCDD
13C-PeCDD
13C-HxCDD
13C-HxCDD
13C-HxCDD
13C-HpCDD
13C-OCDD
13C-TCDF
13C-PeCDF
13C-PeCDF
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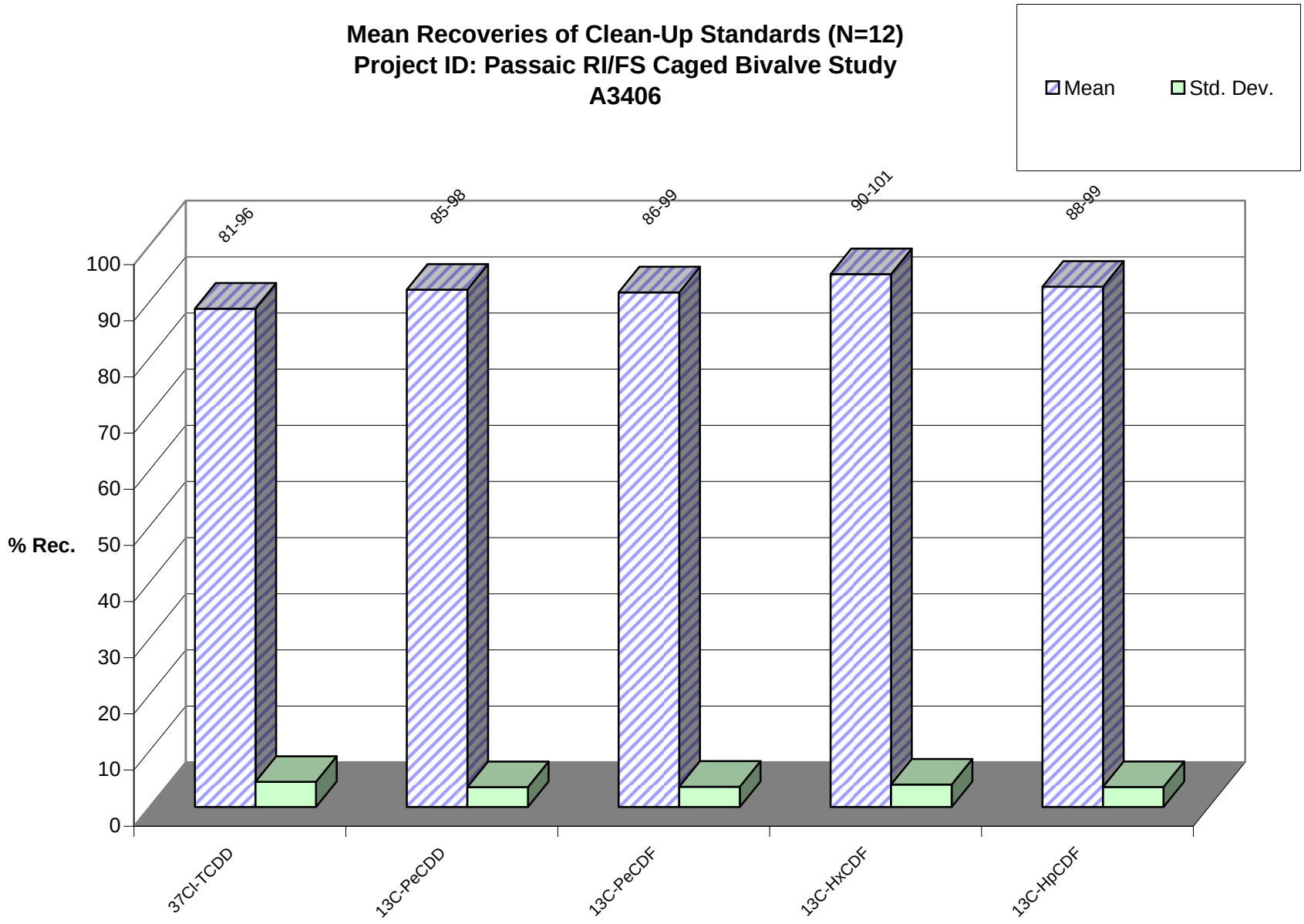
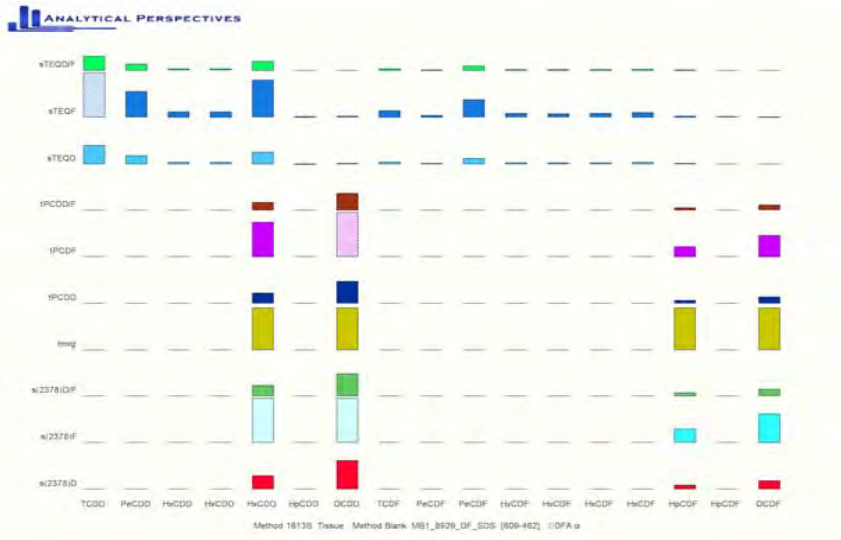
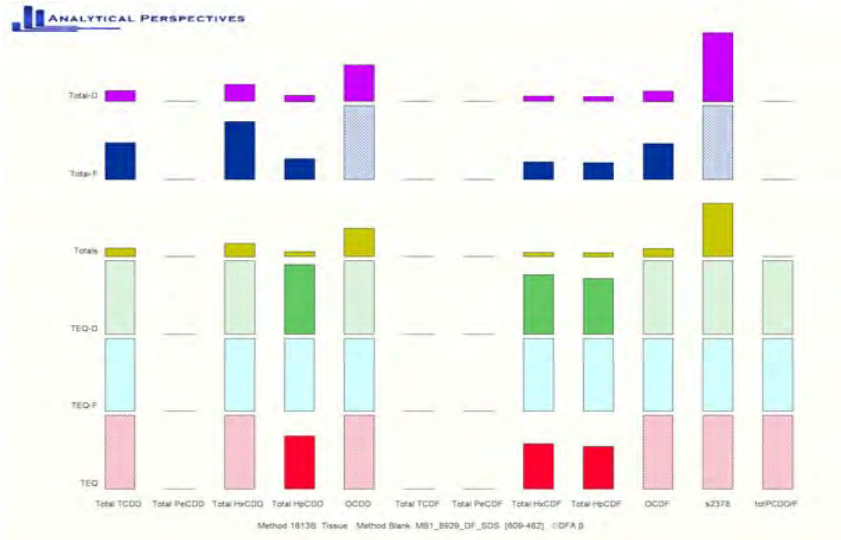
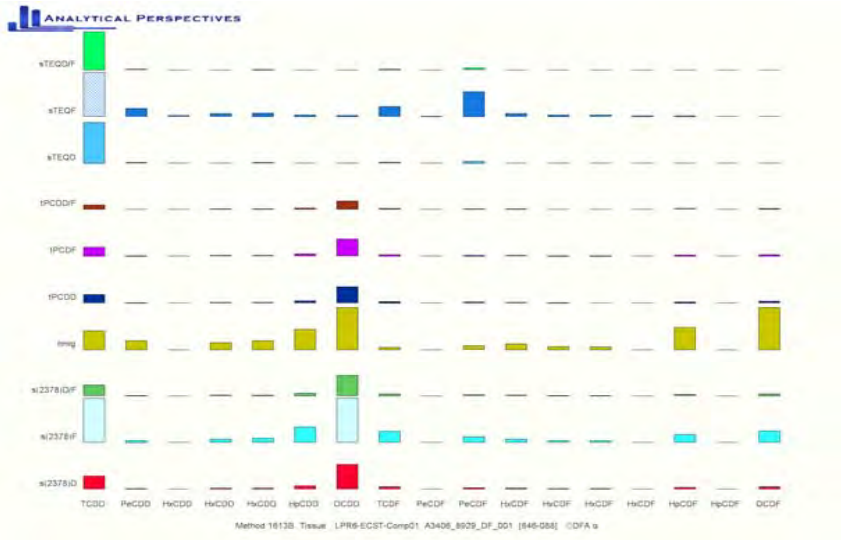
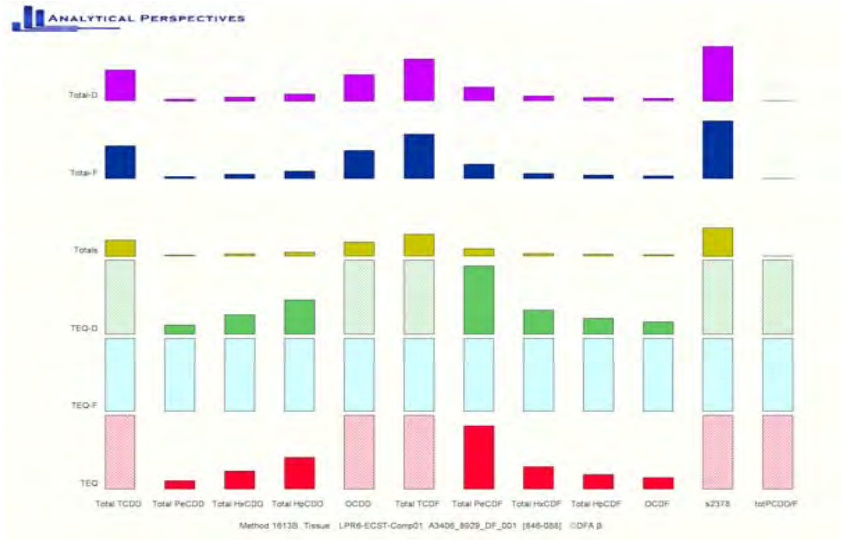
13C-HpCDF
13C-OCDF


Mean Recoveries of Clean-Up Standards (N=12)
Project ID: Passaic RI/FS Caged Bivalve Study
A3406
Mean
Std. Dev.
% Rec.
100
90
80
70
60
50
40
30
20
10
0
81-96
85-98
86-99
90-101
88-99
37Cl-TCDD
13C-PeCDD
13C-PeCDF
13C-HxCDF
13C-HpCDF


ANALYTICAL PERSPECTIVES
sTEQD/F
sTEQF
sTEQD
tPCDD/F
tPCDF
tPCDD
tmig
s2378D/F
s2378F
s2378D
TCDD PeCDD HxCDD HxCDD HxCDD HpCDD OCDD TCDF PeCDF PeCDF HxCDF HxCDF HxCDF HxCDF HpCDF HpCDF OCDF
Method 1613B Tissue Method Blank MB1_8929_DF_SDS [609-462] ©DFA α


ANALYTICAL PERSPECTIVES
Total-D
Total-F
Totals
TEQ-D
TEQ-F
TEQ
Total TCDD Total PeCDD Total HxCDD Total HpCDD OCDD Total TCDF Total PeCDF Total HxCDF Total HpCDF OCDF s2378 totPCDD/F
Method 1613B Tissue Method Blank MB1_8929_DF_SDS [609-462] ©DFA β


ANALYTICAL PERSPECTIVES
sTEQD/F
sTEQF
sTEQD
tPCDD/F
tPCDF
tPCDD
tmig
s2378D/F
s2378F
s2378D
TCDD PeCDD HxCDD HxCDD HxCDD HpCDD OCDD TCDF PeCDF PeCDF HxCDF HxCDF HxCDF HxCDF HpCDF HpCDF OCDF
Method 1613B Tissue LPR6-ECST-Comp01 A3406_8929_DF_001 [646-088] ©DFA α


ANALYTICAL PERSPECTIVES
Total-D
Total-F
Totals
TEQ-D
TEQ-F
TEQ
Total TCDD Total PeCDD Total HxCDD Total HpCDD OCDD Total TCDF Total PeCDF Total HxCDF Total HpCDF OCDF s2378 totPCDD/F
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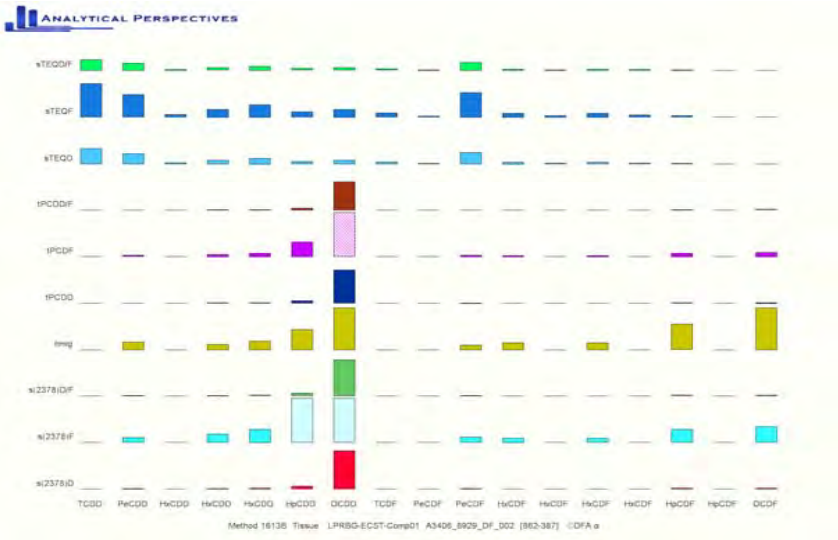
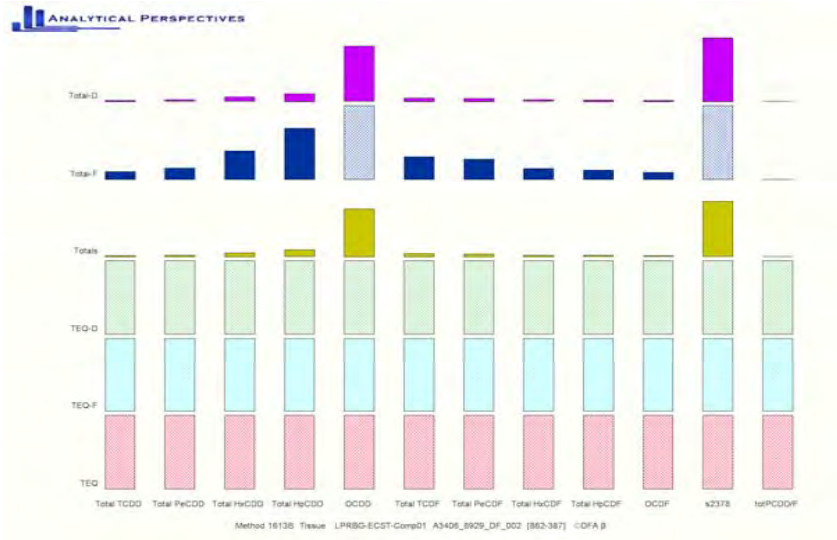
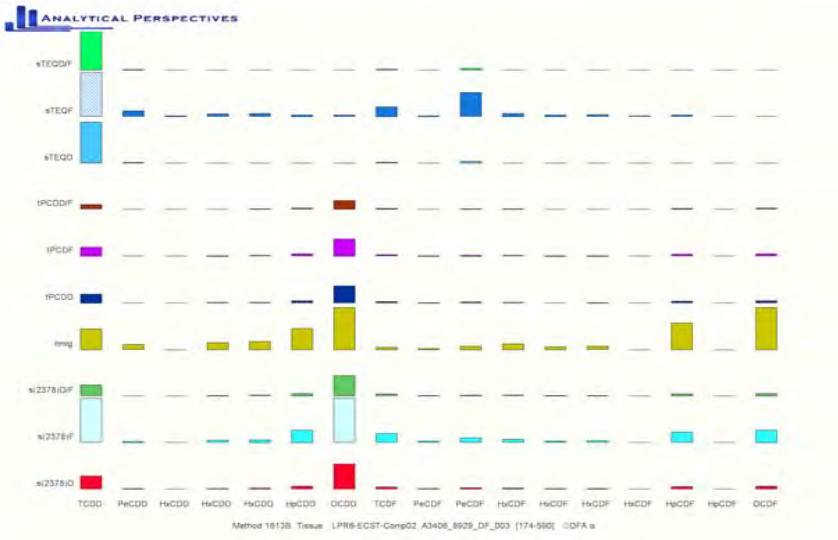
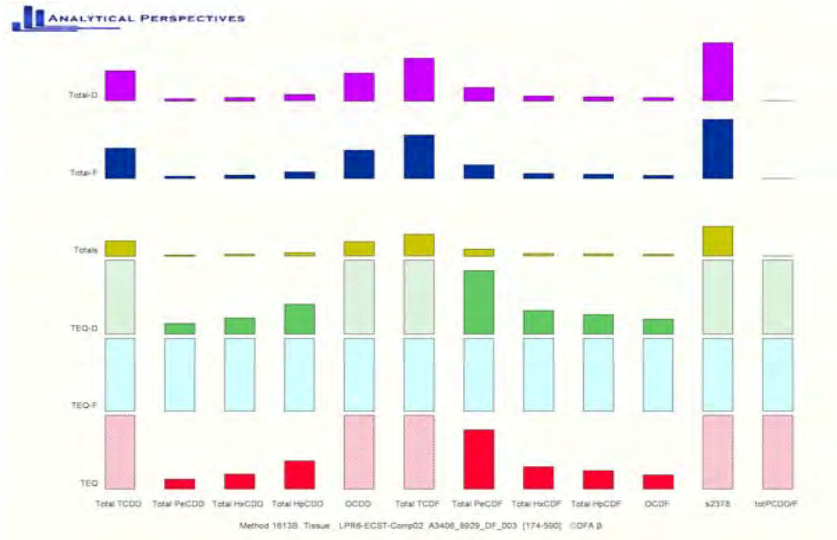
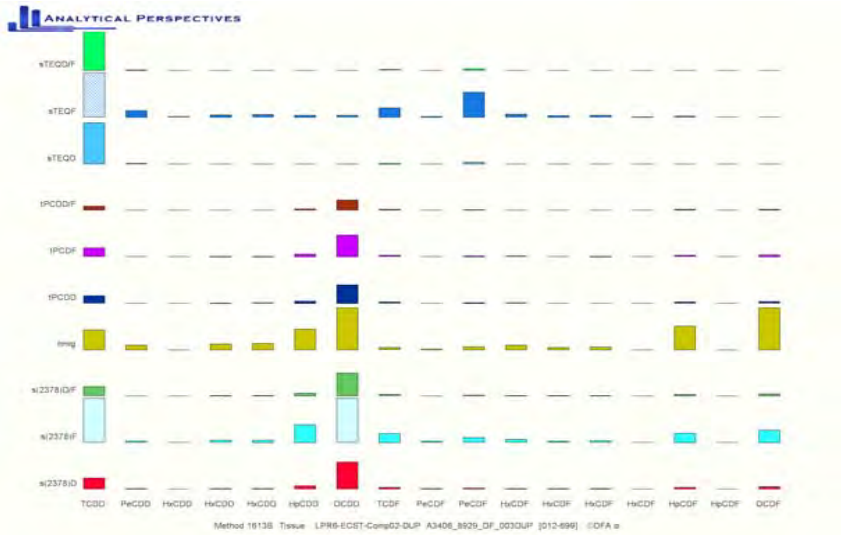
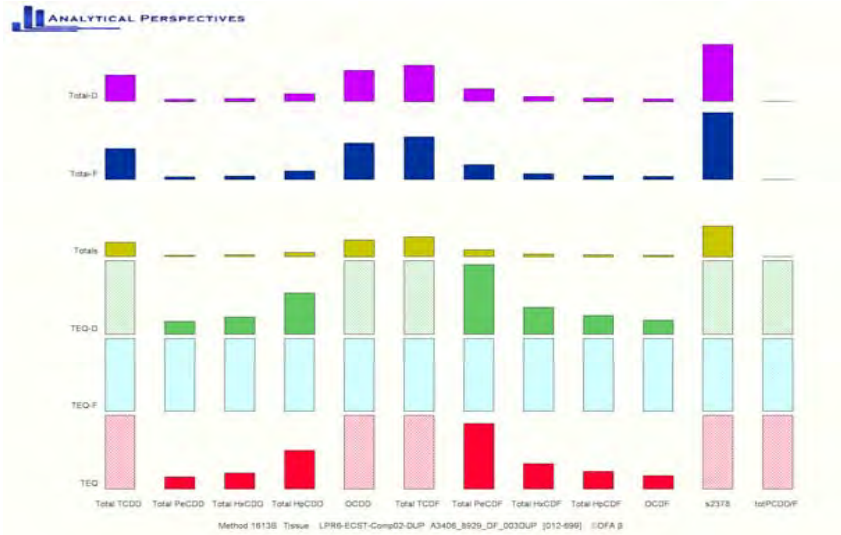

ANALYTICAL PERSPECTIVES
sTEQD/F
sTEQF
sTEQD
tPCDD/F
tPCDF
tPCDD
tmig
si2378D/F
si2378F
si2378D
TCDD PeCDD HxCDD HxCDD HxCDD HpCDD OCDD TCDF PeCDF PeCDF HxCDF HxCDF HxCDF HxCDF HpCDF HpCDF OCDF
Method 1613B Tissue LPRSG-ECST-Comp01 A3406_8929_DF_002 [862-387] ©DFA α

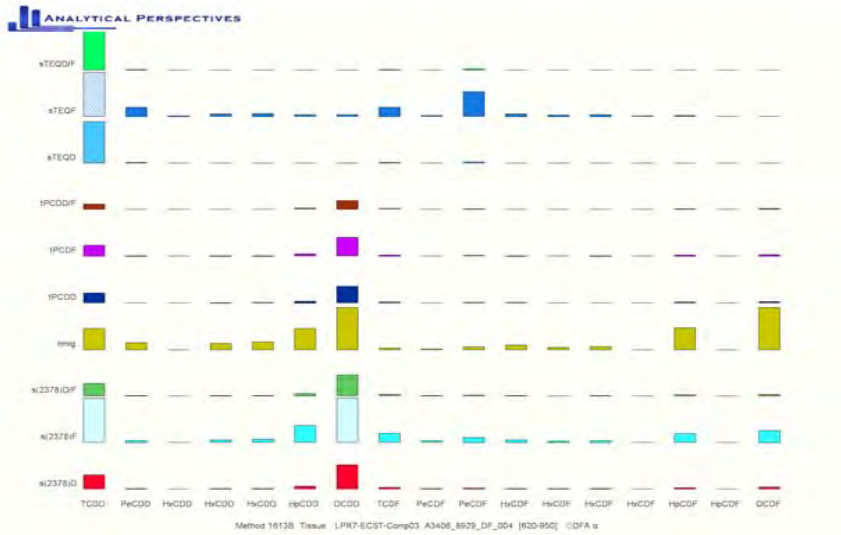

ANALYTICAL PERSPECTIVES
Total-D
Total-F
Totals
TEQ-D
TEQ-F
TEQ
Total TCDD Total PeCDD Total HxCDD Total HpCDD OCDD Total TCDF Total PeCDF Total HxCDF Total HpCDF OCDF s2378 totPCDD/F
Method 1613B Tissue LPRSG-ECST-Comp01 A3406_8929_DF_002 [862-387] ©DFA β


ANALYTICAL PERSPECTIVES
sTEQD/F
sTEQF
sTEQD
tPCDD/F
tPCDF
tPCDD
tmig
si2378D/F
si2378F
si2378D
TCDD PeCDD HxCDD HxCDD HxCDD HpCDD OCDD TCDF PeCDF PeCDF HxCDF HxCDF HxCDF HxCDF HpCDF HpCDF OCDF
Method 1613B Tissue LPR6-ECST-Comp02 A3406_8929_DF_003 [174-590] ©DFA α


ANALYTICAL PERSPECTIVES
Total-D
Total-F
Totals
TEQ-D
TEQ-F
TEQ
Total TCDD Total PeCDD Total HxCDD Total HpCDD OCDD Total TCDF Total PeCDF Total HxCDF Total HpCDF OCDF s2378 totPCDD/F
Method 1613B Tissue LPR6-ECST-Comp02 A3406_8929_DF_003 [174-590] ©DFA β


ANALYTICAL PERSPECTIVES
sTEQD/F
sTEQF
sTEQD
tPCDD/F
tPCDF
tPCDD
tmig
si2378D/F
si2378F
si2378D
TCDD PeCDD HxCDD HxCDD HxCDD HpCDD OCDD TCDF PeCDF PeCDF HxCDF HxCDF HxCDF HxCDF HpCDF HpCDF OCDF
Method 1613B Tissue LPR6-ECST-Comp02-DUP A3406_8929_DF_003DUP [012-696] ©DFA α


ANALYTICAL PERSPECTIVES
Total-D
Total-F
Totals
TEQ-D
TEQ-F
TEQ
Total TCDD Total PeCDD Total HxCDD Total HpCDD OCDD Total TCDF Total PeCDF Total HxCDF Total HpCDF OCDF s2378 totPCDD/F
Method 1613B Tissue LPR6-ECST-Comp02-DUP A3406_8929_DF_003DUP [012-696] ©DFA β


ANALYTICAL PERSPECTIVES
sTEQD/F
sTEQF
sTEQD
tPCDD/F
tPCDF
tPCDD
tmig
si2378D/F
si2378F
si2378D
TCDD PeCDD HxCDD HxCDD HxCDD HpCDD OCDD TCDF PeCDF PeCDF HxCDF HxCDF HxCDF HxCDF HpCDF HpCDF OCDF
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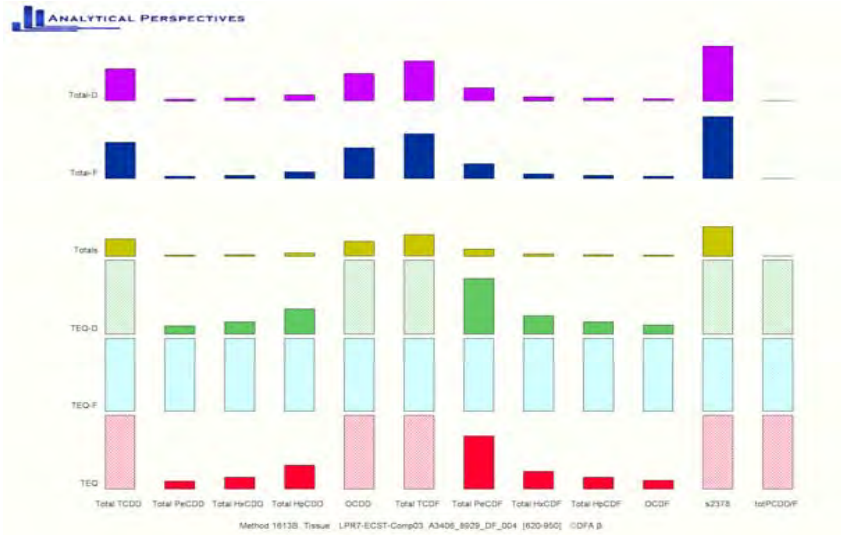
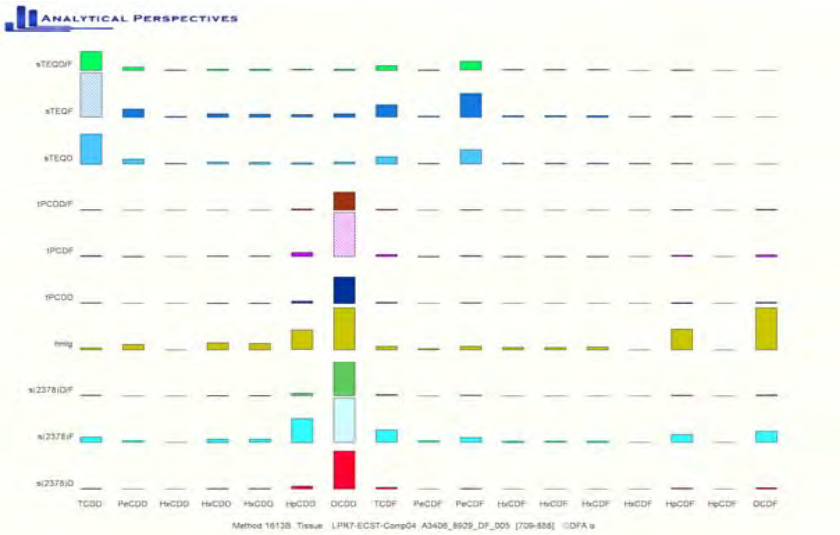
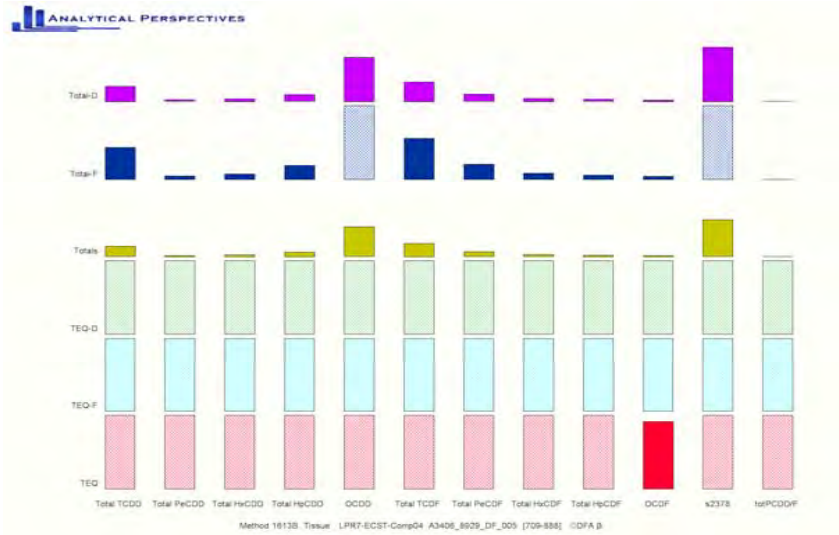
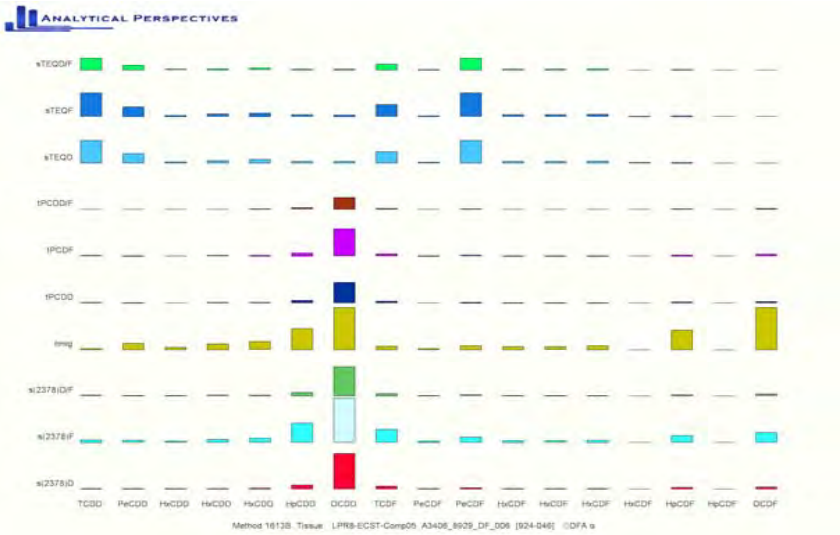
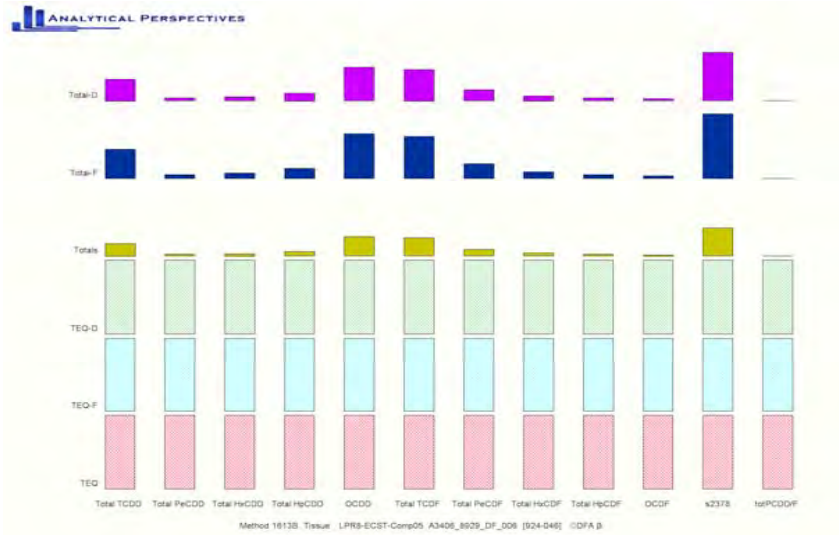
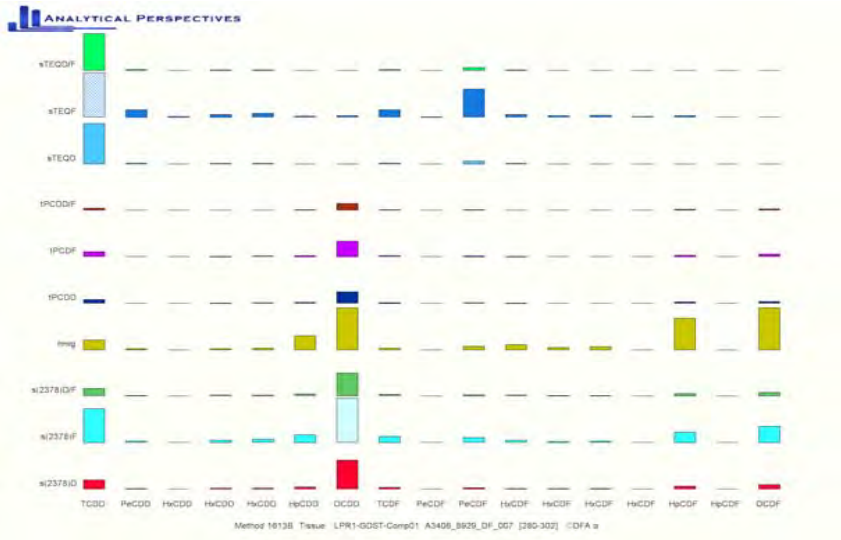

ANALYTICAL PERSPECTIVES
Total-D
Total-F
Totals
TEQ-D
TEQ-F
TEQ
Total TCDD Total PeCDD Total HxCDD Total HpCDD OCDD Total TCDF Total PeCDF Total HxCDF Total HpCDF OCDF s2378 totPCDD/F
Method 1613B Tissue LPR7-ECST-Comp03 A3406_8929_DF_004 [620-950] ©DFA β

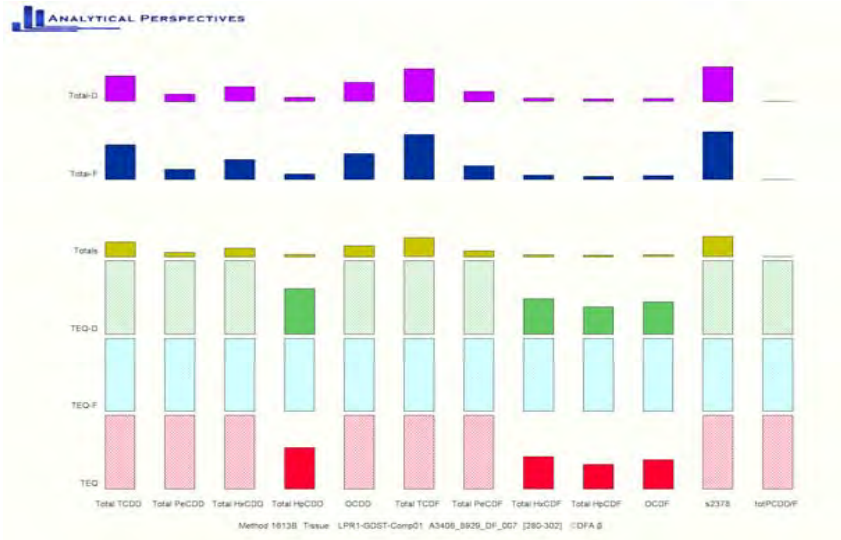

ANALYTICAL PERSPECTIVES
sTEQD/F
sTEQF
sTEQD
tPCDD/F
tPCDF
tPCDD
hmlg
s(2378)D/F
s(2378)F
s(2378)D
TCDD PeCDD HxCDD HxCDD HxCDD HpCDD OCDD TCDF PeCDF PeCDF HxCDF HxCDF HxCDF HxCDF HpCDF HpCDF OCDF
Method 1613B Tissue LPR7-ECST-Comp04 A3406_8929_DF_005 [709-888] ©DFA α

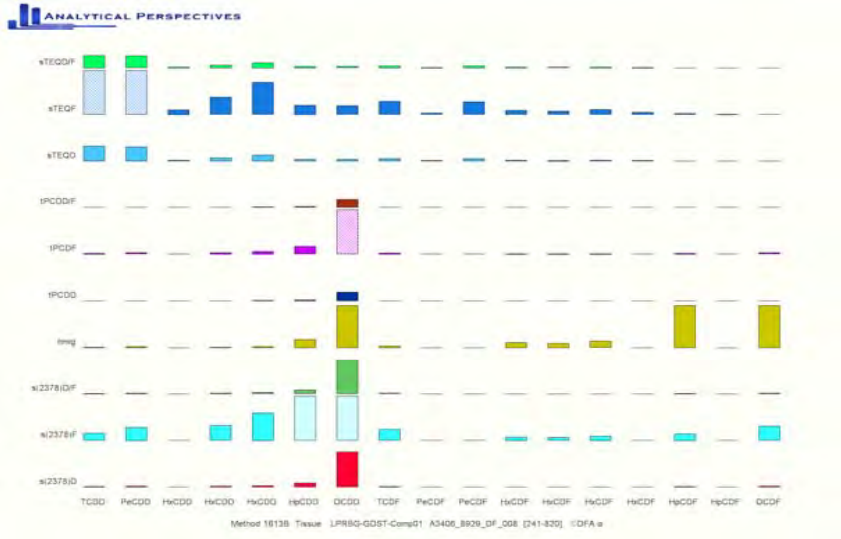

ANALYTICAL PERSPECTIVES
Total-D
Total-F
Totals
TEQ-D
TEQ-F
TEQ
Total TCDD Total PeCDD Total HxCDD Total HpCDD OCDD Total TCDF Total PeCDF Total HxCDF Total HpCDF OCDF s2378 totPCDD/F
Method 1613B Tissue LPR7-ECST-Comp04 A3406_8929_DF_005 [709-888] ©DFA β

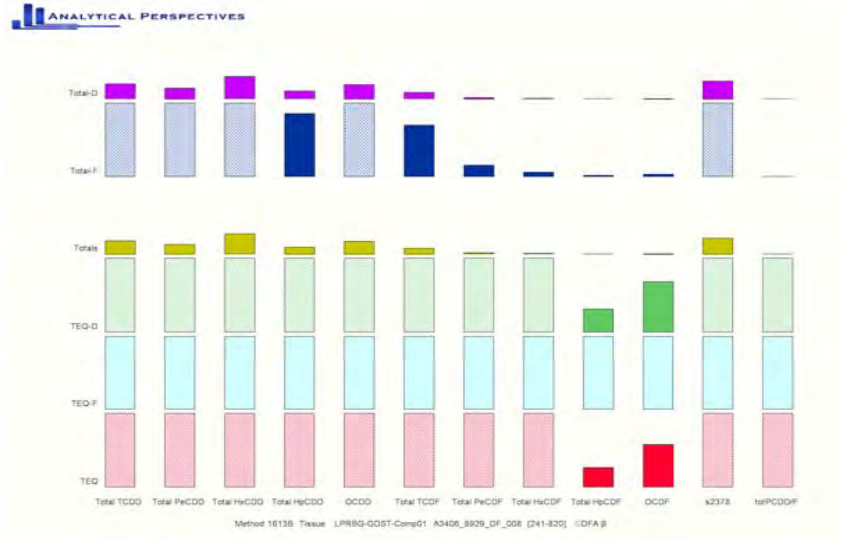

ANALYTICAL PERSPECTIVES
sTEQD/F
sTEQF
sTEQD
tPCDD/F
tPCDF
tPCDD
hmlg
s(2378)D/F
s(2378)F
s(2378)D
TCDD PeCDD HxCDD HxCDD HxCDD HpCDD OCDD TCDF PeCDF PeCDF HxCDF HxCDF HxCDF HxCDF HpCDF HpCDF OCDF
Method 1613B Tissue LPR8-ECST-Comp05 A3406_8929_DF_006 [924-046] ©DFA α

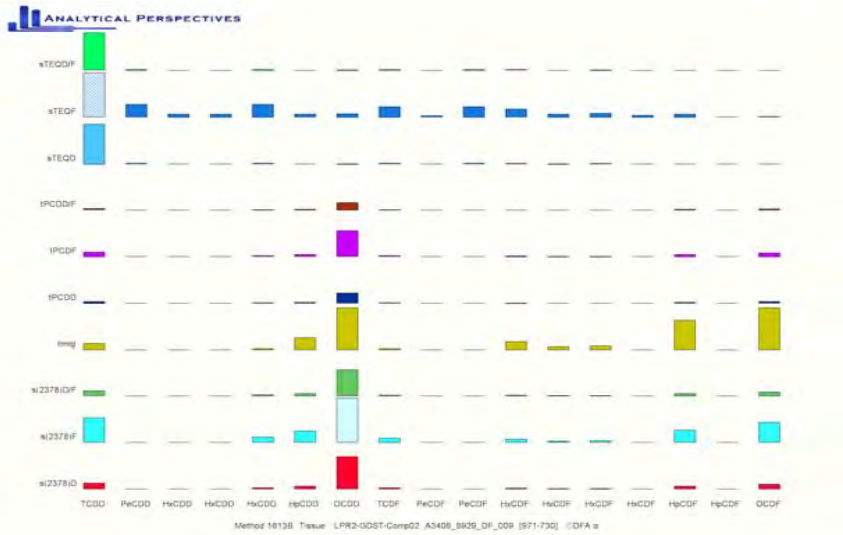

ANALYTICAL PERSPECTIVES
Total-D
Total-F
Totals
TEQ-D
TEQ-F
TEQ
Total TCDD Total PeCDD Total HxCDD Total HpCDD OCDD Total TCDF Total PeCDF Total HxCDF Total HpCDF OCDF s2378 totPCDD/F
Method 1613B Tissue LPR8-ECST-Comp05 A3406_8929_DF_006 [924-046] ©DFA β

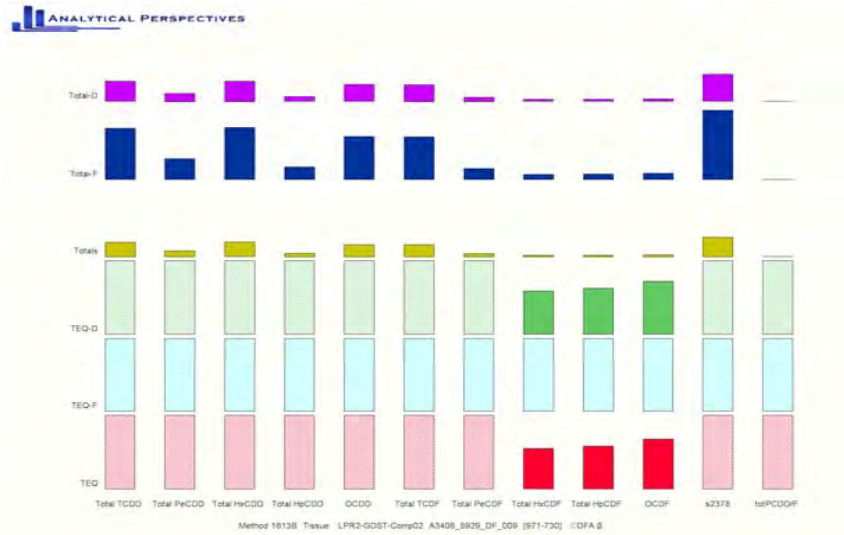

ANALYTICAL PERSPECTIVES
sTEQD/F
sTEQF
sTEQD
tPCDD/F
tPCDF
tPCDD
hmg
s(2378)D/F
s(2378)F
s(2378)D
TCDD PeCDD HxCDD HxCDD HxCDD HpCDD OCDD TCDF PeCDF PeCDF HxCDF HxCDF HxCDF HxCDF HpCDF HpCDF OCDF
Method 1613B Tissue LPR1-GDST-Comp01 A3406_8929_DF_007 [280-302] ©DFA α


ANALYTICAL PERSPECTIVES
Total-D
Total-F
Totals
TEQ-D
TEQ-F
TEQ
Total TCDD Total PeCDD Total HxCDD Total HpCDD OCDD Total TCDF Total PeCDF Total HxCDF Total HpCDF OCDF s2378 totPCDD/F
Method 1613B Tissue LPR1-GDST-Comp01 A3406_8929_DF_007 [280-302] ©DFA β

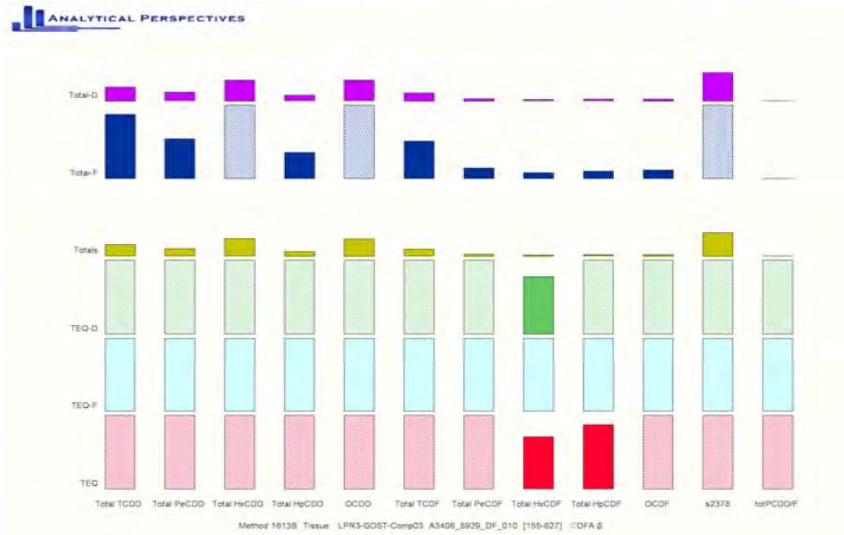

ANALYTICAL PERSPECTIVES
sTEQD/F
sTEQF
sTEQD
tPCDD/F
tPCDF
tPCDD
hmg
s(2378)D/F
s(2378)F
s(2378)D
TCDD PeCDD HxCDD HxCDD HxCDD HpCDD OCDD TCDF PeCDF PeCDF HxCDF HxCDF HxCDF HxCDF HpCDF HpCDF OCDF
Method 1613B Tissue LPRSG-GDST-Comp01 A3406_8929_DF_008 [241-820] ©DFA α


ANALYTICAL PERSPECTIVES
Total-D
Total-F
Totals
TEQ-D
TEQ-F
TEQ
Total TCDD Total PeCDD Total HxCDD Total HpCDD OCDD Total TCDF Total PeCDF Total HxCDF Total HpCDF OCDF s2378 totPCDD/F
Method 1613B Tissue LPRSG-GDST-Comp01 A3406_8929_DF_008 [241-820] ©DFA β


ANALYTICAL PERSPECTIVES
sTEQD/F
sTEQF
sTEQD
tPCDD/F
tPCDF
tPCDD
tmng
si2378D/F
si2378F
si2378D
TCDD PeCDD HxCDD HxCDD HxCDD HpCDD OCDD TCDF PeCDF PeCDF HxCDF HxCDF HxCDF HxCDF HpCDF HpCDF OCDF
Method 1613B Tissue LPR2-GOST-Comp02 A3406_8929_DF_009 [971-730] ©DFA


ANALYTICAL PERSPECTIVES
Total-D
Total-F
Totals
TEQ-D
TEQ-F
TEQ
Total TCDD Total PeCDD Total HxCDD Total HpCDD OCDD Total TCDF Total PeCDF Total HxCDF Total HpCDF OCDF s2378 totPCDD/F
Method 1613B Tissue LPR2-GOST-Comp02 A3406_8929_DF_009 [971-730] ©DFA

ANALYTICAL PERSPECTIVES
sTEQD/F
sTEQF
sTEQD
tPCDD/F
tPCDF
tPCDD
tmng
si2378D/F
si2378F
si2378D
TCDD PeCDD HxCDD HxCDD HxCDD HpCDD OCDD TCDF PeCDF PeCDF HxCDF HxCDF HxCDF HxCDF HpCDF HpCDF OCDF
Method 1613B Tissue LPR3-GOST-Comp03 A3406_8929_DF_010 [155-627] ©DFA


ANALYTICAL PERSPECTIVES
Total-D
Total-F
Totals
TEQ-D
TEQ-F
TEQ
Total TCDD Total PeCDD Total HxCDD Total HpCDD OCDD Total TCDF Total PeCDF Total HxCDF Total HpCDF OCDF s2378 totPCDD/F
Method 1613B Tissue LPR3-GOST-Comp03 A3406_8929_DF_010 [155-627] ©DFA

## CARP2 SRM

ANALYTICAL PERSPECTIVES

## Method 1613

**Project:** **A3406**

| Analyte | Conc. | Assigned Value | Lower QC Limit | UpperQC Limit | Measured value within QC limits (y/n)? | %D from Assigned value |
|---|---|---|---|---|---|---|
| | (pg/g) | (pg/g) | (pg/g) | (pg/g) | | |
| 2,3,7,8-TCDD | 7.93 | 7.4 | 6.7 | 8.1 | Y | 7% |
| 1,2,3,7,8-PeCDD | 4.46 | 5.3 | 4 | 6.6 | Y | -16% |
| 1,2,3,4,7,8-HxCDD | 1.61 | 1.6 | 1.3 | 1.9 | Y | 1% |
| 1,2,3,6,7,8-HxCDD | 5.06 | 5.8 | 5 | 6.6 | Y | -13% |
| 1,2,3,7,8,9-HxCDD | 0.723 | 0.78 | 0.66 | 0.9 | Y | -7% |
| 1,2,3,4,6,7,8-HpCDD | 6.53 | 6.4 | 5.5 | 7.3 | Y | 2% |
| OCDD | 7.32 | 9.4 | 7.7 | 11.1 | N | -22% |
| 2,3,7,8-TCDF | 17.5 | 18.2 | 16.6 | 19.8 | Y | -4% |
| 1,2,3,7,8-PeCDF | 6.23 | 5.6 | 5.3 | 5.9 | N | 11% |

T:\MS-MSD MDL OPR TRI spreadsheets

Reviewer KAM

Date 01 Sep 11

# Sample DUP

ANALYTICAL PERSPECTIVES

Method 1613B

## Sample ID: LPR6-ECST-Comp02

| Analyte | A3406_8929_DF_003 pg/g | A3406_8929_DF_003DUP (DUP) pg/g | RPD |
|---|---|---|---|
| | | | |
| 2,3,7,8-TCDD | 2.83 | 3.24 | 13.8% |
| 1,2,3,7,8-PeCDD | 0.05 | 0.07 | 29.7% |
| 1,2,3,4,7,8-HxCDD | 0.00 | 0.00 | |
| 1,2,3,6,7,8-HxCDD | 0.11 | 0.11 | 7.1% |
| 1,2,3,7,8,9-HxCDD | 0.13 | 0.12 | 5.2% |
| 1,2,3,4,6,7,8-HpCDD | 0.62 | 0.97 | 44.0% |
| OCDD | 5.39 | 8.13 | 40.5% |
| | | | |
| 2,3,7,8-TCDF | 0.43 | 0.48 | 11.5% |
| 1,2,3,7,8-PeCDF | 0.07 | 0.07 | 0.2% |
| 2,3,4,7,8-PeCDF | 0.21 | 0.26 | 18.8% |
| 1,2,3,4,7,8-HxCDF | 0.13 | 0.14 | 7.3% |
| 1,2,3,6,7,8-HxCDF | 0.1 | 0.1 | 12.7% |
| 2,3,4,6,7,8-HxCDF | 0.08 | 0.09 | 11.3% |
| 1,2,3,7,8,9-HxCDF | 0.0 | 0.0 | |
| 1,2,3,4,6,7,8-HpCDF | 0.5 | 0.5 | 0.7% |
| 1,2,3,4,7,8,9-HpCDF | 0.0 | 0.0 | |
| OCDF | 0.6 | 0.7 | 8.3% |
| | | | |
| **Totals** | | | |
| | | | |
| Total TCDD | 5.80 | 6.91 | 17.5% |
| Total PeCDD | 0.43 | 0.61 | 34.0% |
| Total HxCDD | 0.65 | 0.81 | 21.3% |
| Total HpCDD | 1.23 | 1.96 | 46.2% |
| | | | |
| Total TCDF | 8.27 | 9.49 | 13.7% |
| Total PeCDF | 2.61 | 3.31 | 23.8% |
| Total HxCDF | 0.97 | 1.28 | 27.8% |
| Total HpCDF | 0.80 | 0.89 | 10.9% |

Note: EMPC values used whenever available

Reviewer KAM

Date 01 Sep 11

# Sample ID: Method Blank — Method 1613B

| Client Data | | Sample Data | | Laboratory Data | | | |
|---|---|---|---|---|---|---|---|
| Name: | Windward Environmental, LLC | Matrix: | Tissue | Lab Project ID: | A3406 | Date Received: | n/a |
| Project ID: | Passaic RI/FS Caged Bivalve Study | Weight/Volume: | 10.00 g | Lab Sample ID | MB1_8929_DF_SDS | Date Extracted: | 15-Aug-2011 |
| Date Collected: | n/a | | | QC Batch No: | 8929 | Date Analyzed: | 19-Aug-2011 |
| | | Split: | - | Dilution: | - | Time Analyzed: | 16:45:54 |

| Analyte | Conc. (pg/g) | DL (pg/g) | EMPC (pg/g) | Qualifiers | Standard | ES Recoveries | Qualifiers |
|---|---|---|---|---|---|---|---|
| 2378-TCDD | ND | 0.0286 | | | ES 2378-TCDD | 82 | |
| 12378-PeCDD | ND | 0.0253 | | | ES 12378-PeCDD | 86.2 | |
| 123478-HxCDD | ND | 0.0264 | | | ES 123478-HxCDD | 90 | |
| 123678-HxCDD | ND | 0.0268 | | | ES 123678-HxCDD | 91.5 | |
| 123789-HxCDD | 0.0913 | | | J | ES 123789-HxCDD | 92.3 | |
| 1234678-HpCDD | ND | 0.0307 | | | ES 1234678-HpCDD | 89 | |
| OCDD | 0.196 | | | J | ES OCDD | 82.9 | |
| | | | | | | | |
| 2378-TCDF | ND | 0.032 | | | ES 2378-TCDF | 59.8 | |
| 12378-PeCDF | ND | 0.0181 | | | ES 12378-PeCDF | 86.6 | |
| 23478-PeCDF | ND | 0.0171 | | | ES 23478-PeCDF | 86.9 | |
| 123478-HxCDF | ND | 0.0174 | | | ES 123478-HxCDF | 91.7 | |
| 123678-HxCDF | ND | 0.0162 | | | ES 123678-HxCDF | 91.6 | |
| 234678-HxCDF | ND | 0.0174 | | | ES 234678-HxCDF | 92 | |
| 123789-HxCDF | ND | 0.0229 | | | ES 123789-HxCDF | 90.6 | |
| 1234678-HpCDF | 0.0262 | | | J | ES 1234678-HpCDF | 91.7 | |
| 1234789-HpCDF | ND | 0.0201 | | | ES 1234789-HpCDF | 89.9 | |
| OCDF | EMPC | | 0.0564 | J | ES OCDF | 85.9 | |
| **Totals** | | | | | **Standard** | **CS/AS Recoveries** | |
| | | | | | CS 37Cl-2378-TCDD | 88.7 | |
| Total TCDD | 0.0576 | | 0.0576 | | CS 12347-PeCDD | 94.4 | |
| Total PeCDD | ND | 0.0253 | ND | | CS 12346-PeCDF | 94.7 | |
| Total HxCDD | 0.0913 | | 0.0913 | | CS 123469-HxCDF | 99.5 | |
| Total HpCDD | 0.0327 | | 0.0327 | | CS 1234689-HpCDF | 97.5 | |
| | | | | | AS 1368-TCDD | 67.3 | |
| Total TCDF | ND | 0.032 | ND | | AS 1368-TCDF | 76 | |
| Total PeCDF | ND | 0.0176 | ND | | | | |
| Total HxCDF | 0.028 | | 0.028 | | | | |
| Total HpCDF | 0.0262 | | 0.0262 | | | | |
| **Total PCDD/Fs** | **0.432** | | **0.488** | | | | |
| **ITEF TEQs** | | | | | | | |
| TEQ: ND=0 | 0.00958 | | 0.00964 | | | | |
| TEQ: ND=DL/2 | 0.0432 | 0.0353 | 0.0432 | | | | |
| TEQ: ND=DL | 0.0768 | 0.0705 | 0.0768 | | | | |

ANALYTICAL PERSPECTIVES
2714 Exchange Drive
Wilmington, NC 28405 , USA
info@ultratrace.com
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www.ultratrace.com

# Sample ID: Method Blank — Method 1613B

| Client Data | | Sample Data | | Laboratory Data | | | |
|---|---|---|---|---|---|---|---|
| Name: | Windward Environmental, LLC | Matrix: | Tissue | Lab Project ID: | A3406 | Date Received: | n/a |
| Project ID: | Passaic RI/FS Caged Bivalve Study | Weight/Volume: | 10.00 g | Lab Sample ID: | MB1_8929_DF_SDS | Date Extracted: | 15-Aug-2011 |
| Date Collected: | n/a | | | QC Batch No.: | 8929 | Date Analyzed: | 19-Aug-2011 |
| | | Split: | - | Dilution: | - | Time Analyzed: | 16:45:54 |

| Tetra-Dioxins | Conc. (pg/g) | Qualifiers | Penta-Dioxins | Conc. (pg/g) | Qualifiers | Hexa-Dioxins | Conc (pg/g) | Qualifiers | Hepta-Dioxins | Conc (pg/g) | Qualifiers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1368D | 0.0576 | J | 12479/12468D | (0.0253) | | 124679/124689D | (0.028) | | 1234679D | 0.0327 | J |
| 1379D | (0.0286) | | 12469D | (0.0253) | | 123468D | (0.028) | | 1234678D | (0.0307) | |
| 1369D | (0.0286) | | 12368D | (0.0253) | | 123679/123689D | (0.028) | | | | |
| 1469D | (0.0286) | | 12478D | (0.0253) | | 123469D | (0.028) | | | | |
| 1247D...[4] | (0.0286) | | 12379D | (0.0253) | | 123478D | (0.0264) | | | | |
| 1378D | (0.0286) | | 12369D...[3] | (0.0253) | | 123678D | (0.0268) | | | | |
| 1268D | (0.0286) | | 12346/12347D | (0.0253) | | 123467D | (0.028) | | | | |
| 1478D | (0.0286) | | 12378D | (0.0253) | | 123789D | 0.0913 | J | **Conc.** | 0.0327 | |
| 1279D | (0.0286) | | 12367D | (0.0253) | | | | | **EMPC** | 0.0327 | |
| 1234/1269D | (0.0286) | | 12389D | (0.0253) | | | | | | | |
| 1236D | (0.0286) | | | | | | | | **Octa-Dioxin** | **Conc (pg/g)** | **Qualifiers** |
| 1237/1238D | (0.0286) | | | | | | | | | | |
| 1239D | (0.0286) | | | | | | | | OCDD | 0.196 | J |
| 2378D | (0.0286) | | | | | | | | | | |
| 1278D | (0.0286) | | | | | | | | | | |
| 1267D | (0.0286) | | | | | | | | | | |
| 1289D | (0.0286) | | | | | | | | | | |
| **Conc.** | 0.0576 | | **Conc.** | 0 | | **Conc.** | 0.0913 | | | | |
| **EMPC** | 0.0576 | | **EMPC** | 0 | | **EMPC** | 0.0913 | | | | |


ANALYTICAL PERSPECTIVES

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www.ultratrace.com


| ITEF TEQs | Conc. | EMPC |
|---|---|---|
| TEQ: ND=0 | 0.00958 | 0.00964 |
| TEQ: ND=DL/2 | 0.0432 | 0.0432 |
| TEQ: ND=DL | 0.0768 | 0.0768 |

| | Conc. | EMPC |
|---|---|---|
| **Total PCDD/Fs** | 0.432 | 0.488 |

Checkcode: 609-462-TFS

Report Created: 25-Aug-2011 10:31 Analyst: AP

# Sample ID: Method Blank — Method 1613B

| Client Data | | Sample Data | | Laboratory Data | | | |
|---|---|---|---|---|---|---|---|
| Name: | Windward Environmental, LLC | Matrix: | Tissue | Lab Project ID: | A3406 | Date Received: | n/a |
| Project ID: | Passaic RI/FS Caged Bivalve Study | Weight/Volume: | 10.00 g | Lab Sample ID: | MB1_8929_DF_SDS | Date Extracted: | 15 Aug 2011 |
| Date Collected: | n/a | | | QC Batch No.: | 8929 | Date Analyzed: | 19 Aug 2011 |
| | | Split: | - | Dilution: | - | Time Analyzed: | 16:45:54 |

| Tetra-Furans | Conc. (pg/g) | Qualifiers | Penta-Furans | Conc. (pg/g) | Qualifiers | Hexa-Furans | Conc (pg/g) | Qualifiers | Hepta-Furans | Conc (pg/g) | Qualifiers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1368F | (0.032) | | 13468/12468F | (0.0164) | | 123468F | 0.028 | J | 1234678F | 0.0262 | J |
| 1468F | (0.032) | | 13678F...[3] | (0.0176) | | 124678/134678F | (0.0182) | | 1234679F | (0.0165) | |
| 2468F | (0.032) | | 12368F...[3] | (0.0176) | | 134679F | (0.0182) | | 1234689F | (0.0165) | |
| 1346/1246F | (0.032) | | 14678F | (0.0176) | | 124679F | (0.0182) | | 1234789F | (0.0201) | |
| 1347F...[3] | (0.032) | | 13479F | (0.0176) | | 124689F | (0.0182) | | | | |
| 1348F | (0.032) | | 13469/12479F | (0.0176) | | 123467F | (0.0182) | | | | |
| 1248F...[3] | (0.032) | | 12346F | (0.0176) | | 123478F | (0.0174) | | | | |
| 1268F | (0.032) | | 23468/12469F | (0.0176) | | 123678F | (0.0162) | | | | |
| 1467F | (0.032) | | 12347F | (0.0176) | | 123479F | (0.0182) | | | | |
| 1478F | (0.032) | | 12348F | (0.0176) | | 123469F | (0.0182) | | | | |
| 1369/1237F | (0.032) | | 12378F | (0.0181) | | 123679F | (0.0182) | | | | |
| 2467F | (0.032) | | 12678/12367F | (0.0176) | | 234678F | (0.0174) | | **Conc.** | 0.0262 | |
| 2368F | (0.032) | | 12379F | (0.0176) | | 234678/123689F | (0.0174) | | **EMPC** | 0.0262 | |
| 1238F...[5] | (0.032) | | 12679F | (0.0176) | | 123689F | (0.0182) | | | | |
| 1278F | (0.032) | | 23467/12369F | (0.0176) | | 123789F | (0.0229) | | **Octa-Furan** | **Conc (pg/g)** | **Qualifiers** |
| 1349F | (0.032) | | 23478F | (0.0171) | | 123789/123489F | (0.0229) | | | | |
| 1267F | (0.032) | | 23478/12489F | (0.0171) | | 123489F | (0.0182) | | OCDF | [0.0564] | J |
| 2346/1249F | (0.032) | | 12489F | (0.0176) | | | | | | | |
| 2347/1279F | (0.032) | | 12349F | (0.0176) | | | | | | | |
| 2348F | (0.032) | | 12389F | (0.0176) | | | | | | | |
| 2378F | (0.032) | | | | | | | | | | |
| 2367/3467F | (0.032) | | | | | | | | | | |
| 1269F | (0.032) | | | | | | | | | | |
| 1239F | (0.032) | | | | | | | | | | |
| 1289F | (0.032) | | | | | | | | | | |
| **Conc.** | 0 | | **Conc.** | 0 | | **Conc.** | 0.028 | | | | |
| **EMPC** | 0 | | **EMPC** | 0 | | **EMPC** | 0.028 | | | | |

Checkcode: 609-462-TFS

Report Created: 25-Aug-2011 10:31 Analyst: AP

# Sample ID: Method Blank — TEQ Summary — Method 1613B

| | | | | | |
|---|---|---|---|---|---|
| Client Project Name: | Windward Environmental, LLC | Matrix: | Tissue | Lab Sample ID: | MB1_8929_DF_SDS |
| Cliend Project ID: | Passaic RI/FS Caged Bivalve Study | Weight/Volume: | 10.00 g | QC Batch No.: | 8929 |
| Date Collected: | n/a | Split: | - | Date Extracted: | 15-Aug-2011 |
| Date Received: | n/a | Dilution: | - | Date Analyzed: | 19-Aug-2011 16:45 |
| Lab Project No: | A3406 | Units | pg/g | | |

| Analyte | Result | Qualifiers | DLs | I-TEQ | WHO-1998 | WHO-2005 |
|---|---|---|---|---|---|---|
| 2378-TCDD | (0.0286) | | 0.0286 | (0.0286) | (0.0286) | (0.0286) |
| 12378-PeCDD | (0.0253) | | 0.0253 | (0.0127) | (0.0253) | (0.0253) |
| 123478-HxCDD | (0.0264) | | 0.0264 | (0.00264) | (0.00264) | (0.00264) |
| 123678-HxCDD | (0.0268) | | 0.0268 | (0.00268) | (0.00268) | (0.00268) |
| 123789-HxCDD | 0.0913 | J | 0.0311 | 0.00913 | 0.00913 | 0.00913 |
| 1234678-HpCDD | (0.0307) | | 0.0307 | (0.000307) | (0.000307) | (0.000307) |
| OCDD | 0.196 | J | 0.0585 | 0.000196 | 0.0000196 | 0.0000588 |
| | | | | | | |
| 2378-TCDF | (0.032) | | 0.032 | (0.0032) | (0.0032) | (0.0032) |
| 12378-PeCDF | (0.0181) | | 0.0181 | (0.000905) | (0.000905) | (0.000543) |
| 23478-PeCDF | (0.0171) | | 0.0171 | (0.00855) | (0.00855) | (0.00513) |
| 123478-HxCDF | (0.0174) | | 0.0174 | (0.00174) | (0.00174) | (0.00174) |
| 123678-HxCDF | (0.0162) | | 0.0162 | (0.00162) | (0.00162) | (0.00162) |
| 234678-HxCDF | (0.0174) | | 0.0174 | (0.00174) | (0.00174) | (0.00174) |
| 123789-HxCDF | (0.0229) | | 0.0229 | (0.00229) | (0.00229) | (0.00229) |
| 1234678-HpCDF | 0.0262 | J | 0.0137 | 0.000262 | 0.000262 | 0.000262 |
| 1234789-HpCDF | (0.0201) | | 0.0201 | (0.000201) | (0.000201) | (0.000201) |
| OCDF | [0.0564] | J | 0.0583 | [0.0000564] | [0.00000564] | [0.0000169] |

| TEQ Summaries | | | |
|---|---|---|---|
| EMPC = 0, ND = 0 | 0.00958 | 0.00941 | 0.00945 |
| EMPC = 0, ND = DL / 2 | 0.0432 | 0.0493 | 0.0475 |
| EMPC = 0, ND = DL | 0.0768 | 0.0892 | 0.0855 |
| EMPC = 0, < J-level = 0 | 0 | 0 | 0 |
| | | | |
| EMPC = EMPC, ND = 0 | 0.00964 | 0.00941 | 0.00946 |
| EMPC = EMPC, ND = DL / 2 | 0.0432 | 0.0493 | 0.0475 |
| EMPC = EMPC, ND = DL | 0.0768 | 0.0892 | 0.0855 |
| EMPC = EMPC, < J-level = 0 | 0.0000564 | 0.00000564 | 0.0000169 |

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# Sample ID: LPR6-ECST-Comp01 — Method 1613B

| Client Data | | Sample Data | | Laboratory Data | | | |
|---|---|---|---|---|---|---|---|
| Name: | Windward Environmental, LLC | Matrix: | Tissue | Lab Project ID: | A3406 | Date Received: | 02-Aug-2011 |
| Project ID: | Passaic RI/FS Caged Bivalve Study | Weight/Volume: | 10.11 g | Lab Sample ID | A3406_8929_DF_001 | Date Extracted: | 15-Aug-2011 |
| Date Collected: | 08-Jun-2011 | | | QC Batch No: | 8929 | Date Analyzed: | 19-Aug-2011 |
| | | Split: | - | Dilution: | - | Time Analyzed: | 17:32:54 |

| Analyte | Conc. (pg/g) | DL (pg/g) | EMPC (pg/g) | Qualifiers | Standard | ES Recoveries | Qualifiers |
|---|---|---|---|---|---|---|---|
| 2378-TCDD | 2.12 | | | | ES 2378-TCDD | 67 | |
| 12378-PeCDD | 0.0581 | | | J | ES 12378-PeCDD | 70.5 | |
| 123478-HxCDD | ND | 0.0667 | | | ES 123478-HxCDD | 75.7 | |
| 123678-HxCDD | 0.101 | | | J | ES 123678-HxCDD | 75.7 | |
| 123789-HxCDD | 0.127 | | | J B | ES 123789-HxCDD | 77.2 | |
| 1234678-HpCDD | 0.508 | | | J | ES 1234678-HpCDD | 71.5 | |
| OCDD | 4.08 | | | J | ES OCDD | 65.8 | |
| | | | | | | | |
| 2378-TCDF | 0.366 | | | J | ES 2378-TCDF | 46.8 | |
| 12378-PeCDF | ND | 0.0404 | | | ES 12378-PeCDF | 70.5 | |
| 23478-PeCDF | 0.185 | | | J | ES 23478-PeCDF | 71 | |
| 123478-HxCDF | 0.101 | | | J | ES 123478-HxCDF | 76.3 | |
| 123678-HxCDF | 0.054 | | | J | ES 123678-HxCDF | 76.4 | |
| 234678-HxCDF | EMPC | | 0.0501 | J | ES 234678-HxCDF | 77.9 | |
| 123789-HxCDF | ND | 0.0475 | | | ES 123789-HxCDF | 76.6 | |
| 1234678-HpCDF | 0.258 | | | J B | ES 1234678-HpCDF | 73.5 | |
| 1234789-HpCDF | ND | 0.0536 | | | ES 1234789-HpCDF | 72.1 | |
| OCDF | 0.372 | | | J B | ES OCDF | 67.1 | |
| **Totals** | | | | | **Standard** | **CS/AS Recoveries** | |
| | | | | | CS 37Cl-2378-TCDD | 86.4 | |
| Total TCDD | 4.65 | | 4.77 | | CS 12347-PeCDD | 94.9 | |
| Total PeCDD | 0.0581 | | 0.275 | | CS 12346-PeCDF | 93.4 | |
| Total HxCDD | 0.595 | | 0.595 | | CS 123469-HxCDF | 101 | |
| Total HpCDD | 1.06 | | 1.06 | | CS 1234689-HpCDF | 97.4 | |
| | | | | | AS 1368-TCDD | 66.4 | |
| Total TCDF | 5.37 | | 6.43 | | AS 1368-TCDF | 73.9 | |
| Total PeCDF | 2.06 | | 2.11 | | | | |
| Total HxCDF | 0.598 | | 0.742 | | | | |
| Total HpCDF | 0.485 | | 0.485 | | | | |
| **Total PCDD/Fs** | **19.3** | | **20.9** | | | | |
| **ITEF TEQs** | | | | | | | |
| TEQ: ND=0 | 2.33 | | 2.33 | | | | |
| TEQ: ND=DL/2 | 2.34 | 0.0801 | 2.34 | | | | |
| TEQ: ND=DL | 2.34 | 0.16 | 2.35 | | | | |

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# Sample ID: LPR6-ECST-Comp01 — Method 1613B

| Client Data | | Sample Data | | Laboratory Data | | | |
|---|---|---|---|---|---|---|---|
| Name: | Windward Environmental, LLC | Matrix: | Tissue | Lab Project ID: | A3406 | Date Received: | 02-Aug-2011 |
| Project ID: | Passaic RI/FS Caged Bivalve Study | Weight/Volume: | 10.11 g | Lab Sample ID: | A3406_8929_DF_001 | Date Extracted: | 15-Aug-2011 |
| Date Collected: | 08-Jun-2011 | | | QC Batch No.: | 8929 | Date Analyzed: | 19-Aug-2011 |
| | | Split: | - | Dilution: | - | Time Analyzed: | 17:32:54 |

| Tetra-Dioxins | Conc. (pg/g) | Qualifiers | Penta-Dioxins | Conc. (pg/g) | Qualifiers | Hexa-Dioxins | Conc (pg/g) | Qualifiers | Hepta-Dioxins | Conc (pg/g) | Qualifiers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1368D | 0.412 | J B | 12479/12468D | [0.129] | J | 124679/124689D | 0.149 | J | 1234679D | 0.554 | J |
| 1379D | 0.153 | J | 12469D | (0.049) | | 123468D | (0.0702) | | 1234678D | 0.508 | J |
| 1369D | (0.0694) | | 12368D | [0.0882] | J | 123679/123689D | 0.217 | J | | | |
| 1469D | (0.0694) | | 12478D | (0.049) | | 123469D | (0.0702) | | | | |
| 1247D...[4] | (0.0694) | | 12379D | (0.049) | | 123478D | (0.0667) | | | | |
| 1378D | [0.118] | J | 12369D...[3] | (0.049) | | 123678D | 0.101 | J | | | |
| 1268D | (0.0694) | | 12346/12347D | (0.049) | | 123467D | (0.0702) | | | | |
| 1478D | (0.0694) | | 12378D | 0.0581 | J | 123789D | 0.127 | J B | **Conc.** | 1.06 | |
| 1279D | (0.0694) | | 12367D | (0.049) | | | | | **EMPC** | 1.06 | |
| 1234/1269D | (0.0694) | | 12389D | (0.049) | | | | | | | |
| 1236D | (0.0694) | | | | | | | | **Octa-Dioxin** | **Conc (pg/g)** | **Qualifiers** |
| 1237/1238D | 1.96 | | | | | | | | | | |
| 1239D | (0.0694) | | | | | | | | OCDD | 4.08 | J |
| 2378D | 2.12 | | | | | | | | | | |
| 1278D | (0.0694) | | | | | | | | | | |
| 1267D | (0.0694) | | | | | | | | | | |
| 1289D | (0.0694) | | | | | | | | | | |
| **Conc.** | 4.65 | | **Conc.** | 0.0581 | | **Conc.** | 0.595 | | | | |
| **EMPC** | 4.77 | | **EMPC** | 0.275 | | **EMPC** | 0.595 | | | | |


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| ITEF TEQs | Conc. | EMPC |
|---|---|---|
| TEQ: ND=0 | 2.33 | 2.33 |
| TEQ: ND=DL/2 | 2.34 | 2.34 |
| TEQ: ND=DL | 2.34 | 2.35 |

| | Conc. | EMPC |
|---|---|---|
| **Total PCDD/Fs** | 19.3 | 20.9 |

Checkcode: 846-088-JWM

Report Created: 25-Aug-2011 10:31 Analyst: AP

# Sample ID: LPR6-ECST-Comp01 — Method 1613B

| Client Data | | Sample Data | | Laboratory Data | | | |
|---|---|---|---|---|---|---|---|
| Name: | Windward Environmental, LLC | Matrix: | Tissue | Lab Project ID: | A3406 | Date Received: | 02 Aug 2011 |
| Project ID: | Passaic RI/FS Caged Bivalve Study | Weight/Volume: | 10.11 g | Lab Sample ID: | A3406_8929_DF_001 | Date Extracted: | 15 Aug 2011 |
| Date Collected: | 08 Jun 2011 | | | QC Batch No.: | 8929 | Date Analyzed: | 19 Aug 2011 |
| | | Split: | - | Dilution: | - | Time Analyzed: | 17:32:54 |

| Tetra-Furans | Conc. (pg/g) | Qualifiers | Penta-Furans | Conc. (pg/g) | Qualifiers | Hexa-Furans | Conc (pg/g) | Qualifiers | Hepta-Furans | Conc (pg/g) | Qualifiers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1368F | 0.171 | J | 13468/12468F | 0.465 | J | 123468F | [0.0942] | J B | 1234678F | 0.258 | J B |
| 1468F | 0.23 | J | 13678F...[3] | 0.235 | J | 124678/134678F | 0.265 | J | 1234679F | (0.0435) | |
| 2468F | 0.762 | | 12368F...[3] | 0.503 | J | 134679F | (0.0374) | | 1234689F | 0.228 | J |
| 1346/1246F | 0.173 | J | 14678F | 0.0549 | J | 124679F | (0.0374) | | 1234789F | (0.0536) | |
| 1347F...[3] | 0.322 | J | 13479F | (0.0389) | | 124689F | 0.178 | J | | | |
| 1348F | 0.201 | J | 13469/12479F | (0.0389) | | 123467F | (0.0374) | | | | |
| 1248F...[3] | 0.605 | | 12346F | (0.0389) | | 123478F | 0.101 | J | | | |
| 1268F | 0.247 | J | 23468/12469F | 0.447 | J | 123678F | 0.054 | J | | | |
| 1467F | 0.257 | J | 12347F | (0.0389) | | 123479F | (0.0374) | | | | |
| 1478F | 0.257 | J | 12348F | 0.0733 | J | 123469F | (0.0374) | | | | |
| 1369/1237F | (0.0742) | | 12378F | (0.0404) | | 123679F | (0.0374) | | | | |
| 2467F | [0.192] | J | 12678/12367F | 0.1 | J | 234678F | [0.0501] | J | **Conc.** | 0.485 | |
| 2368F | 0.496 | | 12379F | (0.0389) | | 234678/123689F | (0.0335) | | **EMPC** | 0.485 | |
| 1238F...[5] | 0.465 | J | 12679F | (0.0389) | | 123689F | (0.0374) | | | | |
| 1278F | [0.22] | J | 23467/12369F | [0.0507] | J | 123789F | (0.0475) | | **Octa-Furan** | **Conc (pg/g)** | **Qualifiers** |
| 1349F | (0.0742) | | 23478F | 0.185 | J | 123789/123489F | (0.0475) | | | | |
| 1267F | (0.0742) | | 23478/12489F | (0.0375) | | 123489F | (0.0374) | | OCDF | 0.372 | J B |
| 2346/1249F | 0.229 | J | 12489F | (0.0389) | | | | | | | |
| 2347/1279F | [0.101] | J | 12349F | (0.0389) | | | | | | | |
| 2348F | [0.545] | | 12389F | (0.0389) | | | | | | | |
| 2378F | 0.366 | J | | | | | | | | | |
| 2367/3467F | 0.517 | | | | | | | | | | |
| 1269F | (0.0742) | | | | | | | | | | |
| 1239F | (0.0742) | | | | | | | | | | |
| 1289F | 0.0705 | J | | | | | | | | | |
| **Conc.** | 5.37 | | **Conc.** | 2.06 | | **Conc.** | 0.598 | | | | |
| **EMPC** | 6.43 | | **EMPC** | 2.11 | | **EMPC** | 0.742 | | | | |

Checkcode: 846-088-JWM

Report Created: 25-Aug-2011 10:31 Analyst: AP

# Sample ID: LPR6-ECST-Comp01 — TEQ Summary — Method 1613B

| | | | | | |
|---|---|---|---|---|---|
| Client Project Name: | Windward Environmental, LLC | Matrix: | Tissue | Lab Sample ID: | A3406_8929_DF_001 |
| Cliend Project ID: | Passaic RI/FS Caged Bivalve Study | Weight/Volume: | 10.11 g | QC Batch No.: | 8929 |
| Date Collected: | 08-Jun-2011 | Split: | - | Date Extracted: | 15-Aug-2011 |
| Date Received: | 02-Aug-2011 | Dilution: | - | Date Analyzed: | 19-Aug-2011 17:32 |
| Lab Project No: | A3406 | Units | pg/g | | |

| Analyte | Result | Qualifiers | DLs | I-TEQ | WHO-1998 | WHO-2005 |
|---|---|---|---|---|---|---|
| 2378-TCDD | 2.12 | | 0.0694 | 2.12 | 2.12 | 2.12 |
| 12378-PeCDD | 0.0581 | J | 0.049 | 0.0291 | 0.0581 | 0.0581 |
| 123478-HxCDD | (0.0667) | | 0.0667 | (0.00667) | (0.00667) | (0.00667) |
| 123678-HxCDD | 0.101 | J | 0.0676 | 0.0101 | 0.0101 | 0.0101 |
| 123789-HxCDD | 0.127 | J B | 0.0772 | 0.0127 | 0.0127 | 0.0127 |
| 1234678-HpCDD | 0.508 | J | 0.068 | 0.00508 | 0.00508 | 0.00508 |
| OCDD | 4.08 | J | 0.124 | 0.00408 | 0.000408 | 0.00122 |
| | | | | | | |
| 2378-TCDF | 0.366 | J | 0.0742 | 0.0366 | 0.0366 | 0.0366 |
| 12378-PeCDF | (0.0404) | | 0.0404 | (0.00202) | (0.00202) | (0.00121) |
| 23478-PeCDF | 0.185 | J | 0.0375 | 0.0926 | 0.0926 | 0.0555 |
| 123478-HxCDF | 0.101 | J | 0.0357 | 0.0101 | 0.0101 | 0.0101 |
| 123678-HxCDF | 0.054 | J | 0.0347 | 0.0054 | 0.0054 | 0.0054 |
| 234678-HxCDF | [0.0501] | J | 0.0335 | [0.00501] | [0.00501] | [0.00501] |
| 123789-HxCDF | (0.0475) | | 0.0475 | (0.00475) | (0.00475) | (0.00475) |
| 1234678-HpCDF | 0.258 | J B | 0.0356 | 0.00258 | 0.00258 | 0.00258 |
| 1234789-HpCDF | (0.0536) | | 0.0536 | (0.000536) | (0.000536) | (0.000536) |
| OCDF | 0.372 | J B | 0.108 | 0.000372 | 0.0000372 | 0.000112 |

| TEQ Summaries | | | |
|---|---|---|---|
| EMPC = 0, ND = 0 | 2.33 | 2.35 | 2.32 |
| EMPC = 0, ND = DL / 2 | 2.34 | 2.36 | 2.32 |
| EMPC = 0, ND = DL | 2.34 | 2.37 | 2.33 |
| EMPC = 0, < J-level = 0 | 2.12 | 2.12 | 2.12 |
| | | | |
| EMPC = EMPC, ND = 0 | 2.33 | 2.36 | 2.32 |
| EMPC = EMPC, ND = DL / 2 | 2.34 | 2.36 | 2.33 |
| EMPC = EMPC, ND = DL | 2.35 | 2.37 | 2.33 |
| EMPC = EMPC, < J-level = 0 | 2.12 | 2.12 | 2.12 |

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# Sample ID: LPRBG-ECST-Comp01 — Method 1613B

| Client Data | | Sample Data | | Laboratory Data | | | |
|---|---|---|---|---|---|---|---|
| Name: | Windward Environmental, LLC | Matrix: | Tissue | Lab Project ID: | A3406 | Date Received: | 02-Aug-2011 |
| Project ID: | Passaic RI/FS Caged Bivalve Study | Weight/Volume: | 10.25 g | Lab Sample ID | A3406_8929_DF_002 | Date Extracted: | 15-Aug-2011 |
| Date Collected: | 09-Mar-2011 | | | QC Batch No: | 8929 | Date Analyzed: | 19-Aug-2011 |
| | | Split: | - | Dilution: | - | Time Analyzed: | 18:20:30 |

| Analyte | Conc. (pg/g) | DL (pg/g) | EMPC (pg/g) | Qualifiers | Standard | ES Recoveries | Qualifiers |
|---|---|---|---|---|---|---|---|
| 2378-TCDD | ND | 0.0471 | | | ES 2378-TCDD | 70.7 | |
| 12378-PeCDD | EMPC | | 0.0317 | J | ES 12378-PeCDD | 80.1 | |
| 123478-HxCDD | ND | 0.0354 | | | ES 123478-HxCDD | 83 | |
| 123678-HxCDD | EMPC | | 0.0549 | J | ES 123678-HxCDD | 80.6 | |
| 123789-HxCDD | EMPC | | 0.0873 | J B | ES 123789-HxCDD | 81.3 | |
| 1234678-HpCDD | 0.369 | | | J | ES 1234678-HpCDD | 77.5 | |
| OCDD | 5.44 | | | | ES OCDD | 74.1 | |
| | | | | | | | |
| 2378-TCDF | ND | 0.057 | | | ES 2378-TCDF | 44.7 | |
| 12378-PeCDF | ND | 0.026 | | | ES 12378-PeCDF | 80.6 | |
| 23478-PeCDF | EMPC | | 0.0347 | J | ES 23478-PeCDF | 80.4 | |
| 123478-HxCDF | 0.0273 | | | J | ES 123478-HxCDF | 83.8 | |
| 123678-HxCDF | ND | 0.0208 | | | ES 123678-HxCDF | 81.9 | |
| 234678-HxCDF | EMPC | | 0.0269 | J | ES 234678-HxCDF | 83.1 | |
| 123789-HxCDF | ND | 0.0286 | | | ES 123789-HxCDF | 83.4 | |
| 1234678-HpCDF | 0.0863 | | | J B | ES 1234678-HpCDF | 80.3 | |
| 1234789-HpCDF | ND | 0.0231 | | | ES 1234789-HpCDF | 79.9 | |
| OCDF | 0.105 | | | J B | ES OCDF | 75.8 | |
| **Totals** | | | | | **Standard** | **CS/AS Recoveries** | |
| | | | | | CS 37Cl-2378-TCDD | 80.8 | |
| Total TCDD | 0.115 | | 0.115 | | CS 12347-PeCDD | 92.2 | |
| Total PeCDD | 0.0779 | | 0.168 | | CS 12346-PeCDF | 92.3 | |
| Total HxCDD | 0.282 | | 0.425 | | CS 123469-HxCDF | 94.1 | |
| Total HpCDD | 0.765 | | 0.765 | | CS 1234689-HpCDF | 91.8 | |
| | | | | | AS 1368-TCDD | 55.8 | |
| Total TCDF | 0.262 | | 0.338 | | AS 1368-TCDF | 65.4 | |
| Total PeCDF | 0.129 | | 0.304 | | | | |
| Total HxCDF | 0.0712 | | 0.161 | | | | |
| Total HpCDF | 0.142 | | 0.142 | | | | |
| **Total PCDD/Fs** | **7.39** | | **7.97** | | | | |
| **ITEF TEQs** | | | | | | | |
| TEQ: ND=0 | 0.0128 | | 0.0629 | | | | |
| TEQ: ND=DL/2 | 0.0646 | 0.0532 | 0.0943 | | | | |
| TEQ: ND=DL | 0.116 | 0.106 | 0.126 | | | | |

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# Sample ID: LPRBG-ECST-Comp01 — Method 1613B

| Client Data | | Sample Data | | Laboratory Data | | | |
|---|---|---|---|---|---|---|---|
| Name: | Windward Environmental, LLC | Matrix: | Tissue | Lab Project ID: | A3406 | Date Received: | 02-Aug-2011 |
| Project ID: | Passaic RI/FS Caged Bivalve Study | Weight/Volume: | 10.25 g | Lab Sample ID: | A3406_8929_DF_002 | Date Extracted: | 15-Aug-2011 |
| Date Collected: | 09-Mar-2011 | | | QC Batch No.: | 8929 | Date Analyzed: | 19-Aug-2011 |
| | | Split: | - | Dilution: | - | Time Analyzed: | 18:20:30 |

| Tetra-Dioxins | Conc. (pg/g) | Qualifiers | Penta-Dioxins | Conc. (pg/g) | Qualifiers | Hexa-Dioxins | Conc (pg/g) | Qualifiers | Hepta-Dioxins | Conc (pg/g) | Qualifiers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1368D | 0.115 | J B | 12479/12468D | 0.0779 | J | 124679/124689D | 0.141 | J | 1234679D | 0.396 | J |
| 1379D | (0.0471) | | 12469D | [0.0585] | J | 123468D | (0.0372) | | 1234678D | 0.369 | J |
| 1369D | (0.0471) | | 12368D | (0.0385) | | 123679/123689D | 0.141 | J | | | |
| 1469D | (0.0471) | | 12478D | (0.0385) | | 123469D | (0.0372) | | | | |
| 1247D...[4] | (0.0471) | | 12379D | (0.0385) | | 123478D | (0.0354) | | | | |
| 1378D | (0.0471) | | 12369D...[3] | (0.0385) | | 123678D | [0.0549] | J | | | |
| 1268D | (0.0471) | | 12346/12347D | (0.0385) | | 123467D | (0.0372) | | | | |
| 1478D | (0.0471) | | 12378D | [0.0317] | J | 123789D | [0.0873] | J B | **Conc.** | 0.765 | |
| 1279D | (0.0471) | | 12367D | (0.0385) | | | | | **EMPC** | 0.765 | |
| 1234/1269D | (0.0471) | | 12389D | (0.0385) | | | | | | | |
| 1236D | (0.0471) | | | | | | | | **Octa-Dioxin** | **Conc (pg/g)** | **Qualifiers** |
| 1237/1238D | (0.0471) | | | | | | | | | | |
| 1239D | (0.0471) | | | | | | | | OCDD | 5.44 | |
| 2378D | (0.0471) | | | | | | | | | | |
| 1278D | (0.0471) | | | | | | | | | | |
| 1267D | (0.0471) | | | | | | | | | | |
| 1289D | (0.0471) | | | | | | | | | | |
| **Conc.** | 0.115 | | **Conc.** | 0.0779 | | **Conc.** | 0.282 | | | | |
| **EMPC** | 0.115 | | **EMPC** | 0.168 | | **EMPC** | 0.425 | | | | |

| ITEF TEQs | Conc. | EMPC |
|---|---|---|
| TEQ: ND=0 | 0.0128 | 0.0629 |
| TEQ: ND=DL/2 | 0.0646 | 0.0943 |
| TEQ: ND=DL | 0.116 | 0.126 |

| | Conc. | EMPC |
|---|---|---|
| **Total PCDD/Fs** | 7.39 | 7.97 |

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Checkcode: 862-387-YHY

Report Created: 25-Aug-2011 10:32 Analyst: AP

# Sample ID: LPRBG-ECST-Comp01 — Method 1613B

| Client Data | | Sample Data | | Laboratory Data | | | |
|---|---|---|---|---|---|---|---|
| Name: | Windward Environmental, LLC | Matrix: | Tissue | Lab Project ID: | A3406 | Date Received: | 02 Aug 2011 |
| Project ID: | Passaic RI/FS Caged Bivalve Study | Weight/Volume: | 10.25 g | Lab Sample ID: | A3406_8929_DF_002 | Date Extracted: | 15 Aug 2011 |
| Date Collected: | 09 Mar 2011 | | | QC Batch No.: | 8929 | Date Analyzed: | 19 Aug 2011 |
| | | Split: | - | Dilution: | - | Time Analyzed: | 18:20:30 |

| Tetra-Furans | Conc. (pg/g) | Qualifiers | Penta-Furans | Conc. (pg/g) | Qualifiers | Hexa-Furans | Conc (pg/g) | Qualifiers | Hepta-Furans | Conc (pg/g) | Qualifiers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1368F | (0.057) | | 13468/12468F | 0.078 | J | 123468F | (0.0228) | | 1234678F | 0.0863 | J B |
| 1468F | (0.057) | | 13678F...[3] | 0.0509 | J | 124678/134678F | [0.0626] | J | 1234679F | (0.0192) | |
| 2468F | 0.155 | J | 12368F...[3] | [0.0668] | J | 134679F | (0.0228) | | 1234689F | 0.0557 | J |
| 1346/1246F | (0.057) | | 14678F | (0.0247) | | 124679F | (0.0228) | | 1234789F | (0.0231) | |
| 1347F...[3] | (0.057) | | 13479F | (0.0247) | | 124689F | 0.0439 | J | | | |
| 1348F | (0.057) | | 13469/12479F | (0.0247) | | 123467F | (0.0228) | | | | |
| 1248F...[3] | (0.057) | | 12346F | (0.0247) | | 123478F | 0.0273 | J | | | |
| 1268F | (0.057) | | 23468/12469F | [0.0413] | J | 123678F | (0.0208) | | | | |
| 1467F | (0.057) | | 12347F | (0.0247) | | 123479F | (0.0228) | | | | |
| 1478F | (0.057) | | 12348F | (0.0247) | | 123469F | (0.0228) | | | | |
| 1369/1237F | (0.057) | | 12378F | (0.026) | | 123679F | (0.0228) | | | | |
| 2467F | [0.0762] | J | 12678/12367F | (0.0247) | | 234678F | [0.0269] | J | **Conc.** | 0.142 | |
| 2368F | (0.057) | | 12379F | (0.0247) | | 234678/123689F | (0.021) | | **EMPC** | 0.142 | |
| 1238F...[5] | (0.057) | | 12679F | (0.0247) | | 123689F | (0.0228) | | | | |
| 1278F | (0.057) | | 23467/12369F | [0.0327] | J | 123789F | (0.0286) | | **Octa-Furan** | **Conc (pg/g)** | **Qualifiers** |
| 1349F | (0.057) | | 23478F | [0.0347] | J | 123789/123489F | (0.0286) | | | | |
| 1267F | (0.057) | | 23478/12489F | (0.0234) | | 123489F | (0.0228) | | OCDF | 0.105 | J B |
| 2346/1249F | (0.057) | | 12489F | (0.0247) | | | | | | | |
| 2347/1279F | (0.057) | | 12349F | (0.0247) | | | | | | | |
| 2348F | (0.057) | | 12389F | (0.0247) | | | | | | | |
| 2378F | (0.057) | | | | | | | | | | |
| 2367/3467F | 0.106 | J | | | | | | | | | |
| 1269F | (0.057) | | | | | | | | | | |
| 1239F | (0.057) | | | | | | | | | | |
| 1289F | (0.057) | | | | | | | | | | |
| **Conc.** | 0.262 | | **Conc.** | 0.129 | | **Conc.** | 0.0712 | | | | |
| **EMPC** | 0.338 | | **EMPC** | 0.304 | | **EMPC** | 0.161 | | | | |

Checkcode: 862-387-YHY

Report Created: 25-Aug-2011 10:32 Analyst: AP

# Sample ID: LPRBG-ECST-Comp01 — TEQ Summary — Method 1613B

| | | | | | |
|---|---|---|---|---|---|
| Client Project Name: | Windward Environmental, LLC | Matrix: | Tissue | Lab Sample ID: | A3406_8929_DF_002 |
| Cliend Project ID: | Passaic RI/FS Caged Bivalve Study | Weight/Volume: | 10.25 g | QC Batch No.: | 8929 |
| Date Collected: | 09-Mar-2011 | Split: | - | Date Extracted: | 15-Aug-2011 |
| Date Received: | 02-Aug-2011 | Dilution: | - | Date Analyzed: | 19-Aug-2011 18:20 |
| Lab Project No: | A3406 | Units | pg/g | | |

| Analyte | Result | Qualifiers | DLs | I-TEQ | WHO-1998 | WHO-2005 |
|---|---|---|---|---|---|---|
| 2378-TCDD | (0.0471) | | 0.0471 | (0.0471) | (0.0471) | (0.0471) |
| 12378-PeCDD | [0.0317] | J | 0.0385 | [0.0159] | [0.0317] | [0.0317] |
| 123478-HxCDD | (0.0354) | | 0.0354 | (0.00354) | (0.00354) | (0.00354) |
| 123678-HxCDD | [0.0549] | J | 0.0357 | [0.00549] | [0.00549] | [0.00549] |
| 123789-HxCDD | [0.0873] | J B | 0.0409 | [0.00873] | [0.00873] | [0.00873] |
| 1234678-HpCDD | 0.369 | J | 0.0411 | 0.00369 | 0.00369 | 0.00369 |
| OCDD | 5.44 | | 0.0838 | 0.00544 | 0.000544 | 0.00163 |
| | | | | | | |
| 2378-TCDF | (0.057) | | 0.057 | (0.0057) | (0.0057) | (0.0057) |
| 12378-PeCDF | (0.026) | | 0.026 | (0.0013) | (0.0013) | (0.00078) |
| 23478-PeCDF | [0.0347] | J | 0.0234 | [0.0173] | [0.0173] | [0.0104] |
| 123478-HxCDF | 0.0273 | J | 0.0216 | 0.00273 | 0.00273 | 0.00273 |
| 123678-HxCDF | (0.0208) | | 0.0208 | (0.00208) | (0.00208) | (0.00208) |
| 234678-HxCDF | [0.0269] | J | 0.021 | [0.00269] | [0.00269] | [0.00269] |
| 123789-HxCDF | (0.0286) | | 0.0286 | (0.00286) | (0.00286) | (0.00286) |
| 1234678-HpCDF | 0.0863 | J B | 0.0162 | 0.000863 | 0.000863 | 0.000863 |
| 1234789-HpCDF | (0.0231) | | 0.0231 | (0.000231) | (0.000231) | (0.000231) |
| OCDF | 0.105 | J B | 0.0576 | 0.000105 | 0.0000105 | 0.0000314 |

| TEQ Summaries | | | |
|---|---|---|---|
| EMPC = 0, ND = 0 | 0.0128 | 0.00784 | 0.00895 |
| EMPC = 0, ND = DL / 2 | 0.0646 | 0.0692 | 0.0677 |
| EMPC = 0, ND = DL | 0.116 | 0.131 | 0.127 |
| EMPC = 0, < J-level = 0 | 0.00544 | 0.000544 | 0.00163 |
| | | | |
| EMPC = EMPC, ND = 0 | 0.0629 | 0.0738 | 0.068 |
| EMPC = EMPC, ND = DL / 2 | 0.0943 | 0.105 | 0.0991 |
| EMPC = EMPC, ND = DL | 0.126 | 0.137 | 0.13 |
| EMPC = EMPC, < J-level = 0 | 0.0555 | 0.0665 | 0.0607 |

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Checkcode: 862-387-YHY

# Sample ID: LPR6-ECST-Comp02 — Method 1613B

| Client Data | | Sample Data | | Laboratory Data | | | |
|---|---|---|---|---|---|---|---|
| Name: | Windward Environmental, LLC | Matrix: | Tissue | Lab Project ID: | A3406 | Date Received: | 02-Aug-2011 |
| Project ID: | Passaic RI/FS Caged Bivalve Study | Weight/Volume: | 10.17 g | Lab Sample ID | A3406_8929_DF_003 | Date Extracted: | 15-Aug-2011 |
| Date Collected: | 08-Jun-2011 | | | QC Batch No: | 8929 | Date Analyzed: | 19-Aug-2011 |
| | | Split: | - | Dilution: | - | Time Analyzed: | 19:08:09 |

| Analyte | Conc. (pg/g) | DL (pg/g) | EMPC (pg/g) | Qualifiers | Standard | ES Recoveries | Qualifiers |
|---|---|---|---|---|---|---|---|
| 2378-TCDD | 2.83 | | | | ES 2378-TCDD | 78.2 | |
| 12378-PeCDD | EMPC | | 0.0503 | J | ES 12378-PeCDD | 85.8 | |
| 123478-HxCDD | ND | 0.0576 | | | ES 123478-HxCDD | 89.8 | |
| 123678-HxCDD | 0.107 | | | J | ES 123678-HxCDD | 88.8 | |
| 123789-HxCDD | 0.128 | | | J B | ES 123789-HxCDD | 88.1 | |
| 1234678-HpCDD | 0.617 | | | J | ES 1234678-HpCDD | 82.7 | |
| OCDD | 5.39 | | | | ES OCDD | 77.9 | |
| | | | | | | | |
| 2378-TCDF | 0.43 | | | J | ES 2378-TCDF | 52.5 | |
| 12378-PeCDF | 0.0661 | | | J | ES 12378-PeCDF | 87.3 | |
| 23478-PeCDF | 0.213 | | | J | ES 23478-PeCDF | 86.2 | |
| 123478-HxCDF | 0.134 | | | J | ES 123478-HxCDF | 91.6 | |
| 123678-HxCDF | EMPC | | 0.0622 | J | ES 123678-HxCDF | 91 | |
| 234678-HxCDF | 0.0762 | | | J | ES 234678-HxCDF | 92 | |
| 123789-HxCDF | ND | 0.0416 | | | ES 123789-HxCDF | 92 | |
| 1234678-HpCDF | 0.507 | | | J | ES 1234678-HpCDF | 87.1 | |
| 1234789-HpCDF | ND | 0.0448 | | | ES 1234789-HpCDF | 87 | |
| OCDF | 0.618 | | | J | ES OCDF | 79.8 | |
| **Totals** | | | | | **Standard** | **CS/AS Recoveries** | |
| | | | | | CS 37Cl-2378-TCDD | 82.5 | |
| Total TCDD | 5.8 | | 5.8 | | CS 12347-PeCDD | 93.6 | |
| Total PeCDD | 0.384 | | 0.434 | | CS 12346-PeCDF | 92 | |
| Total HxCDD | 0.653 | | 0.653 | | CS 123469-HxCDF | 95.5 | |
| Total HpCDD | 1.23 | | 1.23 | | CS 1234689-HpCDF | 91.3 | |
| | | | | | AS 1368-TCDD | 63.9 | |
| Total TCDF | 7.34 | | 8.27 | | AS 1368-TCDF | 73.7 | |
| Total PeCDF | 2.26 | | 2.61 | | | | |
| Total HxCDF | 0.906 | | 0.969 | | | | |
| Total HpCDF | 0.802 | | 0.802 | | | | |
| **Total PCDD/Fs** | **25.4** | | **26.8** | | | | |
| **ITEF TEQs** | | | | | | | |
| TEQ: ND=0 | 3.04 | | 3.07 | | | | |
| TEQ: ND=DL/2 | 3.06 | 0.0736 | 3.08 | | | | |
| TEQ: ND=DL | 3.08 | 0.147 | 3.08 | | | | |

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# Sample ID: LPR6-ECST-Comp02 — Method 1613B

| Client Data | | Sample Data | | Laboratory Data | | | |
|---|---|---|---|---|---|---|---|
| Name: | Windward Environmental, LLC | Matrix: | Tissue | Lab Project ID: | A3406 | Date Received: | 02-Aug-2011 |
| Project ID: | Passaic RI/FS Caged Bivalve Study | Weight/Volume: | 10.17 g | Lab Sample ID: | A3406_8929_DF_003 | Date Extracted: | 15-Aug-2011 |
| Date Collected: | 08-Jun-2011 | | | QC Batch No.: | 8929 | Date Analyzed: | 19-Aug-2011 |
| | | Split: | - | Dilution: | - | Time Analyzed: | 19:08:09 |

| Tetra-Dioxins | Conc. (pg/g) | Qualifiers | Penta-Dioxins | Conc. (pg/g) | Qualifiers | Hexa-Dioxins | Conc (pg/g) | Qualifiers | Hepta-Dioxins | Conc (pg/g) | Qualifiers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1368D | 0.515 | B | 12479/12468D | 0.172 | J | 124679/124689D | 0.189 | J | 1234679D | 0.61 | J |
| 1379D | 0.192 | J | 12469D | (0.0579) | | 123468D | (0.0592) | | 1234678D | 0.617 | J |
| 1369D | (0.0614) | | 12368D | 0.136 | J | 123679/123689D | 0.23 | J | | | |
| 1469D | (0.0614) | | 12478D | 0.0764 | J | 123469D | (0.0592) | | | | |
| 1247D...[4] | (0.0614) | | 12379D | (0.0579) | | 123478D | (0.0576) | | | | |
| 1378D | 0.167 | J | 12369D...[3] | (0.0579) | | 123678D | 0.107 | J | | | |
| 1268D | (0.0614) | | 12346/12347D | (0.0579) | | 123467D | (0.0592) | | | | |
| 1478D | (0.0614) | | 12378D | [0.0503] | J | 123789D | 0.128 | J B | **Conc.** | 1.23 | |
| 1279D | (0.0614) | | 12367D | (0.0579) | | | | | **EMPC** | 1.23 | |
| 1234/1269D | (0.0614) | | 12389D | (0.0579) | | | | | | | |
| 1236D | (0.0614) | | | | | | | | **Octa-Dioxin** | **Conc (pg/g)** | **Qualifiers** |
| 1237/1238D | 2.1 | | | | | | | | | | |
| 1239D | (0.0614) | | | | | | | | OCDD | 5.39 | |
| 2378D | 2.83 | | | | | | | | | | |
| 1278D | (0.0614) | | | | | | | | | | |
| 1267D | (0.0614) | | | | | | | | | | |
| 1289D | (0.0614) | | | | | | | | | | |
| **Conc.** | 5.8 | | **Conc.** | 0.384 | | **Conc.** | 0.653 | | | | |
| **EMPC** | 5.8 | | **EMPC** | 0.434 | | **EMPC** | 0.653 | | | | |


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| ITEF TEQs | Conc. | EMPC |
|---|---|---|
| TEQ: ND=0 | 3.04 | 3.07 |
| TEQ: ND=DL/2 | 3.06 | 3.08 |
| TEQ: ND=DL | 3.08 | 3.08 |

| | Conc. | EMPC |
|---|---|---|
| **Total PCDD/Fs** | 25.4 | 26.8 |

Checkcode: 174-590-RDW

Report Created: 25-Aug-2011 10:32 Analyst: AP

# Sample ID: LPR6-ECST-Comp02 — Method 1613B

| Client Data | | Sample Data | | Laboratory Data | | | |
|---|---|---|---|---|---|---|---|
| Name: | Windward Environmental, LLC | Matrix: | Tissue | Lab Project ID: | A3406 | Date Received: | 02 Aug 2011 |
| Project ID: | Passaic RI/FS Caged Bivalve Study | Weight/Volume: | 10.17 g | Lab Sample ID: | A3406_8929_DF_003 | Date Extracted: | 15 Aug 2011 |
| Date Collected: | 08 Jun 2011 | | | QC Batch No.: | 8929 | Date Analyzed: | 19 Aug 2011 |
| | | Split: | - | Dilution: | - | Time Analyzed: | 19:08:09 |

| Tetra-Furans | Conc. (pg/g) | Qualifiers | Penta-Furans | Conc. (pg/g) | Qualifiers | Hexa-Furans | Conc (pg/g) | Qualifiers | Hepta-Furans | Conc (pg/g) | Qualifiers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1368F | 0.226 | J | 13468/12468F | 0.564 | J | 123468F | 0.112 | J B | 1234678F | 0.507 | J |
| 1468F | [0.269] | J | 13678F...[3] | [0.267] | J | 124678/134678F | 0.342 | J | 1234679F | (0.0373) | |
| 2468F | 0.961 | | 12368F...[3] | 0.561 | J | 134679F | (0.0331) | | 1234689F | 0.295 | J |
| 1346/1246F | 0.306 | J | 14678F | 0.0745 | J | 124679F | (0.0331) | | 1234789F | (0.0448) | |
| 1347F...[3] | [0.223] | J | 13479F | (0.0319) | | 124689F | 0.202 | J | | | |
| 1348F | 0.171 | J | 13469/12479F | (0.0319) | | 123467F | 0.0402 | J | | | |
| 1248F...[3] | 0.856 | | 12346F | (0.0319) | | 123478F | 0.134 | J | | | |
| 1268F | 0.337 | J | 23468/12469F | 0.534 | J | 123678F | [0.0622] | J | | | |
| 1467F | 0.3 | J | 12347F | (0.0319) | | 123479F | (0.0331) | | | | |
| 1478F | 0.297 | J | 12348F | [0.0769] | J | 123469F | (0.0331) | | | | |
| 1369/1237F | (0.066) | | 12378F | 0.0661 | J | 123679F | (0.0331) | | | | |
| 2467F | [0.231] | J | 12678/12367F | 0.133 | J | 234678F | 0.0762 | J | **Conc.** | 0.802 | |
| 2368F | 0.551 | | 12379F | (0.0319) | | 234678/123689F | (0.0306) | | **EMPC** | 0.802 | |
| 1238F...[5] | 0.697 | | 12679F | (0.0319) | | 123689F | (0.0331) | | | | |
| 1278F | 0.285 | J | 23467/12369F | 0.118 | J | 123789F | (0.0416) | | **Octa-Furan** | **Conc (pg/g)** | **Qualifiers** |
| 1349F | (0.066) | | 23478F | 0.213 | J | 123789/123489F | (0.0416) | | | | |
| 1267F | [0.0972] | J | 23478/12489F | (0.0313) | | 123489F | (0.0331) | | OCDF | 0.618 | J |
| 2346/1249F | 0.282 | J | 12489F | (0.0319) | | | | | | | |
| 2347/1279F | 0.118 | J | 12349F | (0.0319) | | | | | | | |
| 2348F | 0.872 | | 12389F | (0.0319) | | | | | | | |
| 2378F | 0.43 | J | | | | | | | | | |
| 2367/3467F | 0.654 | | | | | | | | | | |
| 1269F | (0.066) | | | | | | | | | | |
| 1239F | (0.066) | | | | | | | | | | |
| 1289F | [0.107] | J | | | | | | | | | |
| **Conc.** | 7.34 | | **Conc.** | 2.26 | | **Conc.** | 0.906 | | | | |
| **EMPC** | 8.27 | | **EMPC** | 2.61 | | **EMPC** | 0.969 | | | | |

Checkcode: 174-590-RDW

Report Created: 25-Aug-2011 10:32 Analyst: AP

# Sample ID: LPR6-ECST-Comp02 — TEQ Summary — Method 1613B

| | | | | | |
|---|---|---|---|---|---|
| Client Project Name: | Windward Environmental, LLC | Matrix: | Tissue | Lab Sample ID: | A3406_8929_DF_003 |
| Cliend Project ID: | Passaic RI/FS Caged Bivalve Study | Weight/Volume: | 10.17 g | QC Batch No.: | 8929 |
| Date Collected: | 08-Jun-2011 | Split: | - | Date Extracted: | 15-Aug-2011 |
| Date Received: | 02-Aug-2011 | Dilution: | - | Date Analyzed: | 19-Aug-2011 19:08 |
| Lab Project No: | A3406 | Units | pg/g | | |

| Analyte | Result | Qualifiers | DLs | I-TEQ | WHO-1998 | WHO-2005 |
|---|---|---|---|---|---|---|
| 2378-TCDD | 2.83 | | 0.0614 | 2.83 | 2.83 | 2.83 |
| 12378-PeCDD | [0.0503] | J | 0.0579 | [0.0251] | [0.0503] | [0.0503] |
| 123478-HxCDD | (0.0576) | | 0.0576 | (0.00576) | (0.00576) | (0.00576) |
| 123678-HxCDD | 0.107 | J | 0.0587 | 0.0107 | 0.0107 | 0.0107 |
| 123789-HxCDD | 0.128 | J B | 0.0618 | 0.0128 | 0.0128 | 0.0128 |
| 1234678-HpCDD | 0.617 | J | 0.0754 | 0.00617 | 0.00617 | 0.00617 |
| OCDD | 5.39 | | 0.124 | 0.00539 | 0.000539 | 0.00162 |
| | | | | | | |
| 2378-TCDF | 0.43 | J | 0.066 | 0.043 | 0.043 | 0.043 |
| 12378-PeCDF | 0.0661 | J | 0.0326 | 0.00331 | 0.00331 | 0.00198 |
| 23478-PeCDF | 0.213 | J | 0.0313 | 0.106 | 0.106 | 0.0638 |
| 123478-HxCDF | 0.134 | J | 0.0322 | 0.0134 | 0.0134 | 0.0134 |
| 123678-HxCDF | [0.0622] | J | 0.0293 | [0.00622] | [0.00622] | [0.00622] |
| 234678-HxCDF | 0.0762 | J | 0.0306 | 0.00762 | 0.00762 | 0.00762 |
| 123789-HxCDF | (0.0416) | | 0.0416 | (0.00416) | (0.00416) | (0.00416) |
| 1234678-HpCDF | 0.507 | J | 0.0313 | 0.00507 | 0.00507 | 0.00507 |
| 1234789-HpCDF | (0.0448) | | 0.0448 | (0.000448) | (0.000448) | (0.000448) |
| OCDF | 0.618 | J | 0.112 | 0.000618 | 0.0000618 | 0.000185 |

| TEQ Summaries | | | |
|---|---|---|---|
| EMPC = 0, ND = 0 | 3.04 | 3.04 | 2.99 |
| EMPC = 0, ND = DL / 2 | 3.06 | 3.07 | 3.03 |
| EMPC = 0, ND = DL | 3.08 | 3.11 | 3.06 |
| EMPC = 0, < J-level = 0 | 2.83 | 2.83 | 2.83 |
| | | | |
| EMPC = EMPC, ND = 0 | 3.07 | 3.09 | 3.05 |
| EMPC = EMPC, ND = DL / 2 | 3.08 | 3.1 | 3.05 |
| EMPC = EMPC, ND = DL | 3.08 | 3.1 | 3.06 |
| EMPC = EMPC, < J-level = 0 | 2.86 | 2.88 | 2.88 |

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# Sample ID: LPR6-ECST-Comp02-DUP — Method 1613B

| Client Data | | Sample Data | | Laboratory Data | | | |
|---|---|---|---|---|---|---|---|
| Name: | Windward Environmental, LLC | Matrix: | Tissue | Lab Project ID: | A3406 | Date Received: | 02-Aug-2011 |
| Project ID: | Passaic RI/FS Caged Bivalve Study | Weight/Volume: | 10.13 g | Lab Sample ID | A3406_8929_DF_003DUP | Date Extracted: | 15-Aug-2011 |
| Date Collected: | 08-Jun-2011 | | | QC Batch No: | 8929 | Date Analyzed: | 19-Aug-2011 |
| | | Split: | - | Dilution: | UP | Time Analyzed: | 19:55:48 |

| Analyte | Conc. (pg/g) | DL (pg/g) | EMPC (pg/g) | Qualifiers | Standard | ES Recoveries | Qualifiers |
|---|---|---|---|---|---|---|---|
| 2378-TCDD | 3.24 | | | | ES 2378-TCDD | 92.3 | |
| 12378-PeCDD | 0.0679 | | | J | ES 12378-PeCDD | 88.4 | |
| 123478-HxCDD | ND | 0.0479 | | | ES 123478-HxCDD | 90.9 | |
| 123678-HxCDD | 0.115 | | | J | ES 123678-HxCDD | 89.8 | |
| 123789-HxCDD | 0.121 | | | J B | ES 123789-HxCDD | 90 | |
| 1234678-HpCDD | 0.965 | | | J | ES 1234678-HpCDD | 88 | |
| OCDD | 8.13 | | | | ES OCDD | 84.6 | |
| | | | | | | | |
| 2378-TCDF | 0.482 | | | J | ES 2378-TCDF | 84.3 | |
| 12378-PeCDF | 0.0662 | | | J | ES 12378-PeCDF | 88.2 | |
| 23478-PeCDF | 0.257 | | | J | ES 23478-PeCDF | 87.2 | |
| 123478-HxCDF | 0.145 | | | J | ES 123478-HxCDF | 94.6 | |
| 123678-HxCDF | EMPC | | 0.0707 | J | ES 123678-HxCDF | 94.2 | |
| 234678-HxCDF | 0.0854 | | | J | ES 234678-HxCDF | 94 | |
| 123789-HxCDF | ND | 0.0322 | | | ES 123789-HxCDF | 93.2 | |
| 1234678-HpCDF | 0.504 | | | J | ES 1234678-HpCDF | 90.6 | |
| 1234789-HpCDF | ND | 0.0362 | | | ES 1234789-HpCDF | 90 | |
| OCDF | 0.672 | | | J | ES OCDF | 84.4 | |
| **Totals** | | | | | **Standard** | **CS/AS Recoveries** | |
| | | | | | CS 37Cl-2378-TCDD | 95.7 | |
| Total TCDD | 6.84 | | 6.91 | | CS 12347-PeCDD | 94.6 | |
| Total PeCDD | 0.564 | | 0.612 | | CS 12346-PeCDF | 92.4 | |
| Total HxCDD | 0.809 | | 0.809 | | CS 123469-HxCDF | 97.9 | |
| Total HpCDD | 1.96 | | 1.96 | | CS 1234689-HpCDF | 93.6 | |
| | | | | | AS 1368-TCDD | 89.2 | |
| Total TCDF | 9.43 | | 9.49 | | AS 1368-TCDF | 91.3 | |
| Total PeCDF | 3.25 | | 3.31 | | | | |
| Total HxCDF | 1.17 | | 1.28 | | | | |
| Total HpCDF | 0.895 | | 0.895 | | | | |
| **Total PCDD/Fs** | **33.7** | | **34.1** | | | | |
| **ITEF TEQs** | | | | | | | |
| TEQ: ND=0 | 3.53 | | 3.54 | | | | |
| TEQ: ND=DL/2 | 3.53 | 0.0532 | 3.54 | | | | |
| TEQ: ND=DL | 3.54 | 0.106 | 3.54 | | | | |

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# Sample ID: LPR6-ECST-Comp02-DUP — Method 1613B

| Client Data | | Sample Data | | Laboratory Data | | | |
|---|---|---|---|---|---|---|---|
| Name: | Windward Environmental, LLC | Matrix: | Tissue | Lab Project ID: | A3406 | Date Received: | 02-Aug-2011 |
| Project ID: | Passaic RI/FS Caged Bivalve Study | Weight/Volume: | 10.13 g | Lab Sample ID: | A3406_8929_DF_003DUP | Date Extracted: | 15-Aug-2011 |
| Date Collected: | 08-Jun-2011 | | | QC Batch No.: | 8929 | Date Analyzed: | 19-Aug-2011 |
| | | Split: | - | Dilution: | UP | Time Analyzed: | 19:55:48 |

| Tetra-Dioxins | Conc. (pg/g) | Qualifiers | Penta-Dioxins | Conc. (pg/g) | Qualifiers | Hexa-Dioxins | Conc (pg/g) | Qualifiers | Hepta-Dioxins | Conc (pg/g) | Qualifiers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1368D | 0.752 | | 12479/12468D | 0.226 | J | 124679/124689D | 0.226 | J | 1234679D | 1 | J |
| 1379D | 0.194 | J | 12469D | [0.0481] | J | 123468D | (0.0508) | | 1234678D | 0.965 | J |
| 1369D | (0.0429) | | 12368D | 0.136 | J | 123679/123689D | 0.347 | J | | | |
| 1469D | (0.0429) | | 12478D | 0.0849 | J | 123469D | (0.0508) | | | | |
| 1247D...[4] | [0.0704] | J | 12379D | 0.0496 | J | 123478D | (0.0479) | | | | |
| 1378D | 0.198 | J | 12369D...[3] | (0.0369) | | 123678D | 0.115 | J | | | |
| 1268D | (0.0429) | | 12346/12347D | (0.0369) | | 123467D | (0.0508) | | | | |
| 1478D | (0.0429) | | 12378D | 0.0679 | J | 123789D | 0.121 | J B | **Conc.** | 1.96 | |
| 1279D | (0.0429) | | 12367D | (0.0369) | | | | | **EMPC** | 1.96 | |
| 1234/1269D | (0.0429) | | 12389D | (0.0369) | | | | | | | |
| 1236D | (0.0429) | | | | | | | | **Octa-Dioxin** | **Conc (pg/g)** | **Qualifiers** |
| 1237/1238D | 2.46 | | | | | | | | | | |
| 1239D | (0.0429) | | | | | | | | OCDD | 8.13 | |
| 2378D | 3.24 | | | | | | | | | | |
| 1278D | (0.0429) | | | | | | | | | | |
| 1267D | (0.0429) | | | | | | | | | | |
| 1289D | (0.0429) | | | | | | | | | | |
| **Conc.** | 6.84 | | **Conc.** | 0.564 | | **Conc.** | 0.809 | | | | |
| **EMPC** | 6.91 | | **EMPC** | 0.612 | | **EMPC** | 0.809 | | | | |


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| ITEF TEQs | Conc. | EMPC |
|---|---|---|
| TEQ: ND=0 | 3.53 | 3.54 |
| TEQ: ND=DL/2 | 3.53 | 3.54 |
| TEQ: ND=DL | 3.54 | 3.54 |

| | Conc. | EMPC |
|---|---|---|
| **Total PCDD/Fs** | 33.7 | 34.1 |

Checkcode: 012-699-RNC

Report Created: 25-Aug-2011 10:32 Analyst: AP

# Sample ID: LPR6-ECST-Comp02-DUP — Method 1613B

| Client Data | | Sample Data | | Laboratory Data | | | |
|---|---|---|---|---|---|---|---|
| Name: | Windward Environmental, LLC | Matrix: | Tissue | Lab Project ID: | A3406 | Date Received: | 02 Aug 2011 |
| Project ID: | Passaic RI/FS Caged Bivalve Study | Weight/Volume: | 10.13 g | Lab Sample ID: | A3406_8929_DF_003DUP | Date Extracted: | 15 Aug 2011 |
| Date Collected: | 08 Jun 2011 | | | QC Batch No.: | 8929 | Date Analyzed: | 19 Aug 2011 |
| | | Split: | - | Dilution: | UP | Time Analyzed: | 19:55:48 |

| Tetra-Furans | Conc. (pg/g) | Qualifiers | Penta-Furans | Conc. (pg/g) | Qualifiers | Hexa-Furans | Conc (pg/g) | Qualifiers | Hepta-Furans | Conc (pg/g) | Qualifiers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1368F | 0.183 | J | 13468/12468F | 0.711 | J | 123468F | 0.138 | J B | 1234678F | 0.504 | J |
| 1468F | 0.277 | J | 13678F...[3] | 0.353 | J | 124678/134678F | 0.474 | J | 1234679F | (0.0298) | |
| 2468F | 0.83 | | 12368F...[3] | 0.742 | J | 134679F | (0.0254) | | 1234689F | 0.391 | J |
| 1346/1246F | 0.327 | J | 14678F | 0.0981 | J | 124679F | [0.0372] | J | 1234789F | (0.0362) | |
| 1347F...[3] | 0.369 | J | 13479F | (0.0276) | | 124689F | 0.287 | J | | | |
| 1348F | 0.154 | J | 13469/12479F | [0.0622] | J | 123467F | 0.0449 | J | | | |
| 1248F...[3] | 1.23 | | 12346F | (0.0276) | | 123478F | 0.145 | J | | | |
| 1268F | 0.406 | J | 23468/12469F | 0.654 | J | 123678F | [0.0707] | J | | | |
| 1467F | 0.345 | J | 12347F | (0.0276) | | 123479F | (0.0254) | | | | |
| 1478F | 0.47 | J | 12348F | 0.103 | J | 123469F | (0.0254) | | | | |
| 1369/1237F | 0.0629 | J | 12378F | 0.0662 | J | 123679F | (0.0254) | | | | |
| 2467F | 0.215 | J | 12678/12367F | 0.154 | J | 234678F | 0.0854 | J | **Conc.** | 0.895 | |
| 2368F | 0.758 | | 12379F | (0.0276) | | 234678/123689F | (0.0239) | | **EMPC** | 0.895 | |
| 1238F...[5] | 0.721 | | 12679F | (0.0276) | | 123689F | (0.0254) | | | | |
| 1278F | 0.301 | J | 23467/12369F | 0.111 | J | 123789F | (0.0322) | | **Octa-Furan** | **Conc (pg/g)** | **Qualifiers** |
| 1349F | (0.0336) | | 23478F | 0.257 | J | 123789/123489F | (0.0322) | | | | |
| 1267F | 0.154 | J | 23478/12489F | (0.027) | | 123489F | (0.0254) | | OCDF | 0.672 | J |
| 2346/1249F | 0.256 | J | 12489F | (0.0276) | | | | | | | |
| 2347/1279F | 0.127 | J | 12349F | (0.0276) | | | | | | | |
| 2348F | 1.13 | | 12389F | (0.0276) | | | | | | | |
| 2378F | 0.482 | J | | | | | | | | | |
| 2367/3467F | 0.552 | | | | | | | | | | |
| 1269F | [0.0583] | J | | | | | | | | | |
| 1239F | (0.0336) | | | | | | | | | | |
| 1289F | 0.0843 | J | | | | | | | | | |
| **Conc.** | 9.43 | | **Conc.** | 3.25 | | **Conc.** | 1.17 | | | | |
| **EMPC** | 9.49 | | **EMPC** | 3.31 | | **EMPC** | 1.28 | | | | |

Checkcode: 012-699-RNC

Report Created: 25-Aug-2011 10:32 Analyst: AP

# Sample ID: LPR6-ECST-Comp02-DUP TEQ Summary Method 1613B

| | | | | | |
|---|---|---|---|---|---|
| Client Project Name: | Windward Environmental, LLC | Matrix: | Tissue | Lab Sample ID: | A3406_8929_DF_003DUP |
| Cliend Project ID: | Passaic RI/FS Caged Bivalve Study | Weight/Volume: | 10.13 g | QC Batch No.: | 8929 |
| Date Collected: | 08-Jun-2011 | Split: | - | Date Extracted: | 15-Aug-2011 |
| Date Received: | 02-Aug-2011 | Dilution: | UP | Date Analyzed: | 19-Aug-2011 19:55 |
| Lab Project No: | A3406 | Units | pg/g | | |

| Analyte | Result | Qualifiers | DLs | I-TEQ | WHO-1998 | WHO-2005 |
|---|---|---|---|---|---|---|
| 2378-TCDD | 3.24 | | 0.0429 | 3.24 | 3.24 | 3.24 |
| 12378-PeCDD | 0.0679 | J | 0.0369 | 0.0339 | 0.0679 | 0.0679 |
| 123478-HxCDD | (0.0479) | | 0.0479 | (0.00479) | (0.00479) | (0.00479) |
| 123678-HxCDD | 0.115 | J | 0.0495 | 0.0115 | 0.0115 | 0.0115 |
| 123789-HxCDD | 0.121 | J B | 0.0555 | 0.0121 | 0.0121 | 0.0121 |
| 1234678-HpCDD | 0.965 | J | 0.0483 | 0.00965 | 0.00965 | 0.00965 |
| OCDD | 8.13 | | 0.0962 | 0.00813 | 0.000813 | 0.00244 |
| | | | | | | |
| 2378-TCDF | 0.482 | J | 0.0336 | 0.0482 | 0.0482 | 0.0482 |
| 12378-PeCDF | 0.0662 | J | 0.0282 | 0.00331 | 0.00331 | 0.00199 |
| 23478-PeCDF | 0.257 | J | 0.027 | 0.128 | 0.128 | 0.077 |
| 123478-HxCDF | 0.145 | J | 0.0243 | 0.0145 | 0.0145 | 0.0145 |
| 123678-HxCDF | [0.0707] | J | 0.0224 | [0.00707] | [0.00707] | [0.00707] |
| 234678-HxCDF | 0.0854 | J | 0.0239 | 0.00854 | 0.00854 | 0.00854 |
| 123789-HxCDF | (0.0322) | | 0.0322 | (0.00322) | (0.00322) | (0.00322) |
| 1234678-HpCDF | 0.504 | J | 0.0246 | 0.00504 | 0.00504 | 0.00504 |
| 1234789-HpCDF | (0.0362) | | 0.0362 | (0.000362) | (0.000362) | (0.000362) |
| OCDF | 0.672 | J | 0.0731 | 0.000672 | 0.0000672 | 0.000201 |

| TEQ Summaries | | | |
|---|---|---|---|
| EMPC = 0, ND = 0 | 3.53 | 3.55 | 3.5 |
| EMPC = 0, ND = DL / 2 | 3.53 | 3.56 | 3.51 |
| EMPC = 0, ND = DL | 3.54 | 3.56 | 3.51 |
| EMPC = 0, < J-level = 0 | 3.25 | 3.25 | 3.25 |
| | | | |
| EMPC = EMPC, ND = 0 | 3.54 | 3.56 | 3.51 |
| EMPC = EMPC, ND = DL / 2 | 3.54 | 3.57 | 3.51 |
| EMPC = EMPC, ND = DL | 3.54 | 3.57 | 3.52 |
| EMPC = EMPC, < J-level = 0 | 3.26 | 3.25 | 3.25 |

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# Sample ID: LPR7-ECST-Comp03 — Method 1613B

| Client Data | | Sample Data | | Laboratory Data | | | |
|---|---|---|---|---|---|---|---|
| Name: | Windward Environmental, LLC | Matrix: | Tissue | Lab Project ID: | A3406 | Date Received: | 02-Aug-2011 |
| Project ID: | Passaic RI/FS Caged Bivalve Study | Weight/Volume: | 10.13 g | Lab Sample ID | A3406_8929_DF_004 | Date Extracted: | 15-Aug-2011 |
| Date Collected: | 08-Jun-2011 | | | QC Batch No: | 8929 | Date Analyzed: | 19-Aug-2011 |
| | | Split: | - | Dilution: | - | Time Analyzed: | 20:43:26 |

| Analyte | Conc. (pg/g) | DL (pg/g) | EMPC (pg/g) | Qualifiers | Standard | ES Recoveries | Qualifiers |
|---|---|---|---|---|---|---|---|
| 2378-TCDD | 3.6 | | | | ES 2378-TCDD | 83.9 | |
| 12378-PeCDD | 0.0712 | | | J | ES 12378-PeCDD | 80.2 | |
| 123478-HxCDD | ND | 0.0504 | | | ES 123478-HxCDD | 85.4 | |
| 123678-HxCDD | 0.0957 | | | J | ES 123678-HxCDD | 86.4 | |
| 123789-HxCDD | 0.119 | | | J B | ES 123789-HxCDD | 86.6 | |
| 1234678-HpCDD | 0.654 | | | J | ES 1234678-HpCDD | 80.6 | |
| OCDD | 6.09 | | | | ES OCDD | 75 | |
| | | | | | | | |
| 2378-TCDF | 0.356 | | | J | ES 2378-TCDF | 73.5 | |
| 12378-PeCDF | EMPC | | 0.0577 | J | ES 12378-PeCDF | 81.1 | |
| 23478-PeCDF | EMPC | | 0.192 | J | ES 23478-PeCDF | 81.3 | |
| 123478-HxCDF | 0.102 | | | J | ES 123478-HxCDF | 87.7 | |
| 123678-HxCDF | 0.0541 | | | J | ES 123678-HxCDF | 89.6 | |
| 234678-HxCDF | 0.0721 | | | J | ES 234678-HxCDF | 88.8 | |
| 123789-HxCDF | ND | 0.0332 | | | ES 123789-HxCDF | 87.9 | |
| 1234678-HpCDF | 0.334 | | | J | ES 1234678-HpCDF | 84.2 | |
| 1234789-HpCDF | ND | 0.0379 | | | ES 1234789-HpCDF | 83.9 | |
| OCDF | 0.465 | | | J B | ES OCDF | 78.3 | |
| **Totals** | | | | | **Standard** | **CS/AS Recoveries** | |
| | | | | | CS 37Cl-2378-TCDD | 87.5 | |
| Total TCDD | 7.01 | | 7.15 | | CS 12347-PeCDD | 88.4 | |
| Total PeCDD | 0.255 | | 0.427 | | CS 12346-PeCDF | 85.6 | |
| Total HxCDD | 0.642 | | 0.642 | | CS 123469-HxCDF | 92.9 | |
| Total HpCDD | 1.31 | | 1.31 | | CS 1234689-HpCDF | 88.5 | |
| | | | | | AS 1368-TCDD | 81.6 | |
| Total TCDF | 8.75 | | 8.91 | | AS 1368-TCDF | 84.4 | |
| Total PeCDF | 2.41 | | 2.9 | | | | |
| Total HxCDF | 0.862 | | 0.951 | | | | |
| Total HpCDF | 0.642 | | 0.642 | | | | |
| **Total PCDD/Fs** | **28.4** | | **29.5** | | | | |
| **ITEF TEQs** | | | | | | | |
| TEQ: ND=0 | 3.73 | | 3.83 | | | | |
| TEQ: ND=DL/2 | 3.74 | 0.0553 | 3.83 | | | | |
| TEQ: ND=DL | 3.75 | 0.111 | 3.84 | | | | |

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# Sample ID: LPR7-ECST-Comp03 — Method 1613B

| Client Data | | Sample Data | | Laboratory Data | | | |
|---|---|---|---|---|---|---|---|
| Name: | Windward Environmental, LLC | Matrix: | Tissue | Lab Project ID: | A3406 | Date Received: | 02-Aug-2011 |
| Project ID: | Passaic RI/FS Caged Bivalve Study | Weight/Volume: | 10.13 g | Lab Sample ID: | A3406_8929_DF_004 | Date Extracted: | 15-Aug-2011 |
| Date Collected: | 08-Jun-2011 | | | QC Batch No.: | 8929 | Date Analyzed: | 19-Aug-2011 |
| | | Split: | - | Dilution: | - | Time Analyzed: | 20:43:26 |

| Tetra-Dioxins | Conc. (pg/g) | Qualifiers | Penta-Dioxins | Conc. (pg/g) | Qualifiers | Hexa-Dioxins | Conc (pg/g) | Qualifiers | Hepta-Dioxins | Conc (pg/g) | Qualifiers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1368D | 0.585 | | 12479/12468D | [0.173] | J | 124679/124689D | 0.169 | J | 1234679D | 0.659 | J |
| 1379D | [0.139] | J | 12469D | (0.0418) | | 123468D | (0.0526) | | 1234678D | 0.654 | J |
| 1369D | (0.041) | | 12368D | 0.114 | J | 123679/123689D | 0.259 | J | | | |
| 1469D | (0.041) | | 12478D | 0.0697 | J | 123469D | (0.0526) | | | | |
| 1247D...[4] | (0.041) | | 12379D | (0.0418) | | 123478D | (0.0504) | | | | |
| 1378D | 0.171 | J | 12369D...[3] | (0.0418) | | 123678D | 0.0957 | J | | | |
| 1268D | (0.041) | | 12346/12347D | (0.0418) | | 123467D | (0.0526) | | | | |
| 1478D | (0.041) | | 12378D | 0.0712 | J | 123789D | 0.119 | J B | **Conc.** | 1.31 | |
| 1279D | (0.041) | | 12367D | (0.0418) | | | | | **EMPC** | 1.31 | |
| 1234/1269D | (0.041) | | 12389D | (0.0418) | | | | | | | |
| 1236D | (0.041) | | | | | | | | **Octa-Dioxin** | **Conc (pg/g)** | **Qualifiers** |
| 1237/1238D | 2.66 | | | | | | | | | | |
| 1239D | (0.041) | | | | | | | | OCDD | 6.09 | |
| 2378D | 3.6 | | | | | | | | | | |
| 1278D | (0.041) | | | | | | | | | | |
| 1267D | (0.041) | | | | | | | | | | |
| 1289D | (0.041) | | | | | | | | | | |
| **Conc.** | 7.01 | | **Conc.** | 0.255 | | **Conc.** | 0.642 | | | | |
| **EMPC** | 7.15 | | **EMPC** | 0.427 | | **EMPC** | 0.642 | | | | |


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| ITEF TEQs | Conc. | EMPC |
|---|---|---|
| TEQ: ND=0 | 3.73 | 3.83 |
| TEQ: ND=DL/2 | 3.74 | 3.83 |
| TEQ: ND=DL | 3.75 | 3.84 |

| | Conc. | EMPC |
|---|---|---|
| **Total PCDD/Fs** | 28.4 | 29.5 |

Checkcode: 620-950-RLZ

Report Created: 25-Aug-2011 10:33 Analyst: AP

# Sample ID: LPR7-ECST-Comp03 — Method 1613B

| Client Data | | Sample Data | | Laboratory Data | | | |
|---|---|---|---|---|---|---|---|
| Name: | Windward Environmental, LLC | Matrix: | Tissue | Lab Project ID: | A3406 | Date Received: | 02 Aug 2011 |
| Project ID: | Passaic RI/FS Caged Bivalve Study | Weight/Volume: | 10.13 g | Lab Sample ID: | A3406_8929_DF_004 | Date Extracted: | 15 Aug 2011 |
| Date Collected: | 08 Jun 2011 | | | QC Batch No.: | 8929 | Date Analyzed: | 19 Aug 2011 |
| | | Split: | - | Dilution: | - | Time Analyzed: | 20:43:26 |

| Tetra-Furans | Conc. (pg/g) | Qualifiers | Penta-Furans | Conc. (pg/g) | Qualifiers | Hexa-Furans | Conc (pg/g) | Qualifiers | Hepta-Furans | Conc (pg/g) | Qualifiers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1368F | 0.169 | J | 13468/12468F | 0.598 | J | 123468F | [0.0893] | J B | 1234678F | 0.334 | J |
| 1468F | 0.285 | J | 13678F...[3] | 0.289 | J | 124678/134678F | 0.345 | J | 1234679F | (0.0314) | |
| 2468F | 0.759 | | 12368F...[3] | 0.64 | J | 134679F | (0.0269) | | 1234689F | 0.308 | J |
| 1346/1246F | 0.272 | J | 14678F | [0.0636] | J | 124679F | 0.0339 | J | 1234789F | (0.0379) | |
| 1347F...[3] | 0.314 | J | 13479F | (0.0309) | | 124689F | 0.255 | J | | | |
| 1348F | [0.105] | J | 13469/12479F | [0.063] | J | 123467F | (0.0269) | | | | |
| 1248F...[3] | 1.11 | | 12346F | (0.0309) | | 123478F | 0.102 | J | | | |
| 1268F | 0.333 | J | 23468/12469F | 0.688 | J | 123678F | 0.0541 | J | | | |
| 1467F | 0.336 | J | 12347F | (0.0309) | | 123479F | (0.0269) | | | | |
| 1478F | 0.408 | J | 12348F | 0.114 | J | 123469F | (0.0269) | | | | |
| 1369/1237F | (0.0421) | | 12378F | [0.0577] | J | 123679F | (0.0269) | | | | |
| 2467F | 0.196 | J | 12678/12367F | [0.113] | J | 234678F | 0.0721 | J | **Conc.** | 0.642 | |
| 2368F | 0.599 | | 12379F | (0.0309) | | 234678/123689F | (0.0249) | | **EMPC** | 0.642 | |
| 1238F...[5] | 0.929 | | 12679F | (0.0309) | | 123689F | (0.0269) | | | | |
| 1278F | 0.259 | J | 23467/12369F | 0.0851 | J | 123789F | (0.0332) | | **Octa-Furan** | **Conc (pg/g)** | **Qualifiers** |
| 1349F | (0.0421) | | 23478F | [0.192] | J | 123789/123489F | (0.0332) | | | | |
| 1267F | 0.101 | J | 23478/12489F | (0.0293) | | 123489F | (0.0269) | | OCDF | 0.465 | J B |
| 2346/1249F | 0.286 | J | 12489F | (0.0309) | | | | | | | |
| 2347/1279F | 0.0945 | J | 12349F | (0.0309) | | | | | | | |
| 2348F | 1.39 | | 12389F | (0.0309) | | | | | | | |
| 2378F | 0.356 | J | | | | | | | | | |
| 2367/3467F | 0.486 | J | | | | | | | | | |
| 1269F | 0.0597 | J | | | | | | | | | |
| 1239F | (0.0421) | | | | | | | | | | |
| 1289F | [0.063] | J | | | | | | | | | |
| **Conc.** | 8.75 | | **Conc.** | 2.41 | | **Conc.** | 0.862 | | | | |
| **EMPC** | 8.91 | | **EMPC** | 2.9 | | **EMPC** | 0.951 | | | | |

Checkcode: 620-950-RLZ

Report Created: 25-Aug-2011 10:33 Analyst: AP

# Sample ID: LPR7-ECST-Comp03 — TEQ Summary — Method 1613B

| | | | | | |
|---|---|---|---|---|---|
| Client Project Name: | Windward Environmental, LLC | Matrix: | Tissue | Lab Sample ID: | A3406_8929_DF_004 |
| Cliend Project ID: | Passaic RI/FS Caged Bivalve Study | Weight/Volume: | 10.13 g | QC Batch No.: | 8929 |
| Date Collected: | 08-Jun-2011 | Split: | - | Date Extracted: | 15-Aug-2011 |
| Date Received: | 02-Aug-2011 | Dilution: | - | Date Analyzed: | 19-Aug-2011 20:43 |
| Lab Project No: | A3406 | Units | pg/g | | |

| Analyte | Result | Qualifiers | DLs | I-TEQ | WHO-1998 | WHO-2005 |
|---|---|---|---|---|---|---|
| 2378-TCDD | 3.6 | | 0.041 | 3.6 | 3.6 | 3.6 |
| 12378-PeCDD | 0.0712 | J | 0.0418 | 0.0356 | 0.0712 | 0.0712 |
| 123478-HxCDD | (0.0504) | | 0.0504 | (0.00504) | (0.00504) | (0.00504) |
| 123678-HxCDD | 0.0957 | J | 0.0497 | 0.00957 | 0.00957 | 0.00957 |
| 123789-HxCDD | 0.119 | J B | 0.0583 | 0.0119 | 0.0119 | 0.0119 |
| 1234678-HpCDD | 0.654 | J | 0.0624 | 0.00654 | 0.00654 | 0.00654 |
| OCDD | 6.09 | | 0.0935 | 0.00609 | 0.000609 | 0.00183 |
| | | | | | | |
| 2378-TCDF | 0.356 | J | 0.0421 | 0.0356 | 0.0356 | 0.0356 |
| 12378-PeCDF | [0.0577] | J | 0.0327 | [0.00289] | [0.00289] | [0.00173] |
| 23478-PeCDF | [0.192] | J | 0.0293 | [0.0959] | [0.0959] | [0.0576] |
| 123478-HxCDF | 0.102 | J | 0.0267 | 0.0102 | 0.0102 | 0.0102 |
| 123678-HxCDF | 0.0541 | J | 0.0238 | 0.00541 | 0.00541 | 0.00541 |
| 234678-HxCDF | 0.0721 | J | 0.0249 | 0.00721 | 0.00721 | 0.00721 |
| 123789-HxCDF | (0.0332) | | 0.0332 | (0.00332) | (0.00332) | (0.00332) |
| 1234678-HpCDF | 0.334 | J | 0.0262 | 0.00334 | 0.00334 | 0.00334 |
| 1234789-HpCDF | (0.0379) | | 0.0379 | (0.000379) | (0.000379) | (0.000379) |
| OCDF | 0.465 | J B | 0.0809 | 0.000465 | 0.0000465 | 0.000139 |

| TEQ Summaries | | | |
|---|---|---|---|
| EMPC = 0, ND = 0 | 3.73 | 3.76 | 3.76 |
| EMPC = 0, ND = DL / 2 | 3.74 | 3.77 | 3.77 |
| EMPC = 0, ND = DL | 3.75 | 3.78 | 3.78 |
| EMPC = 0, < J-level = 0 | 3.6 | 3.6 | 3.6 |
| | | | |
| EMPC = EMPC, ND = 0 | 3.83 | 3.86 | 3.82 |
| EMPC = EMPC, ND = DL / 2 | 3.83 | 3.86 | 3.82 |
| EMPC = EMPC, ND = DL | 3.84 | 3.87 | 3.83 |
| EMPC = EMPC, < J-level = 0 | 3.7 | 3.7 | 3.66 |

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# Sample ID: LPR7-ECST-Comp04 — Method 1613B

| Client Data | | Sample Data | | Laboratory Data | | | |
|---|---|---|---|---|---|---|---|
| Name: | Windward Environmental, LLC | Matrix: | Tissue | Lab Project ID: | A3406 | Date Received: | 02-Aug-2011 |
| Project ID: | Passaic RI/FS Caged Bivalve Study | Weight/Volume: | 10.05 g | Lab Sample ID | A3406_8929_DF_005 | Date Extracted: | 15-Aug-2011 |
| Date Collected: | 08-Jun-2011 | | | QC Batch No: | 8929 | Date Analyzed: | 19-Aug-2011 |
| | | Split: | - | Dilution: | - | Time Analyzed: | 21:31:06 |

| Analyte | Conc. (pg/g) | DL (pg/g) | EMPC (pg/g) | Qualifiers | Standard | ES Recoveries | Qualifiers |
|---|---|---|---|---|---|---|---|
| 2378-TCDD | EMPC | | 0.182 | J | ES 2378-TCDD | 86.7 | |
| 12378-PeCDD | 0.0579 | | | J | ES 12378-PeCDD | 86.2 | |
| 123478-HxCDD | ND | 0.0424 | | | ES 123478-HxCDD | 89.2 | |
| 123678-HxCDD | 0.119 | | | J | ES 123678-HxCDD | 87.3 | |
| 123789-HxCDD | EMPC | | 0.108 | J B | ES 123789-HxCDD | 87.7 | |
| 1234678-HpCDD | 0.852 | | | J | ES 1234678-HpCDD | 84.3 | |
| OCDD | 12 | | | | ES OCDD | 79 | |
| | | | | | | | |
| 2378-TCDF | 0.439 | | | J | ES 2378-TCDF | 77.1 | |
| 12378-PeCDF | 0.0585 | | | J | ES 12378-PeCDF | 85 | |
| 23478-PeCDF | 0.17 | | | J | ES 23478-PeCDF | 85 | |
| 123478-HxCDF | 0.0488 | | | J | ES 123478-HxCDF | 92.4 | |
| 123678-HxCDF | 0.0464 | | | J | ES 123678-HxCDF | 91.1 | |
| 234678-HxCDF | EMPC | | 0.0502 | J | ES 234678-HxCDF | 92.5 | |
| 123789-HxCDF | ND | 0.0291 | | | ES 123789-HxCDF | 91.9 | |
| 1234678-HpCDF | 0.28 | | | J | ES 1234678-HpCDF | 87.5 | |
| 1234789-HpCDF | ND | 0.0329 | | | ES 1234789-HpCDF | 87.6 | |
| OCDF | 0.393 | | | J B | ES OCDF | 81.9 | |
| **Totals** | | | | | **Standard** | **CS/AS Recoveries** | |
| | | | | | CS 37Cl-2378-TCDD | 89.5 | |
| Total TCDD | 3.95 | | 4.14 | | CS 12347-PeCDD | 91.8 | |
| Total PeCDD | 0.326 | | 0.445 | | CS 12346-PeCDF | 89.5 | |
| Total HxCDD | 0.613 | | 0.721 | | CS 123469-HxCDF | 95.7 | |
| Total HpCDD | 1.82 | | 1.82 | | CS 1234689-HpCDF | 90.3 | |
| | | | | | AS 1368-TCDD | 82.8 | |
| Total TCDF | 4.9 | | 5.3 | | AS 1368-TCDF | 83.9 | |
| Total PeCDF | 1.89 | | 1.95 | | | | |
| Total HxCDF | 0.778 | | 0.828 | | | | |
| Total HpCDF | 0.569 | | 0.569 | | | | |
| **Total PCDD/Fs** | **27.2** | | **28.2** | | | | |
| **ITEF TEQs** | | | | | | | |
| TEQ: ND=0 | 0.206 | | 0.404 | | | | |
| TEQ: ND=DL/2 | 0.236 | 0.0533 | 0.408 | | | | |
| TEQ: ND=DL | 0.267 | 0.107 | 0.412 | | | | |

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# Sample ID: LPR7-ECST-Comp04 — Method 1613B

| Client Data | | Sample Data | | Laboratory Data | | | |
|---|---|---|---|---|---|---|---|
| Name: | Windward Environmental, LLC | Matrix: | Tissue | Lab Project ID: | A3406 | Date Received: | 02-Aug-2011 |
| Project ID: | Passaic RI/FS Caged Bivalve Study | Weight/Volume: | 10.05 g | Lab Sample ID: | A3406_8929_DF_005 | Date Extracted: | 15-Aug-2011 |
| Date Collected: | 08-Jun-2011 | | | QC Batch No.: | 8929 | Date Analyzed: | 19-Aug-2011 |
| | | Split: | - | Dilution: | - | Time Analyzed: | 21:31:06 |

| Tetra-Dioxins | Conc. (pg/g) | Qualifiers | Penta-Dioxins | Conc. (pg/g) | Qualifiers | Hexa-Dioxins | Conc (pg/g) | Qualifiers | Hepta-Dioxins | Conc (pg/g) | Qualifiers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1368D | 0.434 | J B | 12479/12468D | 0.2 | J | 124679/124689D | 0.199 | J | 1234679D | 0.969 | J |
| 1379D | 0.162 | J | 12469D | (0.0407) | | 123468D | (0.045) | | 1234678D | 0.852 | J |
| 1369D | (0.0461) | | 12368D | [0.119] | J | 123679/123689D | 0.295 | J | | | |
| 1469D | (0.0461) | | 12478D | 0.0683 | J | 123469D | (0.045) | | | | |
| 1247D...[4] | (0.0461) | | 12379D | (0.0407) | | 123478D | (0.0424) | | | | |
| 1378D | 0.0603 | J | 12369D...[3] | (0.0407) | | 123678D | 0.119 | J | | | |
| 1268D | (0.0461) | | 12346/12347D | (0.0407) | | 123467D | (0.045) | | | | |
| 1478D | (0.0461) | | 12378D | 0.0579 | J | 123789D | [0.108] | J B | **Conc.** | 1.82 | |
| 1279D | (0.0461) | | 12367D | (0.0407) | | | | | **EMPC** | 1.82 | |
| 1234/1269D | (0.0461) | | 12389D | (0.0407) | | | | | | | |
| 1236D | (0.0461) | | | | | | | | **Octa-Dioxin** | **Conc (pg/g)** | **Qualifiers** |
| 1237/1238D | 3.3 | | | | | | | | | | |
| 1239D | (0.0461) | | | | | | | | OCDD | 12 | |
| 2378D | [0.182] | J | | | | | | | | | |
| 1278D | (0.0461) | | | | | | | | | | |
| 1267D | (0.0461) | | | | | | | | | | |
| 1289D | (0.0461) | | | | | | | | | | |
| **Conc.** | 3.95 | | **Conc.** | 0.326 | | **Conc.** | 0.613 | | | | |
| **EMPC** | 4.14 | | **EMPC** | 0.445 | | **EMPC** | 0.721 | | | | |

| ITEF TEQs | Conc. | EMPC |
|---|---|---|
| TEQ: ND=0 | 0.206 | 0.404 |
| TEQ: ND=DL/2 | 0.236 | 0.408 |
| TEQ: ND=DL | 0.267 | 0.412 |

| | Conc. | EMPC |
|---|---|---|
| **Total PCDD/Fs** | 27.2 | 28.2 |

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Checkcode: 709-888-PKX

Report Created: 25-Aug-2011 10:33 Analyst: AP

# Sample ID: LPR7-ECST-Comp04 — Method 1613B

| Client Data | | Sample Data | | Laboratory Data | | | |
|---|---|---|---|---|---|---|---|
| Name: | Windward Environmental, LLC | Matrix: | Tissue | Lab Project ID: | A3406 | Date Received: | 02 Aug 2011 |
| Project ID: | Passaic RI/FS Caged Bivalve Study | Weight/Volume: | 10.05 g | Lab Sample ID: | A3406_8929_DF_005 | Date Extracted: | 15 Aug 2011 |
| Date Collected: | 08 Jun 2011 | | | QC Batch No.: | 8929 | Date Analyzed: | 19 Aug 2011 |
| | | Split: | - | Dilution: | - | Time Analyzed: | 21:31:06 |

| Tetra-Furans | Conc. (pg/g) | Qualifiers | Penta-Furans | Conc. (pg/g) | Qualifiers | Hexa-Furans | Conc (pg/g) | Qualifiers | Hepta-Furans | Conc (pg/g) | Qualifiers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1368F | [0.113] | J | 13468/12468F | 0.451 | J | 123468F | 0.107 | J B | 1234678F | 0.28 | J |
| 1468F | 0.18 | J | 13678F...[3] | 0.283 | J | 124678/134678F | 0.334 | J | 1234679F | (0.0278) | |
| 2468F | 0.454 | J | 12368F...[3] | 0.47 | J | 134679F | (0.0231) | | 1234689F | 0.289 | J |
| 1346/1246F | 0.191 | J | 14678F | [0.0628] | J | 124679F | (0.0231) | | 1234789F | (0.0329) | |
| 1347F...[3] | 0.269 | J | 13479F | (0.0229) | | 124689F | 0.215 | J | | | |
| 1348F | [0.0675] | J | 13469/12479F | 0.0734 | J | 123467F | 0.027 | J | | | |
| 1248F...[3] | 0.642 | | 12346F | (0.0229) | | 123478F | 0.0488 | J | | | |
| 1268F | 0.227 | J | 23468/12469F | 0.193 | J | 123678F | 0.0464 | J | | | |
| 1467F | 0.296 | J | 12347F | (0.0229) | | 123479F | (0.0231) | | | | |
| 1478F | 0.484 | J | 12348F | (0.0229) | | 123469F | (0.0231) | | | | |
| 1369/1237F | (0.0396) | | 12378F | 0.0585 | J | 123679F | (0.0231) | | | | |
| 2467F | 0.185 | J | 12678/12367F | 0.0977 | J | 234678F | [0.0502] | J | **Conc.** | 0.569 | |
| 2368F | 0.33 | J | 12379F | (0.0229) | | 234678/123689F | (0.0218) | | **EMPC** | 0.569 | |
| 1238F...[5] | [0.149] | J | 12679F | (0.0229) | | 123689F | (0.0231) | | | | |
| 1278F | 0.244 | J | 23467/12369F | 0.095 | J | 123789F | (0.0291) | | **Octa-Furan** | **Conc (pg/g)** | **Qualifiers** |
| 1349F | (0.0396) | | 23478F | 0.17 | J | 123789/123489F | (0.0291) | | | | |
| 1267F | 0.116 | J | 23478/12489F | (0.0221) | | 123489F | (0.0231) | | OCDF | 0.393 | J B |
| 2346/1249F | 0.0919 | J | 12489F | (0.0229) | | | | | | | |
| 2347/1279F | 0.0908 | J | 12349F | (0.0229) | | | | | | | |
| 2348F | 0.112 | J | 12389F | (0.0229) | | | | | | | |
| 2378F | 0.439 | J | | | | | | | | | |
| 2367/3467F | 0.49 | J | | | | | | | | | |
| 1269F | 0.0598 | J | | | | | | | | | |
| 1239F | (0.0396) | | | | | | | | | | |
| 1289F | [0.0696] | J | | | | | | | | | |
| **Conc.** | 4.9 | | **Conc.** | 1.89 | | **Conc.** | 0.778 | | | | |
| **EMPC** | 5.3 | | **EMPC** | 1.95 | | **EMPC** | 0.828 | | | | |

Checkcode: 709-888-PKX

Report Created: 25-Aug-2011 10:33 Analyst: AP

# Sample ID: LPR7-ECST-Comp04 — TEQ Summary — Method 1613B

| | | | | | |
|---|---|---|---|---|---|
| Client Project Name: | Windward Environmental, LLC | Matrix: | Tissue | Lab Sample ID: | A3406_8929_DF_005 |
| Cliend Project ID: | Passaic RI/FS Caged Bivalve Study | Weight/Volume: | 10.05 g | QC Batch No.: | 8929 |
| Date Collected: | 08-Jun-2011 | Split: | - | Date Extracted: | 15-Aug-2011 |
| Date Received: | 02-Aug-2011 | Dilution: | - | Date Analyzed: | 19-Aug-2011 21:31 |
| Lab Project No: | A3406 | Units | pg/g | | |

| Analyte | Result | Qualifiers | DLs | I-TEQ | WHO-1998 | WHO-2005 |
|---|---|---|---|---|---|---|
| 2378-TCDD | [0.182] | J | 0.0461 | [0.182] | [0.182] | [0.182] |
| 12378-PeCDD | 0.0579 | J | 0.0407 | 0.029 | 0.0579 | 0.0579 |
| 123478-HxCDD | (0.0424) | | 0.0424 | (0.00424) | (0.00424) | (0.00424) |
| 123678-HxCDD | 0.119 | J | 0.0427 | 0.0119 | 0.0119 | 0.0119 |
| 123789-HxCDD | [0.108] | J B | 0.0503 | [0.0108] | [0.0108] | [0.0108] |
| 1234678-HpCDD | 0.852 | J | 0.0414 | 0.00852 | 0.00852 | 0.00852 |
| OCDD | 12 | | 0.0701 | 0.012 | 0.0012 | 0.0036 |
| | | | | | | |
| 2378-TCDF | 0.439 | J | 0.0396 | 0.0439 | 0.0439 | 0.0439 |
| 12378-PeCDF | 0.0585 | J | 0.0238 | 0.00292 | 0.00292 | 0.00175 |
| 23478-PeCDF | 0.17 | J | 0.0221 | 0.085 | 0.085 | 0.051 |
| 123478-HxCDF | 0.0488 | J | 0.022 | 0.00488 | 0.00488 | 0.00488 |
| 123678-HxCDF | 0.0464 | J | 0.0204 | 0.00464 | 0.00464 | 0.00464 |
| 234678-HxCDF | [0.0502] | J | 0.0218 | [0.00502] | [0.00502] | [0.00502] |
| 123789-HxCDF | (0.0291) | | 0.0291 | (0.00291) | (0.00291) | (0.00291) |
| 1234678-HpCDF | 0.28 | J | 0.0236 | 0.0028 | 0.0028 | 0.0028 |
| 1234789-HpCDF | (0.0329) | | 0.0329 | (0.000329) | (0.000329) | (0.000329) |
| OCDF | 0.393 | J B | 0.0643 | 0.000393 | 0.0000393 | 0.000118 |

| TEQ Summaries | | | |
|---|---|---|---|
| EMPC = 0, ND = 0 | 0.206 | 0.224 | 0.191 |
| EMPC = 0, ND = DL / 2 | 0.236 | 0.254 | 0.221 |
| EMPC = 0, ND = DL | 0.267 | 0.285 | 0.252 |
| EMPC = 0, < J-level = 0 | 0.012 | 0.0012 | 0.0036 |
| | | | |
| EMPC = EMPC, ND = 0 | 0.404 | 0.422 | 0.389 |
| EMPC = EMPC, ND = DL / 2 | 0.408 | 0.426 | 0.393 |
| EMPC = EMPC, ND = DL | 0.412 | 0.43 | 0.397 |
| EMPC = EMPC, < J-level = 0 | 0.21 | 0.2 | 0.202 |

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# Sample ID: LPR8-ECST-Comp05 — Method 1613B

| Client Data | | Sample Data | | Laboratory Data | | | |
|---|---|---|---|---|---|---|---|
| Name: | Windward Environmental, LLC | Matrix: | Tissue | Lab Project ID: | A3406 | Date Received: | 02-Aug-2011 |
| Project ID: | Passaic RI/FS Caged Bivalve Study | Weight/Volume: | 10.19 g | Lab Sample ID | A3406_8929_DF_006 | Date Extracted: | 15-Aug-2011 |
| Date Collected: | 08-Jun-2011 | | | QC Batch No: | 8929 | Date Analyzed: | 20-Aug-2011 |
| | | Split: | - | Dilution: | - | Time Analyzed: | 00:01:27 |

| Analyte | Conc. (pg/g) | DL (pg/g) | EMPC (pg/g) | Qualifiers | Standard | ES Recoveries | Qualifiers |
|---|---|---|---|---|---|---|---|
| 2378-TCDD | EMPC | | 0.0765 | J | ES 2378-TCDD | 94.2 | |
| 12378-PeCDD | 0.0624 | | | J | ES 12378-PeCDD | 97.5 | |
| 123478-HxCDD | 0.0353 | | | J | ES 123478-HxCDD | 94.1 | |
| 123678-HxCDD | EMPC | | 0.0809 | J | ES 123678-HxCDD | 97.1 | |
| 123789-HxCDD | 0.113 | | | J B | ES 123789-HxCDD | 97.7 | |
| 1234678-HpCDD | 0.559 | | | J | ES 1234678-HpCDD | 91.7 | |
| OCDD | 4.92 | | | | ES OCDD | 86.1 | |
| | | | | | | | |
| 2378-TCDF | 0.379 | | | J | ES 2378-TCDF | 75.2 | |
| 12378-PeCDF | 0.0428 | | | J | ES 12378-PeCDF | 96.1 | |
| 23478-PeCDF | EMPC | | 0.153 | J | ES 23478-PeCDF | 96.9 | |
| 123478-HxCDF | 0.052 | | | J | ES 123478-HxCDF | 95.2 | |
| 123678-HxCDF | 0.0499 | | | J | ES 123678-HxCDF | 96.9 | |
| 234678-HxCDF | 0.0648 | | | J | ES 234678-HxCDF | 96.2 | |
| 123789-HxCDF | ND | 0.0212 | | | ES 123789-HxCDF | 95.1 | |
| 1234678-HpCDF | 0.197 | | | J B | ES 1234678-HpCDF | 94.5 | |
| 1234789-HpCDF | ND | 0.0262 | | | ES 1234789-HpCDF | 94.9 | |
| OCDF | 0.291 | | | J B | ES OCDF | 87.2 | |
| **Totals** | | | | | **Standard** | **CS/AS Recoveries** | |
| | | | | | CS 37Cl-2378-TCDD | 95.6 | |
| Total TCDD | 3.07 | | 3.19 | | CS 12347-PeCDD | 98.3 | |
| Total PeCDD | 0.228 | | 0.419 | | CS 12346-PeCDF | 99.2 | |
| Total HxCDD | 0.513 | | 0.594 | | CS 123469-HxCDF | 99.6 | |
| Total HpCDD | 1.12 | | 1.12 | | CS 1234689-HpCDF | 99.1 | |
| | | | | | AS 1368-TCDD | 79.4 | |
| Total TCDF | 4.27 | | 4.61 | | AS 1368-TCDF | 81.9 | |
| Total PeCDF | 1.37 | | 1.61 | | | | |
| Total HxCDF | 0.719 | | 0.719 | | | | |
| Total HpCDF | 0.425 | | 0.425 | | | | |
| **Total PCDD/Fs** | **16.9** | | **17.9** | | | | |
| **ITEF TEQs** | | | | | | | |
| TEQ: ND=0 | 0.116 | | 0.276 | | | | |
| TEQ: ND=DL/2 | 0.139 | 0.0379 | 0.278 | | | | |
| TEQ: ND=DL | 0.162 | 0.0759 | 0.279 | | | | |

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# Sample ID: LPR8-ECST-Comp05 — Method 1613B

| Client Data | | Sample Data | | Laboratory Data | | | |
|---|---|---|---|---|---|---|---|
| Name: | Windward Environmental, LLC | Matrix: | Tissue | Lab Project ID: | A3406 | Date Received: | 02-Aug-2011 |
| Project ID: | Passaic RI/FS Caged Bivalve Study | Weight/Volume: | 10.19 g | Lab Sample ID: | A3406_8929_DF_006 | Date Extracted: | 15-Aug-2011 |
| Date Collected: | 08-Jun-2011 | | | QC Batch No.: | 8929 | Date Analyzed: | 20-Aug-2011 |
| | | Split: | - | Dilution: | - | Time Analyzed: | 00:01:27 |

| Tetra-Dioxins | Conc. (pg/g) | Qualifiers | Penta-Dioxins | Conc. (pg/g) | Qualifiers | Hexa-Dioxins | Conc (pg/g) | Qualifiers | Hepta-Dioxins | Conc (pg/g) | Qualifiers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1368D | 0.353 | J B | 12479/12468D | [0.144] | J | 124679/124689D | 0.142 | J | 1234679D | 0.558 | J |
| 1379D | 0.147 | J | 12469D | [0.0473] | J | 123468D | (0.032) | | 1234678D | 0.559 | J |
| 1369D | (0.0306) | | 12368D | 0.107 | J | 123679/123689D | 0.224 | J | | | |
| 1469D | (0.0306) | | 12478D | 0.0582 | J | 123469D | (0.032) | | | | |
| 1247D...[4] | (0.0306) | | 12379D | (0.0271) | | 123478D | 0.0353 | J | | | |
| 1378D | [0.0413] | J | 12369D...[3] | (0.0271) | | 123678D | [0.0809] | J | | | |
| 1268D | (0.0306) | | 12346/12347D | (0.0271) | | 123467D | (0.032) | | | | |
| 1478D | (0.0306) | | 12378D | 0.0624 | J | 123789D | 0.113 | J B | **Conc.** | 1.12 | |
| 1279D | (0.0306) | | 12367D | (0.0271) | | | | | **EMPC** | 1.12 | |
| 1234/1269D | (0.0306) | | 12389D | (0.0271) | | | | | | | |
| 1236D | (0.0306) | | | | | | | | **Octa-Dioxin** | **Conc** | **Qualifiers** |
| 1237/1238D | 2.57 | | | | | | | | | **(pg/g)** | |
| 1239D | (0.0306) | | | | | | | | OCDD | 4.92 | |
| 2378D | [0.0765] | J | | | | | | | | | |
| 1278D | (0.0306) | | | | | | | | | | |
| 1267D | (0.0306) | | | | | | | | | | |
| 1289D | (0.0306) | | | | | | | | | | |
| **Conc.** | 3.07 | | **Conc.** | 0.228 | | **Conc.** | 0.513 | | | | |
| **EMPC** | 3.19 | | **EMPC** | 0.419 | | **EMPC** | 0.594 | | | | |

| ITEF TEQs | Conc. | EMPC |
|---|---|---|
| TEQ: ND=0 | 0.116 | 0.276 |
| TEQ: ND=DL/2 | 0.139 | 0.278 |
| TEQ: ND=DL | 0.162 | 0.279 |

| | Conc. | EMPC |
|---|---|---|
| **Total PCDD/Fs** | 16.9 | 17.9 |

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Checkcode: 924-046-MYW

Report Created: 25-Aug-2011 10:36 Analyst: AP

# Sample ID: LPR8-ECST-Comp05 — Method 1613B

| Client Data | | Sample Data | | Laboratory Data | | | |
|---|---|---|---|---|---|---|---|
| Name: | Windward Environmental, LLC | Matrix: | Tissue | Lab Project ID: | A3406 | Date Received: | 02 Aug 2011 |
| Project ID: | Passaic RI/FS Caged Bivalve Study | Weight/Volume: | 10.19 g | Lab Sample ID: | A3406_8929_DF_006 | Date Extracted: | 15 Aug 2011 |
| Date Collected: | 08 Jun 2011 | | | QC Batch No.: | 8929 | Date Analyzed: | 20 Aug 2011 |
| | | Split: | - | Dilution: | - | Time Analyzed: | 00:01:27 |

| Tetra-Furans | Conc. (pg/g) | Qualifiers | Penta-Furans | Conc. (pg/g) | Qualifiers | Hexa-Furans | Conc (pg/g) | Qualifiers | Hepta-Furans | Conc (pg/g) | Qualifiers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1368F | 0.124 | J | 13468/12468F | 0.372 | J | 123468F | 0.0802 | J B | 1234678F | 0.197 | J B |
| 1468F | [0.148] | J | 13678F...[3] | 0.253 | J | 124678/134678F | 0.27 | J | 1234679F | (0.0216) | |
| 2468F | 0.44 | J | 12368F...[3] | 0.38 | J | 134679F | (0.0166) | | 1234689F | 0.228 | J |
| 1346/1246F | 0.151 | J | 14678F | [0.0456] | J | 124679F | (0.0166) | | 1234789F | (0.0262) | |
| 1347F...[3] | 0.25 | J | 13479F | (0.0217) | | 124689F | 0.173 | J | | | |
| 1348F | 0.102 | J | 13469/12479F | [0.0379] | J | 123467F | 0.0289 | J | | | |
| 1248F...[3] | 0.434 | J | 12346F | (0.0217) | | 123478F | 0.052 | J | | | |
| 1268F | 0.18 | J | 23468/12469F | 0.15 | J | 123678F | 0.0499 | J | | | |
| 1467F | 0.297 | J | 12347F | (0.0217) | | 123479F | (0.0166) | | | | |
| 1478F | 0.349 | J | 12348F | (0.0217) | | 123469F | (0.0166) | | | | |
| 1369/1237F | 0.0454 | J | 12378F | 0.0428 | J | 123679F | (0.0166) | | | | |
| 2467F | 0.177 | J | 12678/12367F | 0.09 | J | 234678F | 0.0648 | J | **Conc.** | 0.425 | |
| 2368F | 0.273 | J | 12379F | (0.0217) | | 234678/123689F | (0.0154) | | **EMPC** | 0.425 | |
| 1238F...[5] | 0.119 | J | 12679F | (0.0217) | | 123689F | (0.0166) | | | | |
| 1278F | 0.223 | J | 23467/12369F | 0.0853 | J | 123789F | (0.0212) | | **Octa-Furan** | **Conc (pg/g)** | **Qualifiers** |
| 1349F | (0.0282) | | 23478F | [0.153] | J | 123789/123489F | (0.0212) | | | | |
| 1267F | [0.0938] | J | 23478/12489F | (0.0209) | | 123489F | (0.0166) | | OCDF | 0.291 | J B |
| 2346/1249F | 0.0784 | J | 12489F | (0.0217) | | | | | | | |
| 2347/1279F | 0.103 | J | 12349F | (0.0217) | | | | | | | |
| 2348F | 0.0623 | J | 12389F | (0.0217) | | | | | | | |
| 2378F | 0.379 | J | | | | | | | | | |
| 2367/3467F | 0.484 | J | | | | | | | | | |
| 1269F | [0.0316] | J | | | | | | | | | |
| 1239F | (0.0282) | | | | | | | | | | |
| 1289F | [0.0678] | J | | | | | | | | | |
| **Conc.** | 4.27 | | **Conc.** | 1.37 | | **Conc.** | 0.719 | | | | |
| **EMPC** | 4.61 | | **EMPC** | 1.61 | | **EMPC** | 0.719 | | | | |

Checkcode: 924-046-MYW

Report Created: 25-Aug-2011 10:36 Analyst: AP

# Sample ID: LPR8-ECST-Comp05 — TEQ Summary — Method 1613B

| | | | | | |
|---|---|---|---|---|---|
| Client Project Name: | Windward Environmental, LLC | Matrix: | Tissue | Lab Sample ID: | A3406_8929_DF_006 |
| Cliend Project ID: | Passaic RI/FS Caged Bivalve Study | Weight/Volume: | 10.19 g | QC Batch No.: | 8929 |
| Date Collected: | 08-Jun-2011 | Split: | - | Date Extracted: | 15-Aug-2011 |
| Date Received: | 02-Aug-2011 | Dilution: | - | Date Analyzed: | 20-Aug-2011 00:01 |
| Lab Project No: | A3406 | Units | pg/g | | |

| Analyte | Result | Qualifiers | DLs | I-TEQ | WHO-1998 | WHO-2005 |
|---|---|---|---|---|---|---|
| 2378-TCDD | [0.0765] | J | 0.0306 | [0.0765] | [0.0765] | [0.0765] |
| 12378-PeCDD | 0.0624 | J | 0.0271 | 0.0312 | 0.0624 | 0.0624 |
| 123478-HxCDD | 0.0353 | J | 0.0306 | 0.00353 | 0.00353 | 0.00353 |
| 123678-HxCDD | [0.0809] | J | 0.0303 | [0.00809] | [0.00809] | [0.00809] |
| 123789-HxCDD | 0.113 | J B | 0.0355 | 0.0113 | 0.0113 | 0.0113 |
| 1234678-HpCDD | 0.559 | J | 0.0375 | 0.00559 | 0.00559 | 0.00559 |
| OCDD | 4.92 | | 0.0728 | 0.00492 | 0.000492 | 0.00148 |
| | | | | | | |
| 2378-TCDF | 0.379 | J | 0.0282 | 0.0379 | 0.0379 | 0.0379 |
| 12378-PeCDF | 0.0428 | J | 0.0227 | 0.00214 | 0.00214 | 0.00128 |
| 23478-PeCDF | [0.153] | J | 0.0209 | [0.0763] | [0.0763] | [0.0458] |
| 123478-HxCDF | 0.052 | J | 0.016 | 0.0052 | 0.0052 | 0.0052 |
| 123678-HxCDF | 0.0499 | J | 0.0148 | 0.00499 | 0.00499 | 0.00499 |
| 234678-HxCDF | 0.0648 | J | 0.0154 | 0.00648 | 0.00648 | 0.00648 |
| 123789-HxCDF | (0.0212) | | 0.0212 | (0.00212) | (0.00212) | (0.00212) |
| 1234678-HpCDF | 0.197 | J B | 0.0179 | 0.00197 | 0.00197 | 0.00197 |
| 1234789-HpCDF | (0.0262) | | 0.0262 | (0.000262) | (0.000262) | (0.000262) |
| OCDF | 0.291 | J B | 0.0495 | 0.000291 | 0.0000291 | 0.0000874 |

| TEQ Summaries | | | |
|---|---|---|---|
| EMPC = 0, ND = 0 | 0.116 | 0.142 | 0.142 |
| EMPC = 0, ND = DL / 2 | 0.139 | 0.165 | 0.163 |
| EMPC = 0, ND = DL | 0.162 | 0.188 | 0.185 |
| EMPC = 0, < J-level = 0 | 0.00492 | 0.000492 | 0.00148 |
| | | | |
| EMPC = EMPC, ND = 0 | 0.276 | 0.303 | 0.273 |
| EMPC = EMPC, ND = DL / 2 | 0.278 | 0.304 | 0.274 |
| EMPC = EMPC, ND = DL | 0.279 | 0.305 | 0.275 |
| EMPC = EMPC, < J-level = 0 | 0.166 | 0.161 | 0.132 |

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# Sample ID: LPR1-GDST-Comp01 — Method 1613B

| Client Data | | Sample Data | | Laboratory Data | | | |
|---|---|---|---|---|---|---|---|
| Name: | Windward Environmental, LLC | Matrix: | Tissue | Lab Project ID: | A3406 | Date Received: | 02-Aug-2011 |
| Project ID: | Passaic RI/FS Caged Bivalve Study | Weight/Volume: | 10.03 g | Lab Sample ID | A3406_8929_DF_007 | Date Extracted: | 15-Aug-2011 |
| Date Collected: | 09-May-2011 | | | QC Batch No: | 8929 | Date Analyzed: | 20-Aug-2011 |
| | | Split: | - | Dilution: | - | Time Analyzed: | 00:49:03 |

| Analyte | Conc. (pg/g) | DL (pg/g) | EMPC (pg/g) | Qualifiers | Standard | ES Recoveries | Qualifiers |
|---|---|---|---|---|---|---|---|
| 2378-TCDD | 1.21 | | | | ES 2378-TCDD | 91.8 | |
| 12378-PeCDD | EMPC | | 0.0457 | J | ES 12378-PeCDD | 91.4 | |
| 123478-HxCDD | ND | 0.0397 | | | ES 123478-HxCDD | 89.7 | |
| 123678-HxCDD | 0.0794 | | | J | ES 123678-HxCDD | 90.8 | |
| 123789-HxCDD | 0.109 | | | J B | ES 123789-HxCDD | 91.9 | |
| 1234678-HpCDD | EMPC | | 0.275 | J | ES 1234678-HpCDD | 91.6 | |
| OCDD | 3.85 | | | J | ES OCDD | 88.1 | |
| | | | | | | | |
| 2378-TCDF | 0.219 | | | J | ES 2378-TCDF | 89.2 | |
| 12378-PeCDF | ND | 0.0261 | | | ES 12378-PeCDF | 91.7 | |
| 23478-PeCDF | 0.172 | | | J | ES 23478-PeCDF | 92.3 | |
| 123478-HxCDF | EMPC | | 0.0767 | J | ES 123478-HxCDF | 90.5 | |
| 123678-HxCDF | 0.0356 | | | J | ES 123678-HxCDF | 90.8 | |
| 234678-HxCDF | 0.0473 | | | J | ES 234678-HxCDF | 90.4 | |
| 123789-HxCDF | ND | 0.0317 | | | ES 123789-HxCDF | 90.9 | |
| 1234678-HpCDF | 0.371 | | | J | ES 1234678-HpCDF | 90.5 | |
| 1234789-HpCDF | ND | 0.0312 | | | ES 1234789-HpCDF | 92.2 | |
| OCDF | 0.582 | | | J | ES OCDF | 87.3 | |
| **Totals** | | | | | **Standard** | **CS/AS Recoveries** | |
| | | | | | CS 37Cl-2378-TCDD | 91.3 | |
| Total TCDD | 5.08 | | 5.19 | | CS 12347-PeCDD | 91.4 | |
| Total PeCDD | 1.44 | | 1.49 | | CS 12346-PeCDF | 92.7 | |
| Total HxCDD | 2.98 | | 2.98 | | CS 123469-HxCDF | 92.7 | |
| Total HpCDD | 0.546 | | 0.821 | | CS 1234689-HpCDF | 92.9 | |
| | | | | | AS 1368-TCDD | 87.9 | |
| Total TCDF | 6.69 | | 6.69 | | AS 1368-TCDF | 88.5 | |
| Total PeCDF | 1.91 | | 2.04 | | | | |
| Total HxCDF | 0.538 | | 0.64 | | | | |
| Total HpCDF | 0.492 | | 0.492 | | | | |
| **Total PCDD/Fs** | **24.1** | | **24.8** | | | | |
| **ITEF TEQs** | | | | | | | |
| TEQ: ND=0 | 1.35 | | 1.39 | | | | |
| TEQ: ND=DL/2 | 1.37 | 0.0519 | 1.39 | | | | |
| TEQ: ND=DL | 1.38 | 0.104 | 1.4 | | | | |

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# Sample ID: LPR1-GDST-Comp01 — Method 1613B

| Client Data | | Sample Data | | Laboratory Data | | | |
|---|---|---|---|---|---|---|---|
| Name: | Windward Environmental, LLC | Matrix: | Tissue | Lab Project ID: | A3406 | Date Received: | 02-Aug-2011 |
| Project ID: | Passaic RI/FS Caged Bivalve Study | Weight/Volume: | 10.03 g | Lab Sample ID: | A3406_8929_DF_007 | Date Extracted: | 15-Aug-2011 |
| Date Collected: | 09-May-2011 | | | QC Batch No.: | 8929 | Date Analyzed: | 20-Aug-2011 |
| | | Split: | - | Dilution: | - | Time Analyzed: | 00:49:03 |

| Tetra-Dioxins | Conc. (pg/g) | Qualifiers | Penta-Dioxins | Conc. (pg/g) | Qualifiers | Hexa-Dioxins | Conc (pg/g) | Qualifiers | Hepta-Dioxins | Conc (pg/g) | Qualifiers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1368D | 0.583 | | 12479/12468D | 0.479 | J | 124679/124689D | 2.49 | J | 1234679D | 0.546 | J |
| 1379D | 0.14 | J | 12469D | 0.654 | J | 123468D | (0.0429) | | 1234678D | [0.275] | J |
| 1369D | 0.118 | J | 12368D | 0.0933 | J | 123679/123689D | 0.301 | J | | | |
| 1469D | 1.82 | | 12478D | 0.072 | J | 123469D | (0.0429) | | | | |
| 1247D...[4] | 0.187 | J | 12379D | (0.0383) | | 123478D | (0.0397) | | | | |
| 1378D | [0.107] | J | 12369D...[3] | 0.145 | J | 123678D | 0.0794 | J | | | |
| 1268D | (0.0437) | | 12346/12347D | (0.0383) | | 123467D | (0.0429) | | | | |
| 1478D | (0.0437) | | 12378D | [0.0457] | J | 123789D | 0.109 | J B | **Conc.** | 0.546 | |
| 1279D | (0.0437) | | 12367D | (0.0383) | | | | | **EMPC** | 0.821 | |
| 1234/1269D | 0.0706 | J | 12389D | (0.0383) | | | | | | | |
| 1236D | (0.0437) | | | | | | | | **Octa-Dioxin** | **Conc (pg/g)** | **Qualifiers** |
| 1237/1238D | 0.948 | | | | | | | | | | |
| 1239D | (0.0437) | | | | | | | | OCDD | 3.85 | J |
| 2378D | 1.21 | | | | | | | | | | |
| 1278D | (0.0437) | | | | | | | | | | |
| 1267D | (0.0437) | | | | | | | | | | |
| 1289D | (0.0437) | | | | | | | | | | |
| **Conc.** | 5.08 | | **Conc.** | 1.44 | | **Conc.** | 2.98 | | | | |
| **EMPC** | 5.19 | | **EMPC** | 1.49 | | **EMPC** | 2.98 | | | | |

| ITEF TEQs | Conc. | EMPC |
|---|---|---|
| TEQ: ND=0 | 1.35 | 1.39 |
| TEQ: ND=DL/2 | 1.37 | 1.39 |
| TEQ: ND=DL | 1.38 | 1.4 |

| | Conc. | EMPC |
|---|---|---|
| **Total PCDD/Fs** | 24.1 | 24.8 |

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Checkcode: 280-302-MHQ

Report Created: 25-Aug-2011 10:36 Analyst: AP

# Sample ID: LPR1-GDST-Comp01 Method 1613B

| Client Data | | Sample Data | | Laboratory Data | | | |
|---|---|---|---|---|---|---|---|
| Name: | Windward Environmental, LLC | Matrix: | Tissue | Lab Project ID: | A3406 | Date Received: | 02 Aug 2011 |
| Project ID: | Passaic RI/FS Caged Bivalve Study | Weight/Volume: | 10.03 g | Lab Sample ID: | A3406_8929_DF_007 | Date Extracted: | 15 Aug 2011 |
| Date Collected: | 09 May 2011 | | | QC Batch No.: | 8929 | Date Analyzed: | 20 Aug 2011 |
| | | Split: | - | Dilution: | - | Time Analyzed: | 00:49:03 |

| Tetra-Furans | Conc. (pg/g) | Qualifiers | Penta-Furans | Conc. (pg/g) | Qualifiers | Hexa-Furans | Conc (pg/g) | Qualifiers | Hepta-Furans | Conc (pg/g) | Qualifiers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1368F | 0.181 | J | 13468/12468F | 0.602 | J | 123468F | 0.0275 | J B | 1234678F | 0.371 | J |
| 1468F | 0.422 | J | 13678F...[3] | 0.19 | J | 124678/134678F | 0.205 | J | 1234679F | (0.0259) | |
| 2468F | 0.625 | | 12368F...[3] | 0.544 | J | 134679F | (0.0247) | | 1234689F | 0.121 | J |
| 1346/1246F | 0.301 | J | 14678F | 0.0549 | J | 124679F | [0.0252] | J | 1234789F | (0.0312) | |
| 1347F...[3] | 0.334 | J | 13479F | (0.0253) | | 124689F | 0.223 | J | | | |
| 1348F | 0.0868 | J | 13469/12479F | (0.0253) | | 123467F | (0.0247) | | | | |
| 1248F...[3] | 1.05 | | 12346F | (0.0253) | | 123478F | [0.0767] | J | | | |
| 1268F | 0.283 | J | 23468/12469F | 0.35 | J | 123678F | 0.0356 | J | | | |
| 1467F | 0.197 | J | 12347F | (0.0253) | | 123479F | (0.0247) | | | | |
| 1478F | 0.412 | J | 12348F | (0.0253) | | 123469F | (0.0247) | | | | |
| 1369/1237F | 0.0664 | J | 12378F | (0.0261) | | 123679F | (0.0247) | | | | |
| 2467F | 0.129 | J | 12678/12367F | [0.0791] | J | 234678F | 0.0473 | J | **Conc.** | 0.492 | |
| 2368F | 0.386 | J | 12379F | (0.0253) | | 234678/123689F | (0.0226) | | **EMPC** | 0.492 | |
| 1238F...[5] | 0.419 | J | 12679F | (0.0253) | | 123689F | (0.0247) | | | | |
| 1278F | 0.193 | J | 23467/12369F | [0.048] | J | 123789F | (0.0317) | | **Octa-Furan** | **Conc (pg/g)** | **Qualifiers** |
| 1349F | (0.0339) | | 23478F | 0.172 | J | 123789/123489F | (0.0317) | | | | |
| 1267F | 0.0836 | J | 23478/12489F | (0.0246) | | 123489F | (0.0247) | | OCDF | 0.582 | J |
| 2346/1249F | 0.128 | J | 12489F | (0.0253) | | | | | | | |
| 2347/1279F | 0.105 | J | 12349F | (0.0253) | | | | | | | |
| 2348F | 0.639 | | 12389F | (0.0253) | | | | | | | |
| 2378F | 0.219 | J | | | | | | | | | |
| 2367/3467F | 0.3 | J | | | | | | | | | |
| 1269F | 0.0791 | J | | | | | | | | | |
| 1239F | (0.0339) | | | | | | | | | | |
| 1289F | 0.0503 | J | | | | | | | | | |
| **Conc.** | 6.69 | | **Conc.** | 1.91 | | **Conc.** | 0.538 | | | | |
| **EMPC** | 6.69 | | **EMPC** | 2.04 | | **EMPC** | 0.64 | | | | |

Checkcode: 280-302-MHQ

Report Created: 25-Aug-2011 10:36 Analyst: AP

# Sample ID: LPR1-GDST-Comp01 — TEQ Summary — Method 1613B

| | | | | | |
|---|---|---|---|---|---|
| Client Project Name: | Windward Environmental, LLC | Matrix: | Tissue | Lab Sample ID: | A3406_8929_DF_007 |
| Cliend Project ID: | Passaic RI/FS Caged Bivalve Study | Weight/Volume: | 10.03 g | QC Batch No.: | 8929 |
| Date Collected: | 09-May-2011 | Split: | - | Date Extracted: | 15-Aug-2011 |
| Date Received: | 02-Aug-2011 | Dilution: | - | Date Analyzed: | 20-Aug-2011 00:49 |
| Lab Project No: | A3406 | Units | pg/g | | |

| Analyte | Result | Qualifiers | DLs | I-TEQ | WHO-1998 | WHO-2005 |
|---|---|---|---|---|---|---|
| 2378-TCDD | 1.21 | | 0.0437 | 1.21 | 1.21 | 1.21 |
| 12378-PeCDD | [0.0457] | J | 0.0383 | [0.0229] | [0.0457] | [0.0457] |
| 123478-HxCDD | (0.0397) | | 0.0397 | (0.00397) | (0.00397) | (0.00397) |
| 123678-HxCDD | 0.0794 | J | 0.0424 | 0.00794 | 0.00794 | 0.00794 |
| 123789-HxCDD | 0.109 | J B | 0.0469 | 0.0109 | 0.0109 | 0.0109 |
| 1234678-HpCDD | [0.275] | J | 0.0351 | [0.00275] | [0.00275] | [0.00275] |
| OCDD | 3.85 | J | 0.0756 | 0.00385 | 0.000385 | 0.00115 |
| | | | | | | |
| 2378-TCDF | 0.219 | J | 0.0339 | 0.0219 | 0.0219 | 0.0219 |
| 12378-PeCDF | (0.0261) | | 0.0261 | (0.00131) | (0.00131) | (0.000783) |
| 23478-PeCDF | 0.172 | J | 0.0246 | 0.0859 | 0.0859 | 0.0516 |
| 123478-HxCDF | [0.0767] | J | 0.0228 | [0.00767] | [0.00767] | [0.00767] |
| 123678-HxCDF | 0.0356 | J | 0.0227 | 0.00356 | 0.00356 | 0.00356 |
| 234678-HxCDF | 0.0473 | J | 0.0226 | 0.00473 | 0.00473 | 0.00473 |
| 123789-HxCDF | (0.0317) | | 0.0317 | (0.00317) | (0.00317) | (0.00317) |
| 1234678-HpCDF | 0.371 | J | 0.0216 | 0.00371 | 0.00371 | 0.00371 |
| 1234789-HpCDF | (0.0312) | | 0.0312 | (0.000312) | (0.000312) | (0.000312) |
| OCDF | 0.582 | J | 0.07 | 0.000582 | 0.0000582 | 0.000174 |

| TEQ Summaries | | | |
|---|---|---|---|
| EMPC = 0, ND = 0 | 1.35 | 1.35 | 1.32 |
| EMPC = 0, ND = DL / 2 | 1.37 | 1.37 | 1.34 |
| EMPC = 0, ND = DL | 1.38 | 1.4 | 1.37 |
| EMPC = 0, < J-level = 0 | 1.21 | 1.21 | 1.21 |
| | | | |
| EMPC = EMPC, ND = 0 | 1.39 | 1.41 | 1.37 |
| EMPC = EMPC, ND = DL / 2 | 1.39 | 1.41 | 1.38 |
| EMPC = EMPC, ND = DL | 1.4 | 1.41 | 1.38 |
| EMPC = EMPC, < J-level = 0 | 1.24 | 1.27 | 1.27 |

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# Sample ID: LPRBG-GDST-Comp01 — Method 1613B

| Client Data | | Sample Data | | Laboratory Data | | | |
|---|---|---|---|---|---|---|---|
| Name: | Windward Environmental, LLC | Matrix: | Tissue | Lab Project ID: | A3406 | Date Received: | 02-Aug-2011 |
| Project ID: | Passaic RI/FS Caged Bivalve Study | Weight/Volume: | 10.20 g | Lab Sample ID | A3406_8929_DF_008 | Date Extracted: | 15-Aug-2011 |
| Date Collected: | 08-Mar-2011 | | | QC Batch No: | 8929 | Date Analyzed: | 20-Aug-2011 |
| | | Split: | - | Dilution: | - | Time Analyzed: | 01:36:41 |

| Analyte | Conc. (pg/g) | DL (pg/g) | EMPC (pg/g) | Qualifiers | Standard | ES Recoveries | Qualifiers |
|---|---|---|---|---|---|---|---|
| 2378-TCDD | EMPC | | 0.0311 | J | ES 2378-TCDD | 87 | |
| 12378-PeCDD | 0.0587 | | | J | ES 12378-PeCDD | 89 | |
| 123478-HxCDD | ND | 0.0355 | | | ES 123478-HxCDD | 91 | |
| 123678-HxCDD | 0.0659 | | | J | ES 123678-HxCDD | 93.1 | |
| 123789-HxCDD | EMPC | | 0.123 | J B | ES 123789-HxCDD | 94.7 | |
| 1234678-HpCDD | 0.359 | | | J | ES 1234678-HpCDD | 90.9 | |
| OCDD | 3.32 | | | J | ES OCDD | 88.4 | |
| | | | | | | | |
| 2378-TCDF | 0.0494 | | | J | ES 2378-TCDF | 84.4 | |
| 12378-PeCDF | ND | 0.0206 | | | ES 12378-PeCDF | 88.7 | |
| 23478-PeCDF | ND | 0.0193 | | | ES 23478-PeCDF | 89.7 | |
| 123478-HxCDF | EMPC | | 0.0149 | J | ES 123478-HxCDF | 88.5 | |
| 123678-HxCDF | 0.0126 | | | J | ES 123678-HxCDF | 87.7 | |
| 234678-HxCDF | 0.0183 | | | J | ES 234678-HxCDF | 89.7 | |
| 123789-HxCDF | ND | 0.0163 | | | ES 123789-HxCDF | 92.1 | |
| 1234678-HpCDF | 0.0289 | | | J B | ES 1234678-HpCDF | 88.9 | |
| 1234789-HpCDF | ND | 0.0268 | | | ES 1234789-HpCDF | 90 | |
| OCDF | EMPC | | 0.0634 | J B | ES OCDF | 90.2 | |
| **Totals** | | | | | **Standard** | **CS/AS Recoveries** | |
| | | | | | CS 37Cl-2378-TCDD | 87.6 | |
| Total TCDD | 3.29 | | 3.45 | | CS 12347-PeCDD | 88.7 | |
| Total PeCDD | 2.47 | | 2.5 | | CS 12346-PeCDF | 88.7 | |
| Total HxCDD | 5.09 | | 5.21 | | CS 123469-HxCDF | 90.5 | |
| Total HpCDD | 1.82 | | 1.82 | | CS 1234689-HpCDF | 90.6 | |
| | | | | | AS 1368-TCDD | 78.7 | |
| Total TCDF | 1.31 | | 1.48 | | AS 1368-TCDF | 79.2 | |
| Total PeCDF | 0.271 | | 0.325 | | | | |
| Total HxCDF | 0.0581 | | 0.12 | | | | |
| Total HpCDF | 0.0289 | | 0.0289 | | | | |
| **Total PCDD/Fs** | **17.7** | | **18.3** | | | | |
| **ITEF TEQs** | | | | | | | |
| TEQ: ND=0 | 0.0512 | | 0.0961 | | | | |
| TEQ: ND=DL/2 | 0.0779 | 0.0397 | 0.104 | | | | |
| TEQ: ND=DL | 0.105 | 0.0794 | 0.112 | | | | |

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# Sample ID: LPRBG-GDST-Comp01 — Method 1613B

| Client Data | | Sample Data | | Laboratory Data | | | |
|---|---|---|---|---|---|---|---|
| Name: | Windward Environmental, LLC | Matrix: | Tissue | Lab Project ID: | A3406 | Date Received: | 02-Aug-2011 |
| Project ID: | Passaic RI/FS Caged Bivalve Study | Weight/Volume: | 10.20 g | Lab Sample ID: | A3406_8929_DF_008 | Date Extracted: | 15-Aug-2011 |
| Date Collected: | 08-Mar-2011 | | | QC Batch No.: | 8929 | Date Analyzed: | 20-Aug-2011 |
| | | Split: | - | Dilution: | - | Time Analyzed: | 01:36:41 |

| Tetra-Dioxins | Conc. (pg/g) | Qualifiers | Penta-Dioxins | Conc. (pg/g) | Qualifiers | Hexa-Dioxins | Conc (pg/g) | Qualifiers | Hepta-Dioxins | Conc (pg/g) | Qualifiers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1368D | 0.193 | J B | 12479/12468D | 0.781 | J | 124679/124689D | 4.32 | | 1234679D | 1.46 | J |
| 1379D | 0.118 | J | 12469D | 1.11 | J | 123468D | (0.0371) | | 1234678D | 0.359 | J |
| 1369D | 0.182 | J | 12368D | (0.033) | | 123679/123689D | 0.698 | J | | | |
| 1469D | 2.54 | | 12478D | 0.142 | J | 123469D | (0.0371) | | | | |
| 1247D...[4] | 0.255 | J | 12379D | [0.0362] | J | 123478D | (0.0355) | | | | |
| 1378D | (0.0318) | | 12369D...[3] | 0.375 | J | 123678D | 0.0659 | J | | | |
| 1268D | (0.0318) | | 12346/12347D | (0.033) | | 123467D | (0.0371) | | | | |
| 1478D | (0.0318) | | 12378D | 0.0587 | J | 123789D | [0.123] | J B | **Conc.** | 1.82 | |
| 1279D | (0.0318) | | 12367D | (0.033) | | | | | **EMPC** | 1.82 | |
| 1234/1269D | [0.124] | J | 12389D | (0.033) | | | | | | | |
| 1236D | (0.0318) | | | | | | | | **Octa-Dioxin** | **Conc (pg/g)** | **Qualifiers** |
| 1237/1238D | (0.0318) | | | | | | | | | | |
| 1239D | (0.0318) | | | | | | | | OCDD | 3.32 | J |
| 2378D | [0.0311] | J | | | | | | | | | |
| 1278D | (0.0318) | | | | | | | | | | |
| 1267D | (0.0318) | | | | | | | | | | |
| 1289D | (0.0318) | | | | | | | | | | |
| **Conc.** | 3.29 | | **Conc.** | 2.47 | | **Conc.** | 5.09 | | | | |
| **EMPC** | 3.45 | | **EMPC** | 2.5 | | **EMPC** | 5.21 | | | | |

| ITEF TEQs | Conc. | EMPC |
|---|---|---|
| TEQ: ND=0 | 0.0512 | 0.0961 |
| TEQ: ND=DL/2 | 0.0779 | 0.104 |
| TEQ: ND=DL | 0.105 | 0.112 |

| | Conc. | EMPC |
|---|---|---|
| **Total PCDD/Fs** | 17.7 | 18.3 |

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Checkcode: 241-820-BDS

Report Created: 25-Aug-2011 10:36 Analyst: AP

# Sample ID: LPRBG-GDST-Comp01 — Method 1613B

| Client Data | | Sample Data | | Laboratory Data | | | |
|---|---|---|---|---|---|---|---|
| Name: | Windward Environmental, LLC | Matrix: | Tissue | Lab Project ID: | A3406 | Date Received: | 02 Aug 2011 |
| Project ID: | Passaic RI/FS Caged Bivalve Study | Weight/Volume: | 10.20 g | Lab Sample ID: | A3406_8929_DF_008 | Date Extracted: | 15 Aug 2011 |
| Date Collected: | 08 Mar 2011 | | | QC Batch No.: | 8929 | Date Analyzed: | 20 Aug 2011 |
| | | Split: | - | Dilution: | - | Time Analyzed: | 01:36:41 |

| Tetra-Furans | Conc. (pg/g) | Qualifiers | Penta-Furans | Conc. (pg/g) | Qualifiers | Hexa-Furans | Conc (pg/g) | Qualifiers | Hepta-Furans | Conc (pg/g) | Qualifiers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1368F | 0.163 | J | 13468/12468F | 0.143 | J | 123468F | (0.0132) | | 1234678F | 0.0289 | J B |
| 1468F | 0.158 | J | 13678F...[3] | 0.0594 | J | 124678/134678F | 0.0272 | J | 1234679F | (0.0224) | |
| 2468F | 0.373 | J | 12368F...[3] | 0.0692 | J | 134679F | (0.0132) | | 1234689F | (0.0224) | |
| 1346/1246F | [0.0492] | J | 14678F | (0.0199) | | 124679F | (0.0132) | | 1234789F | (0.0268) | |
| 1347F...[3] | 0.125 | J | 13479F | (0.0199) | | 124689F | [0.0473] | J | | | |
| 1348F | 0.0418 | J | 13469/12479F | (0.0199) | | 123467F | (0.0132) | | | | |
| 1248F...[3] | [0.0716] | J | 12346F | (0.0199) | | 123478F | [0.0149] | J | | | |
| 1268F | [0.0537] | J | 23468/12469F | [0.0536] | J | 123678F | 0.0126 | J | | | |
| 1467F | 0.0671 | J | 12347F | (0.0199) | | 123479F | (0.0132) | | | | |
| 1478F | 0.061 | J | 12348F | (0.0199) | | 123469F | (0.0132) | | | | |
| 1369/1237F | (0.0301) | | 12378F | (0.0206) | | 123679F | (0.0132) | | | | |
| 2467F | 0.0477 | J | 12678/12367F | (0.0199) | | 234678F | 0.0183 | J | **Conc.** | 0.0289 | |
| 2368F | 0.057 | J | 12379F | (0.0199) | | 234678/123689F | (0.0121) | | **EMPC** | 0.0289 | |
| 1238F...[5] | 0.0832 | J | 12679F | (0.0199) | | 123689F | (0.0132) | | | | |
| 1278F | (0.0301) | | 23467/12369F | (0.0199) | | 123789F | (0.0163) | | **Octa-Furan** | **Conc (pg/g)** | **Qualifiers** |
| 1349F | (0.0301) | | 23478F | (0.0193) | | 123789/123489F | (0.0163) | | | | |
| 1267F | (0.0301) | | 23478/12489F | (0.0193) | | 123489F | (0.0132) | | OCDF | [0.0634] | J B |
| 2346/1249F | (0.0301) | | 12489F | (0.0199) | | | | | | | |
| 2347/1279F | (0.0301) | | 12349F | (0.0199) | | | | | | | |
| 2348F | (0.0301) | | 12389F | (0.0199) | | | | | | | |
| 2378F | 0.0494 | J | | | | | | | | | |
| 2367/3467F | 0.0844 | J | | | | | | | | | |
| 1269F | (0.0301) | | | | | | | | | | |
| 1239F | (0.0301) | | | | | | | | | | |
| 1289F | (0.0301) | | | | | | | | | | |
| **Conc.** | 1.31 | | **Conc.** | 0.271 | | **Conc.** | 0.0581 | | | | |
| **EMPC** | 1.48 | | **EMPC** | 0.325 | | **EMPC** | 0.12 | | | | |

Checkcode: 241-820-BDS

Report Created: 25-Aug-2011 10:36 Analyst: AP

# Sample ID: LPRBG-GDST-Comp01 — TEQ Summary — Method 1613B

| | | | | | |
|---|---|---|---|---|---|
| Client Project Name: | Windward Environmental, LLC | Matrix: | Tissue | Lab Sample ID: | A3406_8929_DF_008 |
| Cliend Project ID: | Passaic RI/FS Caged Bivalve Study | Weight/Volume: | 10.20 g | QC Batch No.: | 8929 |
| Date Collected: | 08-Mar-2011 | Split: | - | Date Extracted: | 15-Aug-2011 |
| Date Received: | 02-Aug-2011 | Dilution: | - | Date Analyzed: | 20-Aug-2011 01:36 |
| Lab Project No: | A3406 | Units | pg/g | | |

| Analyte | Result | Qualifiers | DLs | I-TEQ | WHO-1998 | WHO-2005 |
|---|---|---|---|---|---|---|
| 2378-TCDD | [0.0311] | J | 0.0318 | [0.0311] | [0.0311] | [0.0311] |
| 12378-PeCDD | 0.0587 | J | 0.033 | 0.0294 | 0.0587 | 0.0587 |
| 123478-HxCDD | (0.0355) | | 0.0355 | (0.00355) | (0.00355) | (0.00355) |
| 123678-HxCDD | 0.0659 | J | 0.0348 | 0.00659 | 0.00659 | 0.00659 |
| 123789-HxCDD | [0.123] | J B | 0.0414 | [0.0123] | [0.0123] | [0.0123] |
| 1234678-HpCDD | 0.359 | J | 0.039 | 0.00359 | 0.00359 | 0.00359 |
| OCDD | 3.32 | J | 0.0501 | 0.00332 | 0.000332 | 0.000996 |
| | | | | | | |
| 2378-TCDF | 0.0494 | J | 0.0301 | 0.00494 | 0.00494 | 0.00494 |
| 12378-PeCDF | (0.0206) | | 0.0206 | (0.00103) | (0.00103) | (0.000618) |
| 23478-PeCDF | (0.0193) | | 0.0193 | (0.00965) | (0.00965) | (0.00579) |
| 123478-HxCDF | [0.0149] | J | 0.0128 | [0.00149] | [0.00149] | [0.00149] |
| 123678-HxCDF | 0.0126 | J | 0.012 | 0.00126 | 0.00126 | 0.00126 |
| 234678-HxCDF | 0.0183 | J | 0.0121 | 0.00183 | 0.00183 | 0.00183 |
| 123789-HxCDF | (0.0163) | | 0.0163 | (0.00163) | (0.00163) | (0.00163) |
| 1234678-HpCDF | 0.0289 | J B | 0.0188 | 0.000289 | 0.000289 | 0.000289 |
| 1234789-HpCDF | (0.0268) | | 0.0268 | (0.000268) | (0.000268) | (0.000268) |
| OCDF | [0.0634] | J B | 0.0485 | [0.0000634] | [0.00000634] | [0.000019] |

| TEQ Summaries | | | |
|---|---|---|---|
| EMPC = 0, ND = 0 | 0.0512 | 0.0775 | 0.0782 |
| EMPC = 0, ND = DL / 2 | 0.0779 | 0.104 | 0.103 |
| EMPC = 0, ND = DL | 0.105 | 0.131 | 0.127 |
| EMPC = 0, < J-level = 0 | 0 | 0 | 0 |
| | | | |
| EMPC = EMPC, ND = 0 | 0.0961 | 0.122 | 0.123 |
| EMPC = EMPC, ND = DL / 2 | 0.104 | 0.13 | 0.129 |
| EMPC = EMPC, ND = DL | 0.112 | 0.139 | 0.135 |
| EMPC = EMPC, < J-level = 0 | 0.0449 | 0.0449 | 0.0449 |

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# Sample ID: LPR2-GDST-Comp02 — Method 1613B

| Client Data | | Sample Data | | Laboratory Data | | | |
|---|---|---|---|---|---|---|---|
| Name: | Windward Environmental, LLC | Matrix: | Tissue | Lab Project ID: | A3406 | Date Received: | 02-Aug-2011 |
| Project ID: | Passaic RI/FS Caged Bivalve Study | Weight/Volume: | 10.13 g | Lab Sample ID | A3406_8929_DF_009 | Date Extracted: | 15-Aug-2011 |
| Date Collected: | 09-May-2011 | | | QC Batch No: | 8929 | Date Analyzed: | 20-Aug-2011 |
| | | Split: | - | Dilution: | - | Time Analyzed: | 02:24:17 |

| Analyte | Conc. (pg/g) | DL (pg/g) | EMPC (pg/g) | Qualifiers | Standard | ES Recoveries | Qualifiers |
|---|---|---|---|---|---|---|---|
| 2378-TCDD | 0.54 | | | | ES 2378-TCDD | 90.9 | |
| 12378-PeCDD | ND | 0.0443 | | | ES 12378-PeCDD | 89 | |
| 123478-HxCDD | ND | 0.0518 | | | ES 123478-HxCDD | 92.2 | |
| 123678-HxCDD | ND | 0.0519 | | | ES 123678-HxCDD | 93 | |
| 123789-HxCDD | 0.112 | | | J B | ES 123789-HxCDD | 92.7 | |
| 1234678-HpCDD | EMPC | | 0.248 | J | ES 1234678-HpCDD | 91.6 | |
| OCDD | 2.98 | | | J | ES OCDD | 88.3 | |
| | | | | | | | |
| 2378-TCDF | 0.0913 | | | J | ES 2378-TCDF | 87.4 | |
| 12378-PeCDF | ND | 0.04 | | | ES 12378-PeCDF | 88.7 | |
| 23478-PeCDF | ND | 0.0369 | | | ES 23478-PeCDF | 89.2 | |
| 123478-HxCDF | 0.0687 | | | J | ES 123478-HxCDF | 91.1 | |
| 123678-HxCDF | EMPC | | 0.027 | J | ES 123678-HxCDF | 88.7 | |
| 234678-HxCDF | 0.0328 | | | J | ES 234678-HxCDF | 90.3 | |
| 123789-HxCDF | ND | 0.0327 | | | ES 123789-HxCDF | 91.2 | |
| 1234678-HpCDF | 0.265 | | | J | ES 1234678-HpCDF | 90.6 | |
| 1234789-HpCDF | ND | 0.0335 | | | ES 1234789-HpCDF | 92 | |
| OCDF | 0.435 | | | J B | ES OCDF | 87 | |
| **Totals** | | | | | **Standard** | **CS/AS Recoveries** | |
| | | | | | CS 37Cl-2378-TCDD | 88 | |
| Total TCDD | 3.37 | | 3.55 | | CS 12347-PeCDD | 84.9 | |
| Total PeCDD | 1.43 | | 1.43 | | CS 12346-PeCDF | 87 | |
| Total HxCDD | 3.59 | | 3.59 | | CS 123469-HxCDF | 89.5 | |
| Total HpCDD | 0.613 | | 0.861 | | CS 1234689-HpCDF | 89 | |
| | | | | | AS 1368-TCDD | 87.5 | |
| Total TCDF | 2.58 | | 2.95 | | AS 1368-TCDF | 88.3 | |
| Total PeCDF | 0.75 | | 0.75 | | | | |
| Total HxCDF | 0.219 | | 0.354 | | | | |
| Total HpCDF | 0.375 | | 0.375 | | | | |
| **Total PCDD/Fs** | **16.3** | | **17.3** | | | | |
| **ITEF TEQs** | | | | | | | |
| TEQ: ND=0 | 0.576 | | 0.582 | | | | |
| TEQ: ND=DL/2 | 0.606 | 0.0606 | 0.61 | | | | |
| TEQ: ND=DL | 0.636 | 0.121 | 0.638 | | | | |

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# Sample ID: LPR2-GDST-Comp02 — Method 1613B

| Client Data | | Sample Data | | Laboratory Data | | | |
|---|---|---|---|---|---|---|---|
| Name: | Windward Environmental, LLC | Matrix: | Tissue | Lab Project ID: | A3406 | Date Received: | 02-Aug-2011 |
| Project ID: | Passaic RI/FS Caged Bivalve Study | Weight/Volume: | 10.13 g | Lab Sample ID: | A3406_8929_DF_009 | Date Extracted: | 15-Aug-2011 |
| Date Collected: | 09-May-2011 | | | QC Batch No.: | 8929 | Date Analyzed: | 20-Aug-2011 |
| | | Split: | - | Dilution: | - | Time Analyzed: | 02:24:17 |

| Tetra-Dioxins | Conc. (pg/g) | Qualifiers | Penta-Dioxins | Conc. (pg/g) | Qualifiers | Hexa-Dioxins | Conc (pg/g) | Qualifiers | Hepta-Dioxins | Conc (pg/g) | Qualifiers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1368D | 0.314 | J B | 12479/12468D | 0.473 | J | 124679/124689D | 3.08 | | 1234679D | 0.613 | J |
| 1379D | 0.133 | J | 12469D | 0.704 | J | 123468D | (0.0545) | | 1234678D | [0.248] | J |
| 1369D | [0.114] | J | 12368D | (0.0443) | | 123679/123689D | 0.399 | J | | | |
| 1469D | 1.72 | | 12478D | 0.088 | J | 123469D | (0.0545) | | | | |
| 1247D...[4] | 0.18 | J | 12379D | (0.0443) | | 123478D | (0.0518) | | | | |
| 1378D | [0.0644] | J | 12369D...[3] | 0.166 | J | 123678D | (0.0519) | | | | |
| 1268D | (0.0463) | | 12346/12347D | (0.0443) | | 123467D | (0.0545) | | | | |
| 1478D | (0.0463) | | 12378D | (0.0443) | | 123789D | 0.112 | J B | **Conc.** | 0.613 | |
| 1279D | (0.0463) | | 12367D | (0.0443) | | | | | **EMPC** | 0.861 | |
| 1234/1269D | 0.0713 | J | 12389D | (0.0443) | | | | | | | |
| 1236D | (0.0463) | | | | | | | | **Octa-Dioxin** | **Conc (pg/g)** | **Qualifiers** |
| 1237/1238D | 0.415 | J | | | | | | | | | |
| 1239D | (0.0463) | | | | | | | | OCDD | 2.98 | J |
| 2378D | 0.54 | | | | | | | | | | |
| 1278D | (0.0463) | | | | | | | | | | |
| 1267D | (0.0463) | | | | | | | | | | |
| 1289D | (0.0463) | | | | | | | | | | |
| **Conc.** | 3.37 | | **Conc.** | 1.43 | | **Conc.** | 3.59 | | | | |
| **EMPC** | 3.55 | | **EMPC** | 1.43 | | **EMPC** | 3.59 | | | | |


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| ITEF TEQs | Conc. | EMPC |
|---|---|---|
| TEQ: ND=0 | 0.576 | 0.582 |
| TEQ: ND=DL/2 | 0.606 | 0.61 |
| TEQ: ND=DL | 0.636 | 0.638 |

| | Conc. | EMPC |
|---|---|---|
| **Total PCDD/Fs** | 16.3 | 17.3 |

Checkcode: 971-730-NPW

Report Created: 25-Aug-2011 10:36 Analyst: AP

# Sample ID: LPR2-GDST-Comp02 — Method 1613B

| Client Data | | Sample Data | | Laboratory Data | | | |
|---|---|---|---|---|---|---|---|
| Name: | Windward Environmental, LLC | Matrix: | Tissue | Lab Project ID: | A3406 | Date Received: | 02 Aug 2011 |
| Project ID: | Passaic RI/FS Caged Bivalve Study | Weight/Volume: | 10.13 g | Lab Sample ID: | A3406_8929_DF_009 | Date Extracted: | 15 Aug 2011 |
| Date Collected: | 09 May 2011 | | | QC Batch No.: | 8929 | Date Analyzed: | 20 Aug 2011 |
| | | Split: | - | Dilution: | - | Time Analyzed: | 02:24:17 |

| Tetra-Furans | Conc. (pg/g) | Qualifiers | Penta-Furans | Conc. (pg/g) | Qualifiers | Hexa-Furans | Conc (pg/g) | Qualifiers | Hepta-Furans | Conc (pg/g) | Qualifiers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1368F | 0.118 | J | 13468/12468F | 0.277 | J | 123468F | (0.0262) | | 1234678F | 0.265 | J |
| 1468F | 0.207 | J | 13678F...[3] | 0.0931 | J | 124678/134678F | [0.108] | J | 1234679F | (0.0283) | |
| 2468F | 0.441 | J | 12368F...[3] | 0.225 | J | 134679F | (0.0262) | | 1234689F | 0.11 | J |
| 1346/1246F | [0.155] | J | 14678F | (0.0384) | | 124679F | (0.0262) | | 1234789F | (0.0335) | |
| 1347F...[3] | 0.149 | J | 13479F | (0.0384) | | 124689F | 0.118 | J | | | |
| 1348F | 0.0596 | J | 13469/12479F | (0.0384) | | 123467F | (0.0262) | | | | |
| 1248F...[3] | 0.34 | J | 12346F | (0.0384) | | 123478F | 0.0687 | J | | | |
| 1268F | 0.115 | J | 23468/12469F | 0.155 | J | 123678F | [0.027] | J | | | |
| 1467F | 0.11 | J | 12347F | (0.0384) | | 123479F | (0.0262) | | | | |
| 1478F | 0.177 | J | 12348F | (0.0384) | | 123469F | (0.0262) | | | | |
| 1369/1237F | (0.0412) | | 12378F | (0.04) | | 123679F | (0.0262) | | | | |
| 2467F | [0.0612] | J | 12678/12367F | (0.0384) | | 234678F | 0.0328 | J | **Conc.** | 0.375 | |
| 2368F | 0.185 | J | 12379F | (0.0384) | | 234678/123689F | (0.0239) | | **EMPC** | 0.375 | |
| 1238F...[5] | [0.16] | J | 12679F | (0.0384) | | 123689F | (0.0262) | | | | |
| 1278F | 0.0931 | J | 23467/12369F | (0.0384) | | 123789F | (0.0327) | | **Octa-Furan** | **Conc (pg/g)** | **Qualifiers** |
| 1349F | (0.0412) | | 23478F | (0.0369) | | 123789/123489F | (0.0327) | | | | |
| 1267F | 0.0514 | J | 23478/12489F | (0.0369) | | 123489F | (0.0262) | | OCDF | 0.435 | J B |
| 2346/1249F | 0.0519 | J | 12489F | (0.0384) | | | | | | | |
| 2347/1279F | (0.0412) | | 12349F | (0.0384) | | | | | | | |
| 2348F | 0.247 | J | 12389F | (0.0384) | | | | | | | |
| 2378F | 0.0913 | J | | | | | | | | | |
| 2367/3467F | 0.14 | J | | | | | | | | | |
| 1269F | (0.0412) | | | | | | | | | | |
| 1239F | (0.0412) | | | | | | | | | | |
| 1289F | (0.0412) | | | | | | | | | | |
| **Conc.** | 2.58 | | **Conc.** | 0.75 | | **Conc.** | 0.219 | | | | |
| **EMPC** | 2.95 | | **EMPC** | 0.75 | | **EMPC** | 0.354 | | | | |

Checkcode: 971-730-NPW

Report Created: 25-Aug-2011 10:36 Analyst: AP

# Sample ID: LPR2-GDST-Comp02 — TEQ Summary — Method 1613B

| | | | | | |
|---|---|---|---|---|---|
| Client Project Name: | Windward Environmental, LLC | Matrix: | Tissue | Lab Sample ID: | A3406_8929_DF_009 |
| Cliend Project ID: | Passaic RI/FS Caged Bivalve Study | Weight/Volume: | 10.13 g | QC Batch No.: | 8929 |
| Date Collected: | 09-May-2011 | Split: | - | Date Extracted: | 15-Aug-2011 |
| Date Received: | 02-Aug-2011 | Dilution: | - | Date Analyzed: | 20-Aug-2011 02:24 |
| Lab Project No: | A3406 | Units | pg/g | | |

| Analyte | Result | Qualifiers | DLs | I-TEQ | WHO-1998 | WHO-2005 |
|---|---|---|---|---|---|---|
| 2378-TCDD | 0.54 | | 0.0463 | 0.54 | 0.54 | 0.54 |
| 12378-PeCDD | (0.0443) | | 0.0443 | (0.0222) | (0.0443) | (0.0443) |
| 123478-HxCDD | (0.0518) | | 0.0518 | (0.00518) | (0.00518) | (0.00518) |
| 123678-HxCDD | (0.0519) | | 0.0519 | (0.00519) | (0.00519) | (0.00519) |
| 123789-HxCDD | 0.112 | J B | 0.0604 | 0.0112 | 0.0112 | 0.0112 |
| 1234678-HpCDD | [0.248] | J | 0.0436 | [0.00248] | [0.00248] | [0.00248] |
| OCDD | 2.98 | J | 0.0765 | 0.00298 | 0.000298 | 0.000894 |
| | | | | | | |
| 2378-TCDF | 0.0913 | J | 0.0412 | 0.00913 | 0.00913 | 0.00913 |
| 12378-PeCDF | (0.04) | | 0.04 | (0.002) | (0.002) | (0.0012) |
| 23478-PeCDF | (0.0369) | | 0.0369 | (0.0185) | (0.0185) | (0.0111) |
| 123478-HxCDF | 0.0687 | J | 0.0256 | 0.00687 | 0.00687 | 0.00687 |
| 123678-HxCDF | [0.027] | J | 0.0237 | [0.0027] | [0.0027] | [0.0027] |
| 234678-HxCDF | 0.0328 | J | 0.0239 | 0.00328 | 0.00328 | 0.00328 |
| 123789-HxCDF | (0.0327) | | 0.0327 | (0.00327) | (0.00327) | (0.00327) |
| 1234678-HpCDF | 0.265 | J | 0.0241 | 0.00265 | 0.00265 | 0.00265 |
| 1234789-HpCDF | (0.0335) | | 0.0335 | (0.000335) | (0.000335) | (0.000335) |
| OCDF | 0.435 | J B | 0.0735 | 0.000435 | 0.0000435 | 0.00013 |

| TEQ Summaries | | | |
|---|---|---|---|
| EMPC = 0, ND = 0 | 0.576 | 0.573 | 0.574 |
| EMPC = 0, ND = DL / 2 | 0.606 | 0.614 | 0.611 |
| EMPC = 0, ND = DL | 0.636 | 0.655 | 0.647 |
| EMPC = 0, < J-level = 0 | 0.54 | 0.54 | 0.54 |
| | | | |
| EMPC = EMPC, ND = 0 | 0.582 | 0.578 | 0.579 |
| EMPC = EMPC, ND = DL / 2 | 0.61 | 0.618 | 0.614 |
| EMPC = EMPC, ND = DL | 0.638 | 0.657 | 0.65 |
| EMPC = EMPC, < J-level = 0 | 0.545 | 0.545 | 0.545 |

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Checkcode: 971-730-NPW

# Sample ID: LPR3-GDST-Comp03 — Method 1613B

| Client Data | | Sample Data | | Laboratory Data | | | |
|---|---|---|---|---|---|---|---|
| Name: | Windward Environmental, LLC | Matrix: | Tissue | Lab Project ID: | A3406 | Date Received: | 02-Aug-2011 |
| Project ID: | Passaic RI/FS Caged Bivalve Study | Weight/Volume: | 10.09 g | Lab Sample ID | A3406_8929_DF_010 | Date Extracted: | 15-Aug-2011 |
| Date Collected: | 09-May-2011 | | | QC Batch No: | 8929 | Date Analyzed: | 20-Aug-2011 |
| | | Split: | - | Dilution: | - | Time Analyzed: | 03:12:00 |

| Analyte | Conc. (pg/g) | DL (pg/g) | EMPC (pg/g) | Qualifiers | Standard | ES Recoveries | Qualifiers |
|---|---|---|---|---|---|---|---|
| 2378-TCDD | 0.252 | | | J | ES 2378-TCDD | 84.6 | |
| 12378-PeCDD | 0.0452 | | | J | ES 12378-PeCDD | 86.9 | |
| 123478-HxCDD | ND | 0.0438 | | | ES 123478-HxCDD | 85 | |
| 123678-HxCDD | ND | 0.0428 | | | ES 123678-HxCDD | 87.5 | |
| 123789-HxCDD | 0.107 | | | J B | ES 123789-HxCDD | 86.4 | |
| 1234678-HpCDD | 0.303 | | | J | ES 1234678-HpCDD | 83.5 | |
| OCDD | 3.87 | | | J | ES OCDD | 82 | |
| | | | | | | | |
| 2378-TCDF | 0.0652 | | | J | ES 2378-TCDF | 78.9 | |
| 12378-PeCDF | ND | 0.0275 | | | ES 12378-PeCDF | 83.4 | |
| 23478-PeCDF | ND | 0.0248 | | | ES 23478-PeCDF | 84.6 | |
| 123478-HxCDF | 0.0605 | | | J | ES 123478-HxCDF | 82.1 | |
| 123678-HxCDF | EMPC | | 0.0231 | J | ES 123678-HxCDF | 82.2 | |
| 234678-HxCDF | ND | 0.0254 | | | ES 234678-HxCDF | 82.7 | |
| 123789-HxCDF | ND | 0.0333 | | | ES 123789-HxCDF | 83.7 | |
| 1234678-HpCDF | EMPC | | 0.197 | J B | ES 1234678-HpCDF | 83.5 | |
| 1234789-HpCDF | ND | 0.0312 | | | ES 1234789-HpCDF | 83 | |
| OCDF | 0.353 | | | J B | ES OCDF | 78.5 | |
| **Totals** | | | | | **Standard** | **CS/AS Recoveries** | |
| | | | | | CS 37Cl-2378-TCDD | 91.3 | |
| Total TCDD | 2.22 | | 2.6 | | CS 12347-PeCDD | 92.2 | |
| Total PeCDD | 1.56 | | 1.61 | | CS 12346-PeCDF | 92.2 | |
| Total HxCDD | 3.92 | | 3.92 | | CS 123469-HxCDF | 89.7 | |
| Total HpCDD | 1.05 | | 1.05 | | CS 1234689-HpCDF | 89.8 | |
| | | | | | AS 1368-TCDD | 86.1 | |
| Total TCDF | 0.968 | | 1.51 | | AS 1368-TCDF | 86 | |
| Total PeCDF | 0.359 | | 0.419 | | | | |
| Total HxCDF | 0.135 | | 0.242 | | | | |
| Total HpCDF | 0.101 | | 0.298 | | | | |
| **Total PCDD/Fs** | **14.5** | | **15.9** | | | | |
| **ITEF TEQs** | | | | | | | |
| TEQ: ND=0 | 0.305 | | 0.309 | | | | |
| TEQ: ND=DL/2 | 0.321 | 0.054 | 0.324 | | | | |
| TEQ: ND=DL | 0.336 | 0.108 | 0.338 | | | | |

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# Sample ID: LPR3-GDST-Comp03 — Method 1613B

| Client Data | | Sample Data | | Laboratory Data | | | |
|---|---|---|---|---|---|---|---|
| Name: | Windward Environmental, LLC | Matrix: | Tissue | Lab Project ID: | A3406 | Date Received: | 02-Aug-2011 |
| Project ID: | Passaic RI/FS Caged Bivalve Study | Weight/Volume: | 10.09 g | Lab Sample ID: | A3406_8929_DF_010 | Date Extracted: | 15-Aug-2011 |
| Date Collected: | 09-May-2011 | | | QC Batch No.: | 8929 | Date Analyzed: | 20-Aug-2011 |
| | | Split: | - | Dilution: | - | Time Analyzed: | 03:12:00 |

| Tetra-Dioxins | Conc. (pg/g) | Qualifiers | Penta-Dioxins | Conc. (pg/g) | Qualifiers | Hexa-Dioxins | Conc (pg/g) | Qualifiers | Hepta-Dioxins | Conc (pg/g) | Qualifiers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1368D | 0.192 | J B | 12479/12468D | 0.514 | J | 124679/124689D | 3.29 | | 1234679D | 0.748 | J |
| 1379D | 0.0853 | J | 12469D | 0.677 | J | 123468D | (0.0446) | | 1234678D | 0.303 | J |
| 1369D | [0.126] | J | 12368D | [0.0477] | J | 123679/123689D | 0.515 | J | | | |
| 1469D | 1.57 | | 12478D | 0.0979 | J | 123469D | (0.0446) | | | | |
| 1247D...[4] | [0.178] | J | 12379D | (0.0419) | | 123478D | (0.0438) | | | | |
| 1378D | (0.0437) | | 12369D...[3] | 0.224 | J | 123678D | (0.0428) | | | | |
| 1268D | (0.0437) | | 12346/12347D | (0.0419) | | 123467D | (0.0446) | | | | |
| 1478D | (0.0437) | | 12378D | 0.0452 | J | 123789D | 0.107 | J B | **Conc.** | 1.05 | |
| 1279D | (0.0437) | | 12367D | (0.0419) | | | | | **EMPC** | 1.05 | |
| 1234/1269D | [0.0741] | J | 12389D | (0.0419) | | | | | | | |
| 1236D | (0.0437) | | | | | | | | **Octa-Dioxin** | **Conc (pg/g)** | **Qualifiers** |
| 1237/1238D | 0.117 | J | | | | | | | | | |
| 1239D | (0.0437) | | | | | | | | OCDD | 3.87 | J |
| 2378D | 0.252 | J | | | | | | | | | |
| 1278D | (0.0437) | | | | | | | | | | |
| 1267D | (0.0437) | | | | | | | | | | |
| 1289D | (0.0437) | | | | | | | | | | |
| **Conc.** | 2.22 | | **Conc.** | 1.56 | | **Conc.** | 3.92 | | | | |
| **EMPC** | 2.6 | | **EMPC** | 1.61 | | **EMPC** | 3.92 | | | | |


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| ITEF TEQs | Conc. | EMPC |
|---|---|---|
| TEQ: ND=0 | 0.305 | 0.309 |
| TEQ: ND=DL/2 | 0.321 | 0.324 |
| TEQ: ND=DL | 0.336 | 0.338 |

| | Conc. | EMPC |
|---|---|---|
| **Total PCDD/Fs** | 14.5 | 15.9 |

Checkcode: 155-627-DYJ

Report Created: 25-Aug-2011 10:36 Analyst: AP

# Sample ID: LPR3-GDST-Comp03 — Method 1613B

| Client Data | | Sample Data | | Laboratory Data | | | |
|---|---|---|---|---|---|---|---|
| Name: | Windward Environmental, LLC | Matrix: | Tissue | Lab Project ID: | A3406 | Date Received: | 02 Aug 2011 |
| Project ID: | Passaic RI/FS Caged Bivalve Study | Weight/Volume: | 10.09 g | Lab Sample ID: | A3406_8929_DF_010 | Date Extracted: | 15 Aug 2011 |
| Date Collected: | 09 May 2011 | | | QC Batch No.: | 8929 | Date Analyzed: | 20 Aug 2011 |
| | | Split: | - | Dilution: | - | Time Analyzed: | 03:12:00 |

| Tetra-Furans | Conc. (pg/g) | Qualifiers |
|---|---|---|
| 1368F | 0.122 | J |
| 1468F | 0.139 | J |
| 2468F | [0.294] | J |
| 1346/1246F | 0.076 | J |
| 1347F...[3] | 0.104 | J |
| 1348F | [0.0469] | J |
| 1248F...[3] | 0.121 | J |
| 1268F | [0.0602] | J |
| 1467F | 0.0653 | J |
| 1478F | 0.0721 | J |
| 1369/1237F | (0.0408) | |
| 2467F | (0.0408) | |
| 2368F | 0.078 | J |
| 1238F...[5] | [0.0769] | J |
| 1278F | (0.0408) | |
| 1349F | (0.0408) | |
| 1267F | (0.0408) | |
| 2346/1249F | 0.0401 | J |
| 2347/1279F | (0.0408) | |
| 2348F | [0.0681] | J |
| 2378F | 0.0652 | J |
| 2367/3467F | 0.0849 | J |
| 1269F | (0.0408) | |
| 1239F | (0.0408) | |
| 1289F | (0.0408) | |
| **Conc.** | 0.968 | |
| **EMPC** | 1.51 | |

| Penta-Furans | Conc. (pg/g) | Qualifiers |
|---|---|---|
| 13468/12468F | 0.156 | J |
| 13678F...[3] | [0.0597] | J |
| 12368F...[3] | 0.113 | J |
| 14678F | (0.0261) | |
| 13479F | (0.0261) | |
| 13469/12479F | (0.0261) | |
| 12346F | (0.0261) | |
| 23468/12469F | 0.0904 | J |
| 12347F | (0.0261) | |
| 12348F | (0.0261) | |
| 12378F | (0.0275) | |
| 12678/12367F | (0.0261) | |
| 12379F | (0.0261) | |
| 12679F | (0.0261) | |
| 23467/12369F | (0.0261) | |
| 23478F | (0.0248) | |
| 23478/12489F | (0.0248) | |
| 12489F | (0.0261) | |
| 12349F | (0.0261) | |
| 12389F | (0.0261) | |
| **Conc.** | 0.359 | |
| **EMPC** | 0.419 | |

| Hexa-Furans | Conc (pg/g) | Qualifiers |
|---|---|---|
| 123468F | (0.0271) | |
| 124678/134678F | [0.0841] | J |
| 134679F | (0.0271) | |
| 124679F | (0.0271) | |
| 124689F | 0.0746 | J |
| 123467F | (0.0271) | |
| 123478F | 0.0605 | J |
| 123678F | [0.0231] | J |
| 123479F | (0.0271) | |
| 123469F | (0.0271) | |
| 123679F | (0.0271) | |
| 234678F | (0.0254) | |
| 234678/123689F | (0.0254) | |
| 123689F | (0.0271) | |
| 123789F | (0.0333) | |
| 123789/123489F | (0.0333) | |
| 123489F | (0.0271) | |
| **Conc.** | 0.135 | |
| **EMPC** | 0.242 | |

| Hepta-Furans | Conc (pg/g) | Qualifiers |
|---|---|---|
| 1234678F | [0.197] | J B |
| 1234679F | (0.0258) | |
| 1234689F | 0.101 | J |
| 1234789F | (0.0312) | |
| **Conc.** | 0.101 | |
| **EMPC** | 0.298 | |

| Octa-Furan | Conc (pg/g) | Qualifiers |
|---|---|---|
| OCDF | 0.353 | J B |

Checkcode: 155-627-DYJ

Report Created: 25-Aug-2011 10:36 Analyst: AP

# Sample ID: LPR3-GDST-Comp03 — TEQ Summary — Method 1613B

| | | | | | |
|---|---|---|---|---|---|
| Client Project Name: | Windward Environmental, LLC | Matrix: | Tissue | Lab Sample ID: | A3406_8929_DF_010 |
| Cliend Project ID: | Passaic RI/FS Caged Bivalve Study | Weight/Volume: | 10.09 g | QC Batch No.: | 8929 |
| Date Collected: | 09-May-2011 | Split: | - | Date Extracted: | 15-Aug-2011 |
| Date Received: | 02-Aug-2011 | Dilution: | - | Date Analyzed: | 20-Aug-2011 03:12 |
| Lab Project No: | A3406 | Units | pg/g | | |

| Analyte | Result | Qualifiers | DLs | I-TEQ | WHO-1998 | WHO-2005 |
|---|---|---|---|---|---|---|
| 2378-TCDD | 0.252 | J | 0.0437 | 0.252 | 0.252 | 0.252 |
| 12378-PeCDD | 0.0452 | J | 0.0419 | 0.0226 | 0.0452 | 0.0452 |
| 123478-HxCDD | (0.0438) | | 0.0438 | (0.00438) | (0.00438) | (0.00438) |
| 123678-HxCDD | (0.0428) | | 0.0428 | (0.00428) | (0.00428) | (0.00428) |
| 123789-HxCDD | 0.107 | J B | 0.0478 | 0.0107 | 0.0107 | 0.0107 |
| 1234678-HpCDD | 0.303 | J | 0.0491 | 0.00303 | 0.00303 | 0.00303 |
| OCDD | 3.87 | J | 0.0803 | 0.00387 | 0.000387 | 0.00116 |
| | | | | | | |
| 2378-TCDF | 0.0652 | J | 0.0408 | 0.00652 | 0.00652 | 0.00652 |
| 12378-PeCDF | (0.0275) | | 0.0275 | (0.00138) | (0.00138) | (0.000825) |
| 23478-PeCDF | (0.0248) | | 0.0248 | (0.0124) | (0.0124) | (0.00744) |
| 123478-HxCDF | 0.0605 | J | 0.0263 | 0.00605 | 0.00605 | 0.00605 |
| 123678-HxCDF | [0.0231] | J | 0.0244 | [0.00231] | [0.00231] | [0.00231] |
| 234678-HxCDF | (0.0254) | | 0.0254 | (0.00254) | (0.00254) | (0.00254) |
| 123789-HxCDF | (0.0333) | | 0.0333 | (0.00333) | (0.00333) | (0.00333) |
| 1234678-HpCDF | [0.197] | J B | 0.0216 | [0.00197] | [0.00197] | [0.00197] |
| 1234789-HpCDF | (0.0312) | | 0.0312 | (0.000312) | (0.000312) | (0.000312) |
| OCDF | 0.353 | J B | 0.0775 | 0.000353 | 0.0000353 | 0.000106 |

| TEQ Summaries | | | |
|---|---|---|---|
| EMPC = 0, ND = 0 | 0.305 | 0.324 | 0.325 |
| EMPC = 0, ND = DL / 2 | 0.321 | 0.34 | 0.338 |
| EMPC = 0, ND = DL | 0.336 | 0.355 | 0.351 |
| EMPC = 0, < J-level = 0 | 0 | 0 | 0 |
| | | | |
| EMPC = EMPC, ND = 0 | 0.309 | 0.328 | 0.329 |
| EMPC = EMPC, ND = DL / 2 | 0.324 | 0.343 | 0.341 |
| EMPC = EMPC, ND = DL | 0.338 | 0.357 | 0.352 |
| EMPC = EMPC, < J-level = 0 | 0.00428 | 0.00428 | 0.00428 |

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# Sample ID: CARP2 SRM — Method 1613B

| Client Data | | Sample Data | | Laboratory Data | | | |
|---|---|---|---|---|---|---|---|
| Name: | Windward Environmental, LLC | Matrix: | Tissue | Lab Project ID: | A3406 | Date Received: | 15-Aug-2011 |
| Project ID: | Passaic RI/FS Caged Bivalve Study | Weight/Volume: | 10.78 g | Lab Sample ID | A3406_8929_DF_011 | Date Extracted: | 15-Aug-2011 |
| Date Collected: | 20-May-1986 | | | QC Batch No: | 8929 | Date Analyzed: | 20-Aug-2011 |
| | | Split: | - | Dilution: | - | Time Analyzed: | 03:59:38 |

| Analyte | Conc. (pg/g) | DL (pg/g) | EMPC (pg/g) | Qualifiers | Standard | ES Recoveries | Qualifiers |
|---|---|---|---|---|---|---|---|
| 2378-TCDD | 7.93 | | | | ES 2378-TCDD | 72.1 | |
| 12378-PeCDD | 4.46 | | | | ES 12378-PeCDD | 75.6 | |
| 123478-HxCDD | 1.61 | | | J | ES 123478-HxCDD | 77.3 | |
| 123678-HxCDD | 5.06 | | | | ES 123678-HxCDD | 81.2 | |
| 123789-HxCDD | 0.723 | | | J B | ES 123789-HxCDD | 78 | |
| 1234678-HpCDD | 6.53 | | | | ES 1234678-HpCDD | 77 | |
| OCDD | 7.32 | | | | ES OCDD | 75.1 | |
| | | | | | | | |
| 2378-TCDF | 17.5 | | | | ES 2378-TCDF | 55.7 | |
| 12378-PeCDF | 6.23 | | | | ES 12378-PeCDF | 74.9 | |
| 23478-PeCDF | 15.2 | | | | ES 23478-PeCDF | 75.9 | |
| 123478-HxCDF | 3.62 | | | | ES 123478-HxCDF | 77.3 | |
| 123678-HxCDF | 2.33 | | | | ES 123678-HxCDF | 74.9 | |
| 234678-HxCDF | 1.11 | | | J | ES 234678-HxCDF | 77.4 | |
| 123789-HxCDF | 0.0806 | | | J | ES 123789-HxCDF | 75.9 | |
| 1234678-HpCDF | 4.06 | | | | ES 1234678-HpCDF | 77.4 | |
| 1234789-HpCDF | 0.0951 | | | J | ES 1234789-HpCDF | 78.6 | |
| OCDF | 0.771 | | | J | ES OCDF | 74 | |
| **Totals** | | | | | **Standard** | **CS/AS Recoveries** | |
| | | | | | CS 37Cl-2378-TCDD | 85 | |
| Total TCDD | 8.11 | | 8.11 | | CS 12347-PeCDD | 90.3 | |
| Total PeCDD | 4.46 | | 4.56 | | CS 12346-PeCDF | 90 | |
| Total HxCDD | 8.14 | | 8.14 | | CS 123469-HxCDF | 92.8 | |
| Total HpCDD | 6.89 | | 6.89 | | CS 1234689-HpCDF | 94 | |
| | | | | | AS 1368-TCDD | 68.9 | |
| Total TCDF | 20.2 | | 20.2 | | AS 1368-TCDF | 76.1 | |
| Total PeCDF | 23.3 | | 23.5 | | | | |
| Total HxCDF | 8.29 | | 8.38 | | | | |
| Total HpCDF | 4.5 | | 4.5 | | | | |
| **Total PCDD/Fs** | **92** | | **92.4** | | | | |
| **ITEF TEQs** | | | | | | | |
| TEQ: ND=0 | 21.4 | | 21.4 | | | | |
| TEQ: ND=DL/2 | 21.4 | 0.0802 | 21.4 | | | | |
| TEQ: ND=DL | 21.4 | 0.16 | 21.4 | | | | |

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www.ultratrace.com

# Sample ID: CARP2 SRM — Method 1613B

| Client Data | | Sample Data | | Laboratory Data | | | |
|---|---|---|---|---|---|---|---|
| Name: | Windward Environmental, LLC | Matrix: | Tissue | Lab Project ID: | A3406 | Date Received: | 15-Aug-2011 |
| Project ID: | Passaic RI/FS Caged Bivalve Study | Weight/Volume: | 10.78 g | Lab Sample ID: | A3406_8929_DF_011 | Date Extracted: | 15-Aug-2011 |
| Date Collected: | 20-May-1986 | | | QC Batch No.: | 8929 | Date Analyzed: | 20-Aug-2011 |
| | | Split: | - | Dilution: | - | Time Analyzed: | 03:59:38 |

| Tetra-Dioxins | Conc. (pg/g) | Qualifiers | Penta-Dioxins | Conc. (pg/g) | Qualifiers | Hexa-Dioxins | Conc (pg/g) | Qualifiers | Hepta-Dioxins | Conc (pg/g) | Qualifiers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1368D | 0.179 | J B | 12479/12468D | (0.0596) | | 124679/124689D | (0.0597) | | 1234679D | 0.369 | J |
| 1379D | (0.066) | | 12469D | (0.0596) | | 123468D | (0.0597) | | 1234678D | 6.53 | |
| 1369D | (0.066) | | 12368D | (0.0596) | | 123679/123689D | 0.224 | J | | | |
| 1469D | (0.066) | | 12478D | [0.0949] | J | 123469D | 0.521 | J | | | |
| 1247D...[4] | (0.066) | | 12379D | (0.0596) | | 123478D | 1.61 | J | | | |
| 1378D | (0.066) | | 12369D...[3] | (0.0596) | | 123678D | 5.06 | | | | |
| 1268D | (0.066) | | 12346/12347D | (0.0596) | | 123467D | (0.0597) | | | | |
| 1478D | (0.066) | | 12378D | 4.46 | | 123789D | 0.723 | J B | **Conc.** | 6.89 | |
| 1279D | (0.066) | | 12367D | (0.0596) | | | | | **EMPC** | 6.89 | |
| 1234/1269D | (0.066) | | 12389D | (0.0596) | | | | | | | |
| 1236D | (0.066) | | | | | | | | **Octa-Dioxin** | **Conc (pg/g)** | **Qualifiers** |
| 1237/1238D | (0.066) | | | | | | | | | | |
| 1239D | (0.066) | | | | | | | | OCDD | 7.32 | |
| 2378D | 7.93 | | | | | | | | | | |
| 1278D | (0.066) | | | | | | | | | | |
| 1267D | (0.066) | | | | | | | | | | |
| 1289D | (0.066) | | | | | | | | | | |
| **Conc.** | 8.11 | | **Conc.** | 4.46 | | **Conc.** | 8.14 | | | | |
| **EMPC** | 8.11 | | **EMPC** | 4.56 | | **EMPC** | 8.14 | | | | |

| ITEF TEQs | Conc. | EMPC |
|---|---|---|
| TEQ: ND=0 | 21.4 | 21.4 |
| TEQ: ND=DL/2 | 21.4 | 21.4 |
| TEQ: ND=DL | 21.4 | 21.4 |

| | Conc. | EMPC |
|---|---|---|
| **Total PCDD/Fs** | 92 | 92.4 |

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Checkcode: 697-376-LHQ

Report Created: 25-Aug-2011 10:37 Analyst: AP

# Sample ID: CARP2 SRM — Method 1613B

| Client Data | | Sample Data | | Laboratory Data | | | |
|---|---|---|---|---|---|---|---|
| Name: | Windward Environmental, LLC | Matrix: | Tissue | Lab Project ID: | A3406 | Date Received: | 15 Aug 2011 |
| Project ID: | Passaic RI/FS Caged Bivalve Study | Weight/Volume: | 10.78 g | Lab Sample ID: | A3406_8929_DF_011 | Date Extracted: | 15 Aug 2011 |
| Date Collected: | 20 May 1986 | | | QC Batch No.: | 8929 | Date Analyzed: | 20 Aug 2011 |
| | | Split: | - | Dilution: | - | Time Analyzed: | 03:59:38 |

| Tetra-Furans | Conc. (pg/g) | Qualifiers | Penta-Furans | Conc. (pg/g) | Qualifiers | Hexa-Furans | Conc (pg/g) | Qualifiers | Hepta-Furans | Conc (pg/g) | Qualifiers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1368F | 0.15 | J | 13468/12468F | 0.294 | J | 123468F | 0.0845 | J B | 1234678F | 4.06 | |
| 1468F | 0.163 | J | 13678F...[3] | 0.214 | J | 124678/134678F | 0.458 | J | 1234679F | (0.0318) | |
| 2468F | 0.505 | | 12368F...[3] | 0.994 | J | 134679F | (0.0334) | | 1234689F | 0.339 | J |
| 1346/1246F | (0.0715) | | 14678F | (0.0463) | | 124679F | (0.0334) | | 1234789F | 0.0951 | J |
| 1347F...[3] | (0.0715) | | 13479F | (0.0463) | | 124689F | 0.614 | J | | | |
| 1348F | (0.0715) | | 13469/12479F | (0.0463) | | 123467F | [0.0899] | J | | | |
| 1248F...[3] | 0.175 | J | 12346F | (0.0463) | | 123478F | 3.62 | | | | |
| 1268F | (0.0715) | | 23468/12469F | (0.0463) | | 123678F | 2.33 | | | | |
| 1467F | (0.0715) | | 12347F | (0.0463) | | 123479F | (0.0334) | | | | |
| 1478F | (0.0715) | | 12348F | (0.0463) | | 123469F | (0.0334) | | | | |
| 1369/1237F | (0.0715) | | 12378F | 6.23 | | 123679F | (0.0334) | | | | |
| 2467F | (0.0715) | | 12678/12367F | [0.252] | J | 234678F | 1.11 | J | **Conc.** | 4.5 | |
| 2368F | 0.101 | J | 12379F | (0.0463) | | 234678/123689F | (0.0311) | | **EMPC** | 4.5 | |
| 1238F...[5] | (0.0715) | | 12679F | (0.0463) | | 123689F | (0.0334) | | | | |
| 1278F | 0.0933 | J | 23467/12369F | 0.293 | J | 123789F | 0.0806 | J | **Octa-Furan** | **Conc (pg/g)** | **Qualifiers** |
| 1349F | 0.149 | J | 23478F | 15.2 | | 123789/123489F | (0.0414) | | | | |
| 1267F | (0.0715) | | 23478/12489F | (0.0438) | | 123489F | (0.0334) | | OCDF | 0.771 | J |
| 2346/1249F | (0.0715) | | 12489F | (0.0463) | | | | | | | |
| 2347/1279F | (0.0715) | | 12349F | (0.0463) | | | | | | | |
| 2348F | (0.0715) | | 12389F | (0.0463) | | | | | | | |
| 2378F | 17.5 | | | | | | | | | | |
| 2367/3467F | 1.38 | | | | | | | | | | |
| 1269F | (0.0715) | | | | | | | | | | |
| 1239F | (0.0715) | | | | | | | | | | |
| 1289F | (0.0715) | | | | | | | | | | |
| **Conc.** | 20.2 | | **Conc.** | 23.3 | | **Conc.** | 8.29 | | | | |
| **EMPC** | 20.2 | | **EMPC** | 23.5 | | **EMPC** | 8.38 | | | | |

Checkcode: 697-376-LHQ

Report Created: 25-Aug-2011 10:37 Analyst: AP

# Sample ID: CARP2 SRM — TEQ Summary — Method 1613B

| | | | | | |
|---|---|---|---|---|---|
| Client Project Name: | Windward Environmental, LLC | Matrix: | Tissue | Lab Sample ID: | A3406_8929_DF_011 |
| Cliend Project ID: | Passaic RI/FS Caged Bivalve Study | Weight/Volume: | 10.78 g | QC Batch No.: | 8929 |
| Date Collected: | 20-May-1986 | Split: | - | Date Extracted: | 15-Aug-2011 |
| Date Received: | 15-Aug-2011 | Dilution: | - | Date Analyzed: | 20-Aug-2011 03:59 |
| Lab Project No: | A3406 | Units | pg/g | | |

| Analyte | Result | Qualifiers | DLs | I-TEQ | WHO-1998 | WHO-2005 |
|---|---|---|---|---|---|---|
| 2378-TCDD | 7.93 | | 0.066 | 7.93 | 7.93 | 7.93 |
| 12378-PeCDD | 4.46 | | 0.0596 | 2.23 | 4.46 | 4.46 |
| 123478-HxCDD | 1.61 | J | 0.0583 | 0.161 | 0.161 | 0.161 |
| 123678-HxCDD | 5.06 | | 0.0563 | 0.506 | 0.506 | 0.506 |
| 123789-HxCDD | 0.723 | J B | 0.0656 | 0.0723 | 0.0723 | 0.0723 |
| 1234678-HpCDD | 6.53 | | 0.0713 | 0.0653 | 0.0653 | 0.0653 |
| OCDD | 7.32 | | 0.098 | 0.00732 | 0.000732 | 0.0022 |
| | | | | | | |
| 2378-TCDF | 17.5 | | 0.0715 | 1.75 | 1.75 | 1.75 |
| 12378-PeCDF | 6.23 | | 0.049 | 0.312 | 0.312 | 0.187 |
| 23478-PeCDF | 15.2 | | 0.0438 | 7.62 | 7.62 | 4.57 |
| 123478-HxCDF | 3.62 | | 0.0321 | 0.362 | 0.362 | 0.362 |
| 123678-HxCDF | 2.33 | | 0.0304 | 0.233 | 0.233 | 0.233 |
| 234678-HxCDF | 1.11 | J | 0.0311 | 0.111 | 0.111 | 0.111 |
| 123789-HxCDF | 0.0806 | J | 0.0414 | 0.00806 | 0.00806 | 0.00806 |
| 1234678-HpCDF | 4.06 | | 0.0263 | 0.0406 | 0.0406 | 0.0406 |
| 1234789-HpCDF | 0.0951 | J | 0.0386 | 0.000951 | 0.000951 | 0.000951 |
| OCDF | 0.771 | J | 0.0721 | 0.000771 | 0.0000771 | 0.000231 |

| TEQ Summaries | | | |
|---|---|---|---|
| EMPC = 0, ND = 0 | 21.4 | 23.6 | 20.5 |
| EMPC = 0, ND = DL / 2 | 21.4 | 23.6 | 20.5 |
| EMPC = 0, ND = DL | 21.4 | 23.6 | 20.5 |
| EMPC = 0, < J-level = 0 | 21.1 | 23.3 | 20.1 |
| | | | |
| EMPC = EMPC, ND = 0 | 21.4 | 23.6 | 20.5 |
| EMPC = EMPC, ND = DL / 2 | 21.4 | 23.6 | 20.5 |
| EMPC = EMPC, ND = DL | 21.4 | 23.6 | 20.5 |
| EMPC = EMPC, < J-level = 0 | 21.1 | 23.3 | 20.1 |

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# Sample Summary

ANALYTICAL PERSPECTIVES

**1668B**

| Analyte | Method Blank EQUALIZED | LPR6-ECST-Comp01 EQUALIZED | LPRBG-ECST-Comp01 EQUALIZED | LPR6-ECST-Comp02 EQUALIZED | LPR6-ECST-Comp02-DUP EQUALIZED | LPR7-ECST-Comp03 EQUALIZED | LPR7-ECST-Comp04 EQUALIZED | LPR8-ECST-Comp05 EQUALIZED | LPR1-GDST-Comp01 EQUALIZED | LPRBG-GDST-Comp01 EQUALIZED | LPR2-GDST-Comp02 EQUALIZED | LPR3-GDST-Comp03 EQUALIZED |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Conc. pg/g | Conc. pg/g | Conc. pg/g | Conc. pg/g | Conc. pg/g | Conc. pg/g | Conc. pg/g | Conc. pg/g | Conc. pg/g | Conc. pg/g | Conc. pg/g | Conc. pg/g |
| PCB-77 | (0.231) | 61.3 | [0.561] | 77.9 | 87.0 | 91.1 | 53.4 | 46.4 | 46.0 | 1.38 | 18.3 | 5.70 |
| PCB-81 | (0.228) | 2.89 | (0.356) | 3.34 | 3.51 | 3.57 | 2.05 | (0.532) | 1.68 | (0.184) | 0.734 | (0.395) |
| PCB-105 | (0.217) | 209 | 5.50 | 267 | 318 | 323 | 201 | 164 | 175 | 7.65 | 59.1 | 19.4 |
| PCB-114 | (0.217) | 13.1 | (0.345) | 16.2 | 18.7 | 19.8 | 11.6 | 10.2 | 8.30 | (0.282) | 3.07 | [0.994] |
| PCB-118 | (0.217) | 568 | 15.3 | 696 | 857 | 814 | 530 | 413 | 433 | 36.1 | 154 | 56.2 |
| PCB-123 | (0.219) | 11.5 | (0.335) | 13.6 | 16.5 | 15.7 | 10.3 | 9.50 | 10.2 | [0.573] | [2.82] | 1.02 |
| PCB-126 | (0.223) | 1.75 | (0.289) | 2.06 | 2.68 | 2.02 | [1.36] | 1.61 | [0.831] | (0.277) | 0.383 | (0.619) |
| PCB-156/157 | (0.315) | 50.1 | 2.48 | 63.7 | 89.6 | 78.1 | 52.6 | 41.2 | 21.1 | 0.966 | 6.71 | 3.47 |
| PCB-167 | (0.23) | 18.8 | 1.38 | 25.2 | 34.8 | 29.1 | 20.0 | 15.6 | 15.7 | 2.81 | 5.16 | 2.59 |
| PCB-169 | (0.263) | (0.585) | (0.33) | [0.765] | 2.08 | (0.57) | [0.909] | (0.502) | (0.433) | (0.273) | (0.204) | (0.372) |
| PCB-189 | (0.222) | 2.75 | (0.448) | 4.15 | 6.33 | [3.48] | 2.64 | 2.02 | 1.20 | (0.389) | 0.431 | (0.407) |
| Total Mono-CBs | (0.141) | 4.55 | (0.178) | 4.14 | 3.92 | 4.65 | 4.36 | 5.36 | 7.99 | 2.67 | 12.5 | 5.31 |
| Total Di-CBs | 4.49 | 430 | 4.50 | 438 | 441 | 517 | 345 | 337 | 368 | 28.9 | 260 | 122 |
| Total Tri-CBs | 1.81 | 5290 | 8.30 | 5910 | 6190 | 6800 | 3690 | 3590 | 3740 | 47.5 | 1900 | 690 |
| Total Tetra-CBs | 2.24 | 8070 | 21.6 | 9070 | 10400 | 9630 | 5480 | 5450 | 7070 | 107 | 2760 | 862 |
| Total Penta-CBs | 0.727 | 4960 | 88.7 | 6120 | 7470 | 6580 | 4560 | 3730 | 4180 | 188 | 1430 | 431 |
| Total Hexa-CBs | 0.666 | 3100 | 143 | 3910 | 5650 | 4320 | 3150 | 2480 | 2430 | 263 | 827 | 355 |
| Total Hepta-CBs | 0.448 | 1040 | 58.6 | 1480 | 2330 | 1480 | 1050 | 777 | 575 | 94.7 | 209 | 108 |
| Total Octa-CBs | (0.245) | 239 | 27.3 | 352 | 566 | 358 | 281 | 216 | 46.5 | 10.5 | 18.7 | 13.7 |
| Total Nona-CBs | (0.323) | 52.1 | 12.7 | 76.2 | 113 | 79.4 | 80.3 | 60.9 | [1.93] | (0.681) | [1.43] | 1.70 |
| PCB-209 | (0.311) | 30.8 | 10.3 | 42.1 | 65.4 | 44.2 | 50.4 | 39.0 | 1.54 | (0.374) | 1.13 | 1.30 |
| TEQs (WHO 2005 M/H) | | | | | | | | | | | | |
| ND = 0; EMPC = 0 | 0.00 | 0.208 | 0.000741 | 0.248 | 0.381 | 0.250 | 0.0308 | 0.186 | 0.025 | 0.00156 | 0.0473 | 0.00305 |
| ND = 0; EMPC = EMPC | 0.00 | 0.208 | 0.000797 | 0.271 | 0.381 | 0.250 | 0.194 | 0.186 | 0.108 | 0.00158 | 0.0473 | 0.00308 |
| ND = DL/2; EMPC = 0 | 0.0152 | 0.217 | 0.0203 | 0.256 | 0.381 | 0.259 | 0.0715 | 0.193 | 0.0505 | 0.0196 | 0.0503 | 0.0396 |
| ND = DL/2; EMPC = EMPC | 0.0152 | 0.217 | 0.0203 | 0.271 | 0.381 | 0.259 | 0.194 | 0.193 | 0.115 | 0.0196 | 0.0504 | 0.0397 |
| ND = DL; EMPC = 0 | 0.0304 | 0.226 | 0.0398 | 0.264 | 0.381 | 0.267 | 0.112 | 0.201 | 0.0759 | 0.0376 | 0.0534 | 0.0762 |
| ND = DL; EMPC = EMPC | 0.0304 | 0.226 | 0.0398 | 0.271 | 0.381 | 0.267 | 0.194 | 0.201 | 0.121 | 0.0376 | 0.0535 | 0.0762 |
| Checkcode | 386-509-CNJ | 997-484-BKQ | 938-643-PDM | 753-798-GGR | 752-577-HMG | 142-102-DPG | 748-200-VDJ | 024-610-SRP | 183-309-WWH | 939-239-HCG | 325-779-TCJ | 674-686-WWN |

() = DL
[] = EMPC

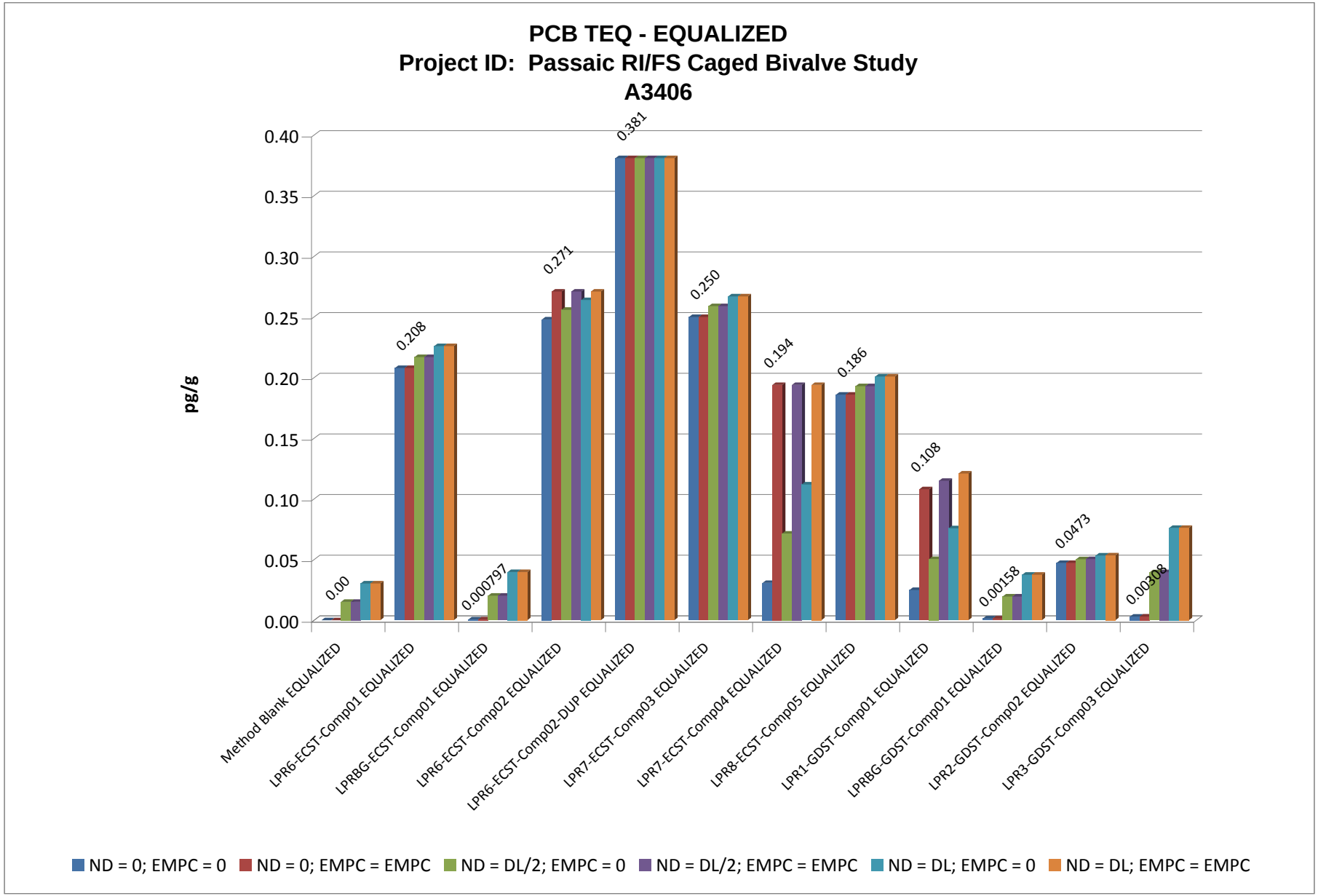
# PCB Recoveries

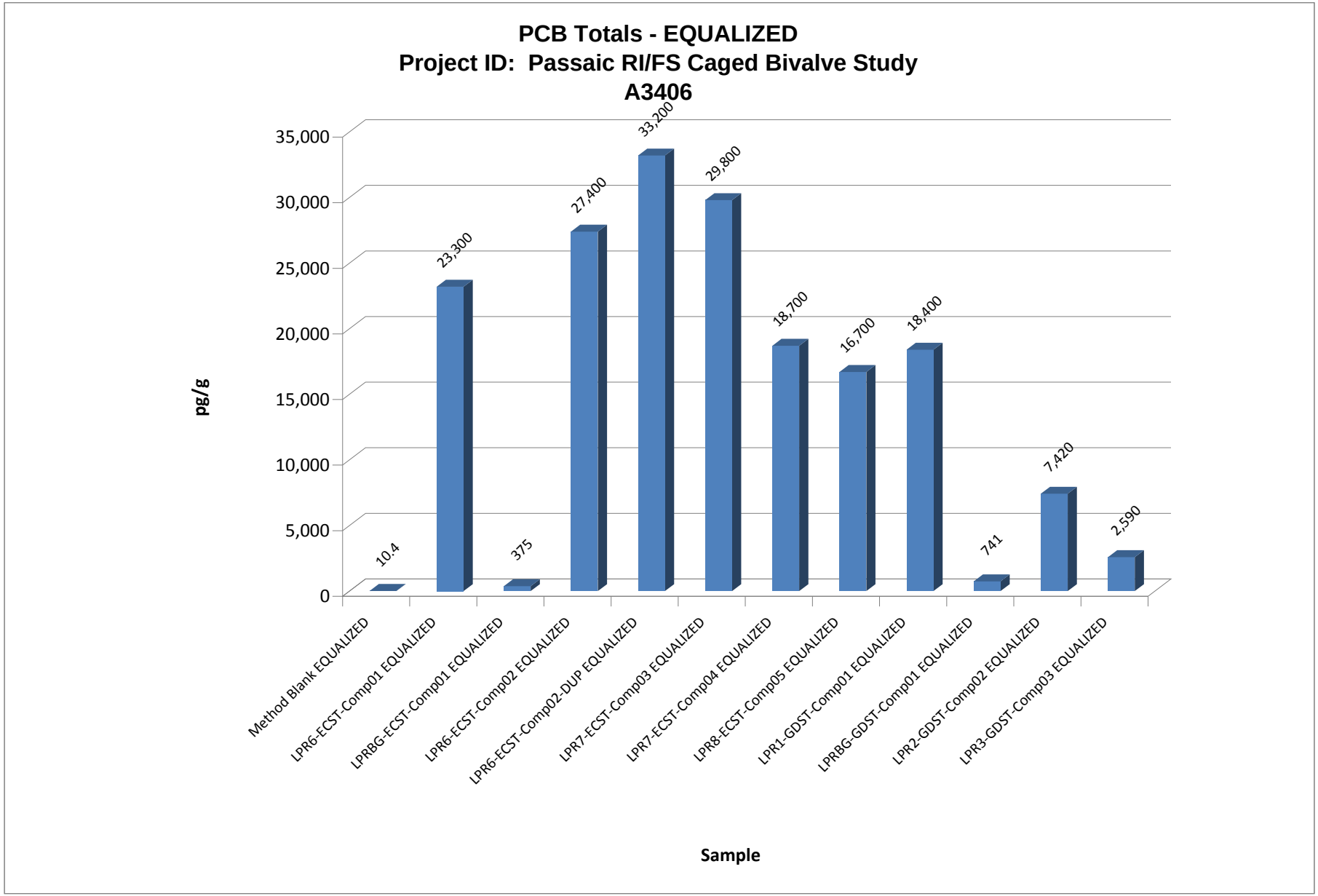
ANALYTICAL PERSPECTIVES

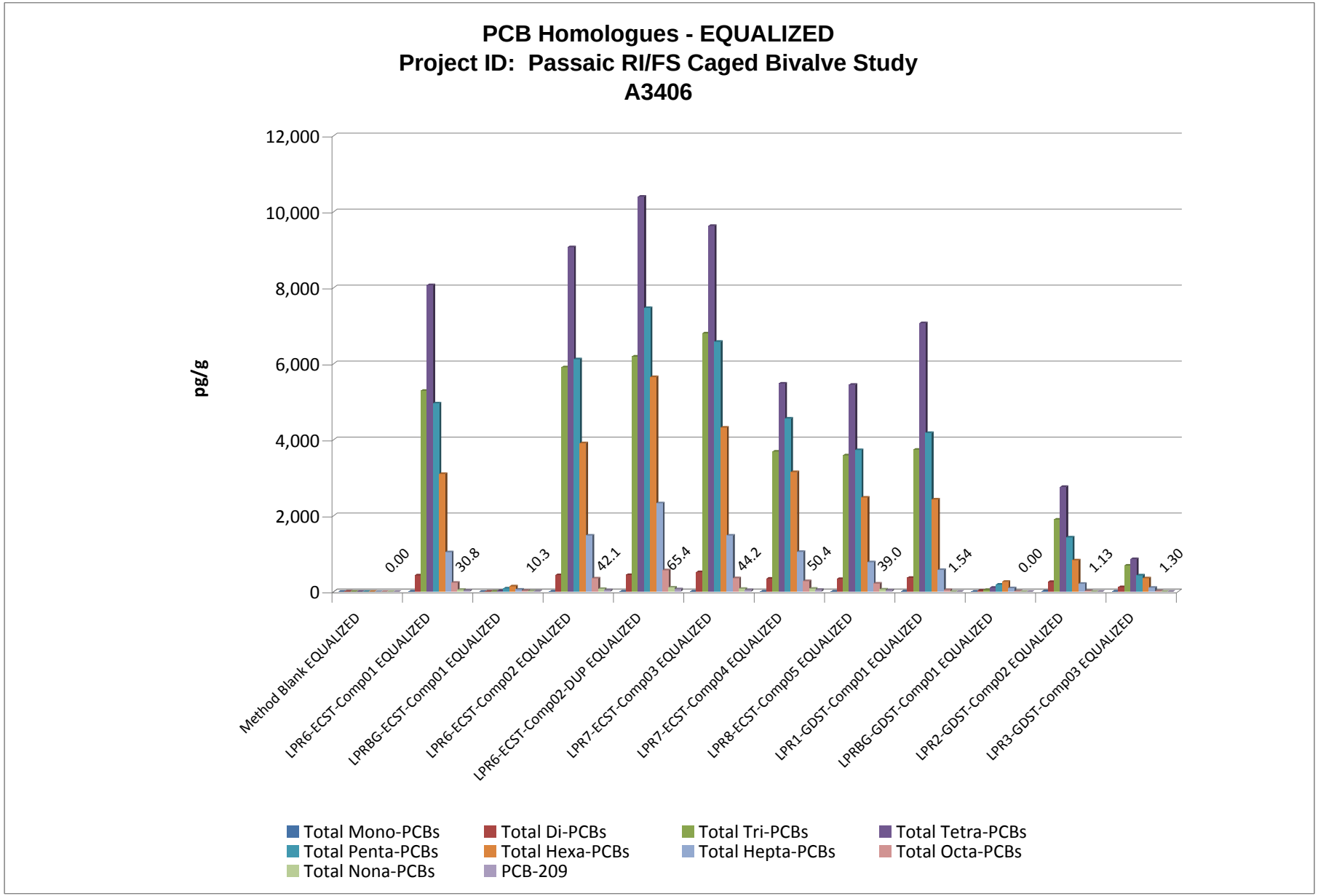
**1668B**

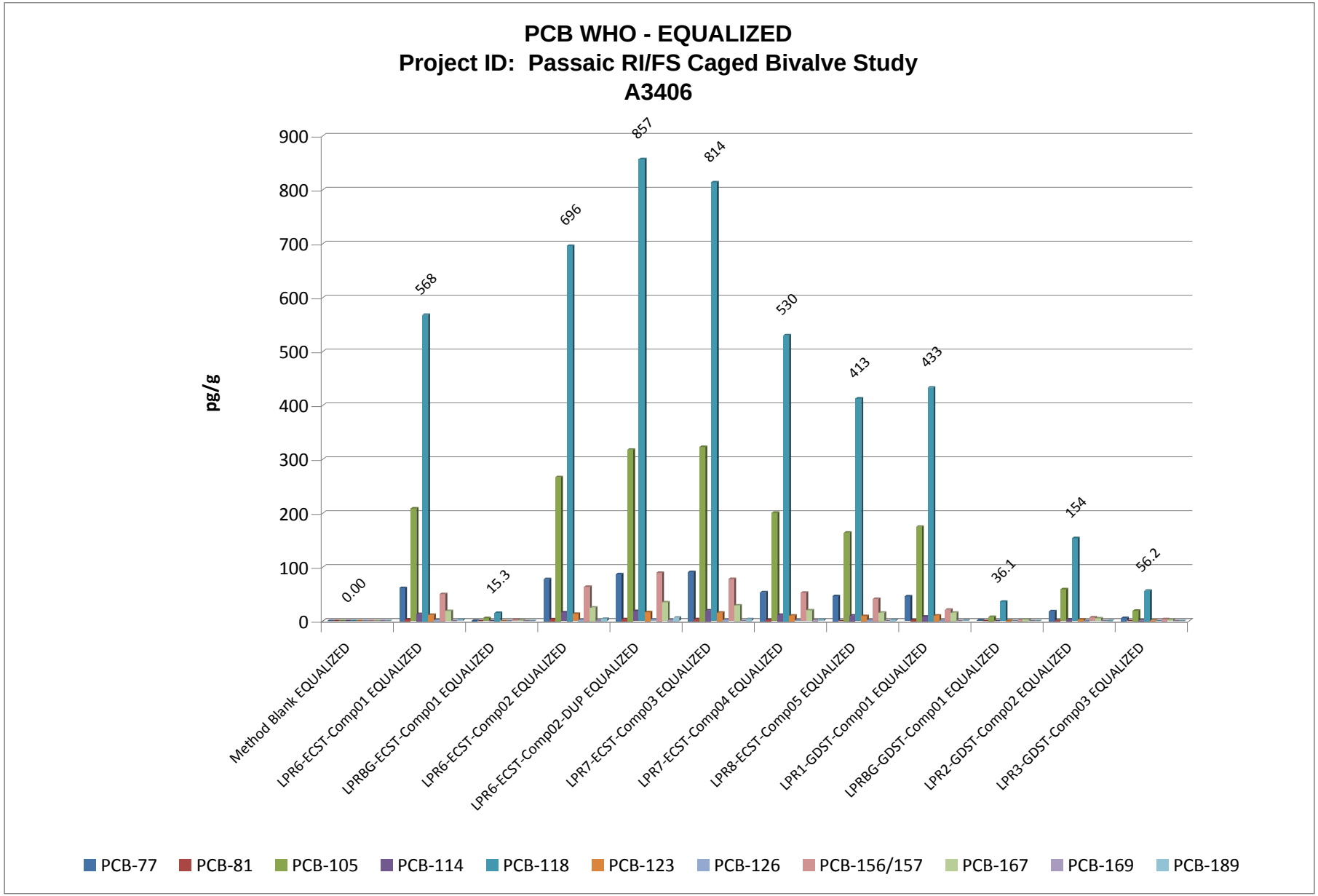
| Standard | Method Blank EQUALIZED | LPR6-ECST-Comp01 EQUALIZED | LPRBG-ECST-Comp01 EQUALIZED | LPR6-ECST-Comp02 EQUALIZED | LPR6-ECST-Comp02-DUP EQUALIZED | LPR7-ECST-Comp03 EQUALIZED | LPR7-ECST-Comp04 EQUALIZED | LPR8-ECST-Comp05 EQUALIZED | LPR1-GDST-Comp01 EQUALIZED | LPRBG-GDST-Comp01 EQUALIZED | LPR2-GDST-Comp02 EQUALIZED | LPR3-GDST-Comp03 EQUALIZED |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ES PCB-1 | 81.6 | 64.1 | 69.7 | 76.9 | 77.4 | 79.5 | 79.8 | 79.3 | 70.2 | 80.6 | 82.1 | 94.8 |
| ES PCB-3 | 87.5 | 71.9 | 80.3 | 85.6 | 87.4 | 82.4 | 85.4 | 85.8 | 84.4 | 81.2 | 89.2 | 97.2 |
| ES PCB-4 | 90.7 | 74.3 | 81.3 | 86.4 | 90.1 | 85.1 | 85.2 | 93.9 | 90.7 | 96.4 | 101 | 102 |
| ES PCB-15 | 102 | 86.0 | 104 | 100 | 107 | 105 | 99.3 | 107 | 107 | 110 | 116 | 96.1 |
| ES PCB-19 | 96.3 | 77.8 | 92.5 | 88.1 | 94.3 | 94.0 | 89.6 | 98.1 | 92.3 | 97.9 | 103 | 92.3 |
| ES PCB-37 | 98.6 | 81.4 | 99.0 | 103 | 100 | 101 | 109 | 101 | 99.3 | 103 | 104 | 97.4 |
| ES PCB-54 | 88.2 | 71.7 | 83.1 | 81.8 | 84.4 | 80.6 | 83.6 | 96.4 | 91.6 | 86.1 | 91.1 | 82.8 |
| ES PCB-77 | 97.0 | 83.6 | 103 | 110 | 103 | 114 | 125 | 99.6 | 100 | 109 | 114 | 105 |
| ES PCB-81 | 91.0 | 80.1 | 99.4 | 107 | 101 | 107 | 120 | 99.0 | 96.1 | 107 | 111 | 102 |
| ES PCB-104 | 98.3 | 75.8 | 85.8 | 90.0 | 92.9 | 80.7 | 78.9 | 102 | 98.3 | 94.6 | 98.3 | 90.9 |
| ES PCB-105 | 101 | 84.3 | 96.6 | 100 | 97.7 | 93.9 | 96.3 | 99.5 | 96.5 | 99.4 | 103 | 106 |
| ES PCB-114 | 96.3 | 80.2 | 92.5 | 97.2 | 95.5 | 93.1 | 95.1 | 93.9 | 93.7 | 95.2 | 99.3 | 102 |
| ES PCB-118 | 98.0 | 81.1 | 94.5 | 100 | 95.3 | 95.0 | 95.7 | 101 | 101 | 102 | 105 | 108 |
| ES PCB-123 | 100 | 84.9 | 98.2 | 106 | 102 | 101 | 101 | 103 | 102 | 103 | 107 | 111 |
| ES PCB-126 | 96.4 | 79.0 | 95.5 | 91.8 | 95.0 | 90.1 | 94.0 | 98.6 | 97.0 | 94.6 | 99.5 | 104 |
| ES PCB-153 | 88.3 | 72.7 | 85.8 | 92.5 | 91.6 | 89.7 | 93.2 | 95.1 | 96.3 | 97.4 | 98.3 | 93.4 |
| ES PCB-155 | 84.0 | 65.6 | 74.2 | 78.3 | 88.2 | 82.2 | 88 | 89.5 | 86.5 | 93.0 | 89.6 | 82.1 |
| ES PCB-156/157 | 83.2 | 65.5 | 77.8 | 76.6 | 88.3 | 83.7 | 89.6 | 83.4 | 81.9 | 85.2 | 84.6 | 93.6 |
| ES PCB-167 | 80.5 | 66.2 | 78.4 | 76.1 | 86.5 | 79.4 | 85.8 | 83.1 | 84.3 | 85.4 | 84.7 | 92.3 |
| ES PCB-169 | 77.1 | 63.6 | 85.0 | 80.3 | 91.9 | 87.0 | 93.3 | 84 | 81.7 | 87.3 | 87.8 | 102 |
| ES PCB-170 | 119 | 67 | 87.1 | 90.3 | 90.7 | 83.2 | 78.9 | 85 | 86.5 | 87.5 | 81.3 | 96.6 |
| ES PCB-180 | 114 | 63.8 | 80.0 | 80.2 | 83.6 | 73.4 | 71.5 | 82.9 | 85.9 | 83.3 | 80.8 | 92.2 |
| ES PCB-188 | 83.4 | 69.5 | 80.4 | 89.1 | 93.2 | 88.1 | 92.9 | 88.1 | 88.1 | 97.9 | 98.1 | 92.1 |
| ES PCB-189 | 96.0 | 71.2 | 86.7 | 88.6 | 91.8 | 90.2 | 93.3 | 98.3 | 96.5 | 97.0 | 95.2 | 101 |
| ES PCB-202 | 91.5 | 66.5 | 79.4 | 81.0 | 85.9 | 79.4 | 84.2 | 83.3 | 86.5 | 91.7 | 87.7 | 89.2 |
| ES PCB-205 | 99.1 | 70.7 | 85.3 | 89.7 | 91.1 | 86.2 | 93.0 | 101 | 101 | 105 | 99.3 | 104 |
| ES PCB-206 | 102 | 69.8 | 79.5 | 89.7 | 95.7 | 85.5 | 89.2 | 104 | 91.2 | 102 | 97.1 | 101 |
| ES PCB-208 | 110 | 65.8 | 81.6 | 86.1 | 90.5 | 84.4 | 85.9 | 91.8 | 89.7 | 98.7 | 94.1 | 95.6 |
| ES PCB-209 | 95.2 | 63.3 | 72.4 | 81.3 | 89.7 | 84.1 | 86.5 | 89.7 | 83.1 | 96.8 | 93.9 | 95.0 |
| Checkcode | 386-509-CNJ | 997-484-BKQ | 938-643-PDM | 753-798-GGR | 752-577-HMG | 142-102-DPG | 748-200-VDJ | 024-610-SRP | 183-309-WWH | 939-239-HCG | 325-779-TCJ | 674-686-WWN |

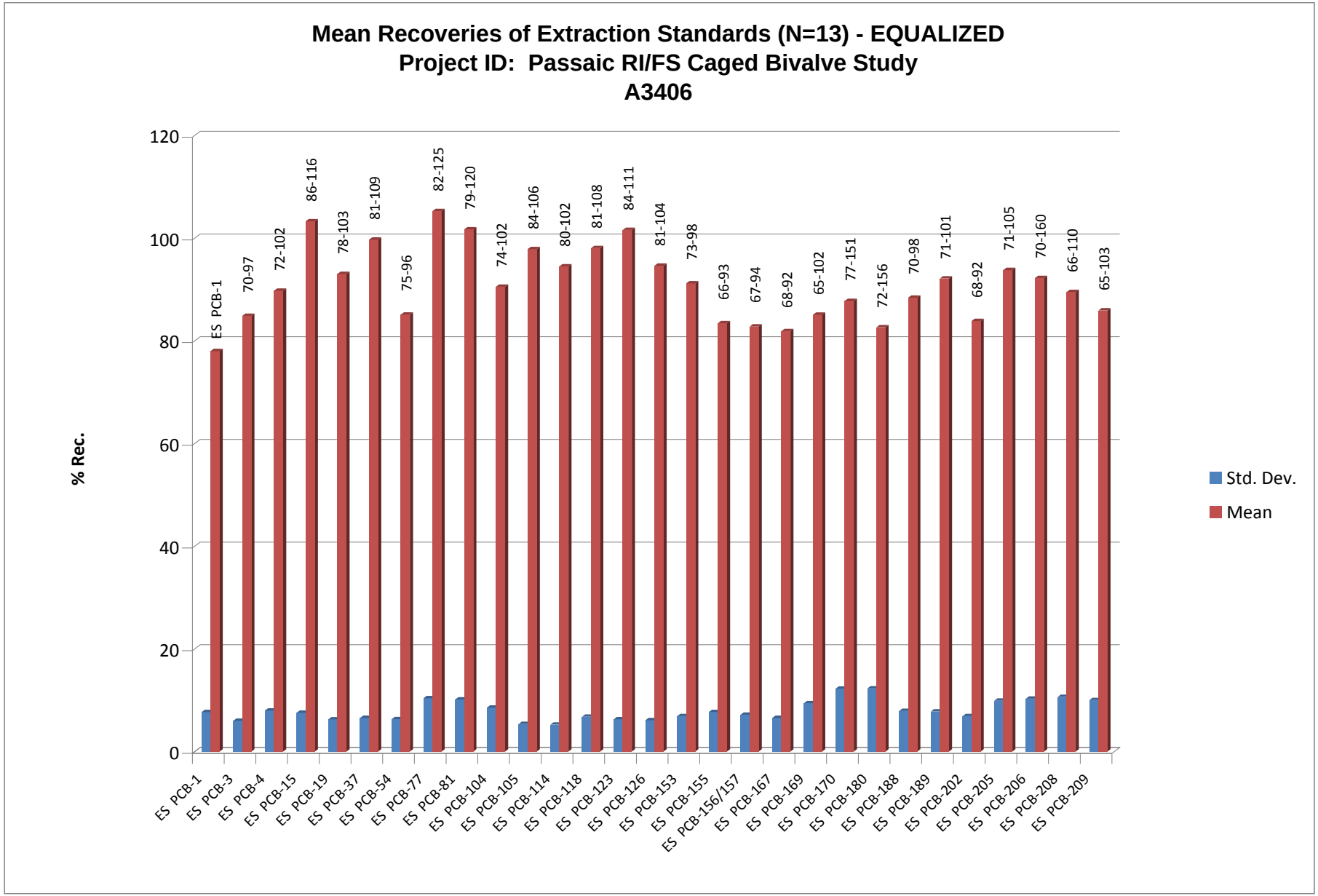
() = DL
[] = EMPC


PCB TEQ - EQUALIZED
Project ID: Passaic RI/FS Caged Bivalve Study
A3406
pg/g
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
0.00
0.208
0.000797
0.271
0.381
0.250
0.194
0.186
0.108
0.00158
0.0473
0.00308
Method Blank EQUALIZED
LPR6-ECST-Comp01 EQUALIZED
LPRBG-ECST-Comp01 EQUALIZED
LPR6-ECST-Comp02 EQUALIZED
LPR6-ECST-Comp02-DUP EQUALIZED
LPR7-ECST-Comp03 EQUALIZED
LPR7-ECST-Comp04 EQUALIZED
LPR8-ECST-Comp05 EQUALIZED
LPR1-GDST-Comp01 EQUALIZED
LPRBG-GDST-Comp01 EQUALIZED
LPR2-GDST-Comp02 EQUALIZED
LPR3-GDST-Comp03 EQUALIZED
ND = 0; EMPC = 0
ND = 0; EMPC = EMPC
ND = DL/2; EMPC = 0
ND = DL/2; EMPC = EMPC
ND = DL; EMPC = 0
ND = DL; EMPC = EMPC


PCB Totals - EQUALIZED
Project ID: Passaic RI/FS Caged Bivalve Study
A3406
pg/g
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0
10.4
23,300
375
27,400
33,200
29,800
18,700
16,700
18,400
741
7,420
2,590
Method Blank EQUALIZED
LPR6-ECST-Comp01 EQUALIZED
LPRBG-ECST-Comp01 EQUALIZED
LPR6-ECST-Comp02 EQUALIZED
LPR6-ECST-Comp02-DUP EQUALIZED
LPR7-ECST-Comp03 EQUALIZED
LPR7-ECST-Comp04 EQUALIZED
LPR8-ECST-Comp05 EQUALIZED
LPR1-GDST-Comp01 EQUALIZED
LPRBG-GDST-Comp01 EQUALIZED
LPR2-GDST-Comp02 EQUALIZED
LPR3-GDST-Comp03 EQUALIZED
Sample


PCB Homologues - EQUALIZED
Project ID: Passaic RI/FS Caged Bivalve Study
A3406
pg/g
12,000
10,000
8,000
6,000
4,000
2,000
0
0.00
30.8
10.3
42.1
65.4
44.2
50.4
39.0
1.54
0.00
1.13
1.30
Method Blank EQUALIZED
LPR6-ECST-Comp01 EQUALIZED
LPRBG-ECST-Comp01 EQUALIZED
LPR6-ECST-Comp02 EQUALIZED
LPR6-ECST-Comp02-DUP EQUALIZED
LPR7-ECST-Comp03 EQUALIZED
LPR7-ECST-Comp04 EQUALIZED
LPR8-ECST-Comp05 EQUALIZED
LPR1-GDST-Comp01 EQUALIZED
LPRBG-GDST-Comp01 EQUALIZED
LPR2-GDST-Comp02 EQUALIZED
LPR3-GDST-Comp03 EQUALIZED
Total Mono-PCBs
Total Di-PCBs
Total Tri-PCBs
Total Tetra-PCBs
Total Penta-PCBs
Total Hexa-PCBs
Total Hepta-PCBs
Total Octa-PCBs
Total Nona-PCBs
PCB-209


PCB WHO - EQUALIZED
Project ID: Passaic RI/FS Caged Bivalve Study
A3406
pg/g
900
800
700
600
500
400
300
200
100
0
0.00
568
15.3
696
857
814
530
413
433
36.1
154
56.2
Method Blank EQUALIZED
LPR6-ECST-Comp01 EQUALIZED
LPRBG-ECST-Comp01 EQUALIZED
LPR6-ECST-Comp02 EQUALIZED
LPR6-ECST-Comp02-DUP EQUALIZED
LPR7-ECST-Comp03 EQUALIZED
LPR7-ECST-Comp04 EQUALIZED
LPR8-ECST-Comp05 EQUALIZED
LPR1-GDST-Comp01 EQUALIZED
LPRBG-GDST-Comp01 EQUALIZED
LPR2-GDST-Comp02 EQUALIZED
LPR3-GDST-Comp03 EQUALIZED
PCB-77
PCB-81
PCB-105
PCB-114
PCB-118
PCB-123
PCB-126
PCB-156/157
PCB-167
PCB-169
PCB-189


Mean Recoveries of Extraction Standards (N=13) - EQUALIZED
Project ID: Passaic RI/FS Caged Bivalve Study
A3406
% Rec.
120
100
80
60
40
20
0
ES PCB-1 70-97 72-102 86-116 78-103 81-109 75-96 82-125 79-120 74-102 84-106 80-102 81-108 84-111 81-104 73-98 66-93 67-94 68-92 65-102 77-151 72-156 70-98 71-101 68-92 71-105 70-160 66-110 65-103
ES PCB-1
ES PCB-3
ES PCB-4
ES PCB-15
ES PCB-19
ES PCB-37
ES PCB-54
ES PCB-77
ES PCB-81
ES PCB-104
ES PCB-105
ES PCB-114
ES PCB-118
ES PCB-123
ES PCB-126
ES PCB-153
ES PCB-155
ES PCB-156/157
ES PCB-167
ES PCB-169
ES PCB-170
ES PCB-180
ES PCB-188
ES PCB-189
ES PCB-202
ES PCB-205
ES PCB-206
ES PCB-208
ES PCB-209
Std. Dev.
Mean

# CARP2 SRM - EQUALIZED

ANALYTICAL PERSPECTIVES

**Method 1668B**

## Lab ID: A3406_8929_PCB_011-sp10 (EQ)

| Analyte | AP Analyte | Conc. | Assigned Value | PD from Assigned value |
|---|---|---|---|---|
| | | (pg/g) | (pg/g) | % |
| PCB-8 | PCB-8 | 4,750 | 4,800 | -1.04% |
| PCB-18 ‡ | PCB-30/18 | 33,300 | 27,300 | 22.0% |
| PCB-28 * | PCB-28/20 | 42,700 | 34,000 | 25.6% |
| PCB-44 * | PCB-44/47/65 | 137,000 | 86,600 | 58.2% |
| PCB-52 | PCB-52 | 150,000 | 138,000 | 8.70% |
| PCB-66/95 * | PCB-66 / PCB-95 | 216,500 | 174,000 | 24.4% |
| PCB-101/90 * | PCB-113/90/101 | 151,000 | 145,000 | 4.14% |
| PCB-105 | PCB-105 | 60,800 | 53,200 | 14.3% |
| PCB-118 | PCB-118 | 143,000 | 148,000 | -3.38% |
| PCB-128 * | PCB-128/166 | 21,100 | 20,400 | 3.43% |
| PCB-138/163/164 * | PCB-163/138/129 | 140,000 | 103,000 | 35.9% |
| PCB-153 * | PCB-153/168 | 92,700 | 105,000 | -11.7% |
| PCB-170/190 * | PCB-170 | 20,600 | 20,600 | 0.00% |
| PCB-180 * | PCB-180/193 | 52,800 | 53,300 | -0.938% |
| PCB-187/159/182 * | PCB-187 | 42,500 | 37,100 | 14.6% |
| PCB-194 | PCB-194 | 15,600 | 10,900 | 43.1% |
| PCB-206 | PCB-206 | 2,390 | 4,400 | -45.7% |
| PCB-209 | PCB-209 | 5,520 | 4,600 | 20.0% |

‡ PCB-18 coelutes with PCB-30 and therefore will not match the SRM values for PCB-18
* Denotes variance in co-elution profile

Reviewer KAM
Date 01 Sep 11

| Sample DUP | ANALYTICAL PERSPECTIVES | Method HR-PCB |
|---|---|---|
| **EQUALIZED** | Sample ID: LPR6-ECST-Comp02 | |

| Analyte | A3406_8929_PCB_003 pg/g | A3406_8929_PCB_003DUP(DUP) pg/g | RPD |
|---|---|---|---|
| | | | |
| PCB-77 33'44'-TeCB | 77.9 | 87 | 11.0% |
| PCB-81 344'5-TeCB | 3.34 | 3.51 | 5.0% |
| PCB-105 233'44'-PeCB | 267 | 318 | 17.4% |
| PCB-114 2344'5-PeCB | 16.2 | 18.7 | 14.3% |
| PCB-118 23'44'5-PeCB | 696 | 857 | 20.7% |
| PCB-123 2'344'5-PeCB | 13.6 | 16.5 | 19.3% |
| PCB-126 33'44'5-PeCB | 2.06 | 2.68 | 26.2% |
| PCB-156/157 233'44'5/233'44'5' | 63.7 | 89.6 | 33.8% |
| PCB-167 23'44'55'-HxCB | 25.2 | 34.8 | 32.0% |
| PCB-169 33'44'55'-HxCB | 0.765 | 2.08 | 92.4% |
| PCB-189 233'44'55'-HpCB | 4.15 | 6.33 | 41.6% |
| | | | |
| **TEQs** | | | |
| | | | |
| ND = 0 | 0.248 | 0.381 | 42.3% |
| ND = 0.5 x DL | 0.256 | 0.381 | 39.2% |
| | | | |
| **Totals** | | | |
| | | | |
| Mono-CBs | 4.14 | 3.92 | 5.5% |
| Di-CBs | 438 | 441 | 0.7% |
| Tri-CBs | 5910 | 6190 | 4.6% |
| Tetra-CBs | 9070 | 10400 | 13.7% |
| Penta-CBs | 6120 | 7470 | 19.9% |
| Hexa-CBs | 3910 | 5650 | 36.4% |
| Hepta-CBs | 1480 | 2330 | 44.6% |
| Octa-CBs | 352 | 566 | 46.6% |
| Nona-CBs | 76.2 | 113 | 38.9% |
| PCB-209 DeCB | 42.1 | 65.4 | 43.3% |
| | | | |

# Sample ID: Method Blank (EQUALIZED) — Method 1668B

| Client Data | | Sample Data | | Laboratory Data | | | |
|---|---|---|---|---|---|---|---|
| Name: | Windward Environmental, LLC | Matrix: | Tissue | Project No.: | A3406 | Date Received: | n/a |
| Project ID: | Passaic RI/FS Caged Bivalve Study | Weight/Volume: | 10.00 g | Sample ID: | MB1_8929_PCB_SDS | Date Extracted: | 15-Aug-2011 |
| Date Collected: | n/a | | | QC Batch No.: | 8929 | Date Analyzed: | 22-Aug-2011 |

| Analyte | Conc. | DL | EMPC | Qualifier | Standard | Recovery |
|---|---|---|---|---|---|---|
| | pg/g | pg/g | pg/g | | | % |
| PCB-77 33'44'-TeCB | ND | 0.231 | | | ES PCB-1 | 81.6 |
| PCB-81 344'5-TeCB | ND | 0.228 | | | ES PCB-3 | 87.5 |
| PCB-105 233'44'-PeCB | ND | 0.217 | | | ES PCB-4 | 90.7 |
| PCB-114 2344'5-PeCB | ND | 0.217 | | | ES PCB-15 | 102 |
| PCB-118 23'44'5-PeCB | ND | 0.217 | | | ES PCB-19 | 96.3 |
| PCB-123 23'44'5'-PeCB | ND | 0.219 | | | ES PCB-37 | 98.6 |
| PCB-126 33'44'5-PeCB | ND | 0.223 | | | ES PCB-54 | 88.2 |
| PCB-156/157 233'44'5/233'44'5'-HxCB | ND | 0.315 | | C | ES PCB-77 | 97 |
| PCB-167 23'44'55'-HxCB | ND | 0.23 | | | ES PCB-81 | 91 |
| PCB-169 33'44'55'-HxCB | ND | 0.263 | | | ES PCB-104 | 98.3 |
| PCB-189 233'44'55'-HpCB | ND | 0.222 | | | ES PCB-105 | 101 |
| | | | | | ES PCB-114 | 96.3 |
| **TEQs (WHO M/H)** | | | | | ES PCB-118 | 98 |
| | | | | | ES PCB-123 | 100 |
| ND = 0 | 0 | | 0 | | ES PCB-126 | 96.4 |
| ND = 0.5 x DL | 0.0152 | | 0.0152 | | ES PCB-153 | 88.3 |
| | | | | | ES PCB-155 | 84 |
| **Totals** | | | | | ES PCB-156/157 | 83.2 |
| | | | | | ES PCB-167 | 80.5 |
| Mono-CBs | ND | 0.141 | | | ES PCB-169 | 77.1 |
| Di-CBs | 4.49 | | | | ES PCB-170 | 119 |
| Tri-CBs | 1.81 | | 2.38 | | ES PCB-180 | 114 |
| Tetra-CBs | 2.24 | | | | ES PCB-188 | 83.4 |
| Penta-CBs | 0.727 | | | | ES PCB-189 | 96 |
| Hexa-CBs | 0.666 | | 1.2 | | ES PCB-202 | 91.5 |
| Hepta-CBs | 0.448 | | | | ES PCB-205 | 99.1 |
| Octa-CBs | ND | 0.245 | | | ES PCB-206 | 102 |
| Nona-CBs | ND | 0.323 | | | ES PCB-208 | 110 |
| Deca-CB | ND | 0.311 | | | ES PCB-209 | 95.2 |
| | | | | | CS PCB-28 | 104 |
| Mono-Deca | 10.4 | | 11.5 | | CS PCB-111 | 106 |
| | | | | | CS PCB-178 | 107 |

Checkcode: 386-509-CNJ  AP PCB 2011 Rev. A  Report Created: 29-Aug-2011 16:53  Analyst: LB

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# Sample ID: Method Blank (EQUALIZED) — Method 1668B

| Client Data | | Sample Data | | Laboratory Data | | | |
|---|---|---|---|---|---|---|---|
| Name: | Windward Environmental, LLC | Matrix: | Tissue | Project No.: | A3406 | Date Received: | n/a |
| Project ID: | Passaic RI/FS Caged Bivalve Study | Weight/Volume: | 10.00 g | Sample ID: | MB1_8929_PCB_SDS | Date Extracted: | 15-Aug-2011 |
| Date Collected: | n/a | | | QC Batch No.: | 8929 | Date Analyzed: | 22-Aug-2011 |
| | | Units | pg/g | Checkcode: | 386-509-CNJ | Time Analyzed: | 12:58:59 |

| Mono | Conc. | Qualifiers | Tri | Conc. | Qualifiers | Tetra | Conc. | Qualifiers | Tetra | Conc. | Qualifiers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PCB-1 | (0.133) | | PCB-19 | (0.215) | | PCB-54 | (0.118) | | PCB-72 | (0.216) | |
| PCB-2 | (0.158) | | PCB-30/18 | [0.577] | J EMPC C | PCB-50/53 | (0.233) | C | PCB-68 | (0.193) | |
| PCB-3 | (0.149) | | PCB-17 | (0.216) | | PCB-45 | (0.302) | | PCB-57 | (0.226) | |
| | | | PCB-27 | (0.164) | | PCB-51 | (0.211) | | PCB-58 | (0.212) | |
| **Conc.** | 0 | | PCB-24 | (0.159) | | PCB-46 | (0.275) | | PCB-67 | (0.194) | |
| **EMPC** | 0 | | PCB-16 | (0.272) | | PCB-52 | 1.04 | | PCB-63 | (0.211) | |
| | | | PCB-32 | 0.438 | J | PCB-73 | (0.177) | | PCB-61/70/74/76 | 0.699 | J C |
| **Di** | **Conc.** | **Qualifiers** | PCB-34 | (0.202) | | PCB-43 | (0.281) | | PCB-66 | (0.218) | |
| PCB-4 | (0.661) | | PCB-23 | (0.196) | | PCB-69/49 | 0.492 | J C | PCB-55 | (0.219) | |
| PCB-10 | (0.454) | | PCB-26/29 | (0.19) | C | PCB-48 | (0.231) | | PCB-56 | (0.217) | |
| PCB-9 | (0.521) | | PCB-25 | (0.18) | | PCB-44/47/65 | (0.211) | C | PCB-60 | (0.215) | |
| PCB-7 | (0.507) | | PCB-31 | 0.535 | J | PCB-59/62/75 | (0.178) | C | PCB-80 | (0.188) | |
| PCB-6 | (0.53) | | PCB-28/20 | 0.833 | J C | PCB-42 | (0.247) | | PCB-79 | (0.194) | |
| PCB-5 | (0.533) | | PCB-21/33 | (0.198) | C | PCB-41 | (0.297) | | PCB-78 | (0.23) | |
| PCB-8 | (0.52) | | PCB-22 | (0.193) | | PCB-71/40 | (0.217) | C | PCB-81 | (0.228) | |
| PCB-14 | (0.522) | | PCB-36 | (0.192) | | PCB-64 | (0.176) | | PCB-77 | (0.231) | |
| PCB-11 | 4.49 | | PCB-39 | (0.176) | | | | | | | |
| PCB-13/12 | (0.506) | C | PCB-38 | (0.2) | | | | | | | |
| PCB-15 | (0.512) | | PCB-35 | (0.204) | | | | | | | |
| | | | PCB-37 | (0.226) | | | | | | | |
| **Conc.** | 4.49 | | **Conc.** | 1.81 | | | | | **Conc.** | 2.24 | |
| **EMPC** | 4.49 | | **EMPC** | 2.38 | | | | | **EMPC** | 2.24 | |


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www.ultratrace.com


| Totals | Conc. | EMPC |
|---|---|---|
| Mono-Tri | 6.29 | 6.87 |
| Tetra-Hexa | 3.63 | 4.16 |
| Hepta-Deca | 0.448 | 0.448 |
| Mono-Deca | 10.4 | 11.5 |

# Sample ID: Method Blank (EQUALIZED) Method 1668B

| Penta | Conc. | Qualifiers | Penta | Conc. | Qualifiers | Hexa | Conc. | Qualifiers | Hexa | Conc. | Qualifiers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PCB-104 | (0.13) | | PCB-109/119/86… | (0.232) | C | PCB-155 | (0.155) | | PCB-165 | (0.206) | |
| PCB-96 | (0.138) | | PCB-117 | (0.219) | | PCB-152 | (0.171) | | PCB-146 | (0.226) | |
| PCB-103 | (0.249) | | PCB-116/85 | (0.229) | C | PCB-150 | (0.165) | | PCB-161 | (0.205) | |
| PCB-94 | (0.276) | | PCB-110 | (0.206) | | PCB-136 | (0.176) | | PCB-153/168 | [0.53] | J EMPC C |
| PCB-95 | (0.264) | | PCB-115 | (0.199) | | PCB-145 | (0.173) | | PCB-141 | (0.252) | |
| PCB-100/93 | (0.26) | C | PCB-82 | (0.327) | | PCB-148 | (0.25) | | PCB-130 | (0.308) | |
| PCB-102 | (0.233) | | PCB-111 | (0.194) | | PCB-151/135 | (0.25) | C | PCB-137 | (0.254) | |
| PCB-98 | (0.282) | | PCB-120 | (0.199) | | PCB-154 | (0.203) | | PCB-164 | (0.2) | |
| PCB-88 | (0.303) | | PCB-108/124 | (0.215) | C | PCB-144 | (0.248) | | PCB-163/138/129 | 0.666 | J C |
| PCB-91 | (0.243) | | PCB-107 | (0.18) | | PCB-147/149 | (0.233) | C | PCB-160 | (0.197) | |
| PCB-84 | (0.291) | | PCB-123 | (0.219) | | PCB-134 | (0.324) | | PCB-158 | (0.178) | |
| PCB-89 | (0.301) | | PCB-106 | (0.221) | | PCB-143 | (0.25) | | PCB-128/166 | (0.269) | C |
| PCB-121 | (0.19) | | PCB-118 | (0.217) | | PCB-139/140 | (0.237) | C | PCB-159 | (0.232) | |
| PCB-92 | (0.281) | | PCB-122 | (0.229) | | PCB-131 | (0.288) | | PCB-162 | (0.215) | |
| PCB-113/90/101 | 0.727 | J C | PCB-114 | (0.217) | | PCB-142 | (0.292) | | PCB-167 | (0.23) | |
| PCB-83 | (0.329) | | PCB-105 | (0.217) | | PCB-132 | (0.278) | | PCB-156/157 | (0.315) | C |
| PCB-99 | (0.242) | | PCB-127 | (0.211) | | PCB-133 | (0.279) | | PCB-169 | (0.263) | |
| PCB-112 | (0.194) | | PCB-126 | (0.223) | | | | | | | |
| | | | **Conc.** | 0.727 | | | | | **Conc.** | 0.666 | |
| | | | **EMPC** | 0.727 | | | | | **EMPC** | 1.2 | |

| Hepta | Conc. | Qualifiers | Hepta | Conc. | Qualifiers | Octa | Conc. | Qualifiers | Nona | Conc. | Qualifiers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PCB-188 | (0.165) | | PCB-174 | (0.355) | | PCB-202 | (0.199) | | PCB-208 | (0.279) | |
| PCB-179 | (0.185) | | PCB-177 | (0.395) | | PCB-201 | (0.21) | | PCB-207 | (0.291) | |
| PCB-184 | (0.168) | | PCB-181 | (0.353) | | PCB-204 | (0.209) | | PCB-206 | (0.368) | |
| PCB-176 | (0.194) | | PCB-171/173 | (0.394) | C | PCB-197 | (0.191) | | | | |
| PCB-186 | (0.188) | | PCB-172 | (0.407) | | PCB-200 | (0.216) | | **Conc.** | 0 | |
| PCB-178 | (0.249) | | PCB-192 | (0.293) | | PCB-198/199 | (0.265) | C | **EMPC** | 0 | |
| PCB-175 | (0.356) | | PCB-180/193 | 0.448 | J C | PCB-196 | (0.278) | | | | |
| PCB-187 | (0.317) | | PCB-191 | (0.292) | | PCB-203 | (0.24) | | **Deca** | **Conc.** | **Qualifiers** |
| PCB-182 | (0.328) | | PCB-170 | (0.321) | | PCB-195 | (0.515) | | PCB-209 | (0.311) | |
| PCB-183 | (0.347) | | PCB-190 | (0.261) | | PCB-194 | (0.48) | | | | |
| PCB-185 | (0.331) | | PCB-189 | (0.222) | | PCB-205 | (0.29) | | | | |
| | | | **Conc.** | 0.448 | | **Conc.** | 0 | | | | |
| | | | **EMPC** | 0.448 | | **EMPC** | 0 | | | | |

# Sample ID: LPR6-ECST-Comp01 (EQUALIZED) Method 1668B

| Client Data | | Sample Data | | Laboratory Data | | | |
|---|---|---|---|---|---|---|---|
| Name: | Windward Environmental, LLC | Matrix: | Tissue | Project No.: | A3406 | Date Received: | 02-Aug-2011 |
| Project ID: | Passaic RI/FS Caged Bivalve Study | Weight/Volume: | 10.11 g | Sample ID: | A3406_8929_PCB_001 | Date Extracted: | 15-Aug-2011 |
| Date Collected: | 08-Jun-2011 | | | QC Batch No.: | 8929 | Date Analyzed: | 22-Aug-2011 |

| Analyte | Conc. | DL | EMPC | Qualifier |
|---|---|---|---|---|
| | pg/g | pg/g | pg/g | |
| PCB-77 33'44'-TeCB | 61.3 | | | |
| PCB-81 344'5-TeCB | 2.89 | | | |
| PCB-105 233'44'-PeCB | 209 | | | |
| PCB-114 2344'5-PeCB | 13.1 | | | |
| PCB-118 23'44'5-PeCB | 568 | | | |
| PCB-123 23'44'5'-PeCB | 11.5 | | | |
| PCB-126 33'44'5-PeCB | 1.75 | | | |
| PCB-156/157 233'44'5/233'44'5'-HxCB | 50.1 | | | C |
| PCB-167 23'44'55'-HxCB | 18.8 | | | |
| PCB-169 33'44'55'-HxCB | ND | 0.585 | | |
| PCB-189 233'44'55'-HpCB | 2.75 | | | |
| | | | | |
| **TEQs (WHO M/H)** | | | | |
| | | | | |
| ND = 0 | 0.208 | | 0.208 | |
| ND = 0.5 x DL | 0.217 | | 0.217 | |
| | | | | |
| **Totals** | | | | |
| | | | | |
| Mono-CBs | 4.55 | | | |
| Di-CBs | 430 | | 431 | |
| Tri-CBs | 5,290 | | | |
| Tetra-CBs | 8,070 | | 8,080 | |
| Penta-CBs | 4,960 | | | |
| Hexa-CBs | 3,100 | | 3,100 | |
| Hepta-CBs | 1,040 | | | |
| Octa-CBs | 239 | | | |
| Nona-CBs | 52.1 | | | |
| Deca-CB | 30.8 | | | |
| | | | | |
| Mono-Deca | 23,200 | | 23,200 | |
| | | | | |

| Standard | Recovery |
|---|---|
| | % |
| ES PCB-1 | 64.1 |
| ES PCB-3 | 71.9 |
| ES PCB-4 | 74.3 |
| ES PCB-15 | 86 |
| ES PCB-19 | 77.8 |
| ES PCB-37 | 81.4 |
| ES PCB-54 | 71.7 |
| ES PCB-77 | 83.6 |
| ES PCB-81 | 80.1 |
| ES PCB-104 | 75.8 |
| ES PCB-105 | 84.3 |
| ES PCB-114 | 80.2 |
| ES PCB-118 | 81.1 |
| ES PCB-123 | 84.9 |
| ES PCB-126 | 79 |
| ES PCB-153 | 72.7 |
| ES PCB-155 | 65.6 |
| ES PCB-156/157 | 65.5 |
| ES PCB-167 | 66.2 |
| ES PCB-169 | 63.6 |
| ES PCB-170 | 67 |
| ES PCB-180 | 63.8 |
| ES PCB-188 | 69.5 |
| ES PCB-189 | 71.2 |
| ES PCB-202 | 66.5 |
| ES PCB-205 | 70.7 |
| ES PCB-206 | 69.8 |
| ES PCB-208 | 65.8 |
| ES PCB-209 | 63.3 |
| CS PCB-28 | 126 |
| CS PCB-111 | 106 |
| CS PCB-178 | 102 |

Checkcode: 997-484-BKQ AP PCB 2011 Rev. A Report Created: 01-Sep-2011 15:45 Analyst: CM

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# Sample ID: LPR6-ECST-Comp01 (EQUALIZED) Method 1668B

| Client Data | | Sample Data | | Laboratory Data | | | |
|---|---|---|---|---|---|---|---|
| Name: | Windward Environmental, LLC | Matrix: | Tissue | Project No.: | A3406 | Date Received: | 02-Aug-2011 |
| Project ID: | Passaic RI/FS Caged Bivalve Study | Weight/Volume: | 10.11 g | Sample ID: | A3406_8929_PCB_001 | Date Extracted: | 15-Aug-2011 |
| Date Collected: | 08-Jun-2011 | | | QC Batch No.: | 8929 | Date Analyzed: | 22-Aug-2011 |
| | | Units | pg/g | Checkcode: | 997-484-BKQ | Time Analyzed: | 13:53:59 |

| Mono | Conc. | Qualifiers | Tri | Conc. | Qualifiers | Tetra | Conc. | Qualifiers | Tetra | Conc. | Qualifiers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PCB-1 | 2.47 | | PCB-19 | 71.2 | | PCB-54 | 12.7 | | PCB-72 | 10.9 | |
| PCB-2 | 0.906 | J | PCB-30/18 | 699 | C | PCB-50/53 | 232 | C | PCB-68 | [6.11] | EMPC |
| PCB-3 | 1.17 | | PCB-17 | 388 | | PCB-45 | 196 | | PCB-57 | 5.44 | |
| | | | PCB-27 | 74.8 | | PCB-51 | 126 | | PCB-58 | 4.68 | |
| **Conc.** | 4.55 | | PCB-24 | 11.6 | | PCB-46 | 76.2 | | PCB-67 | 31.6 | |
| **EMPC** | 4.55 | | PCB-16 | 279 | | PCB-52 | 1,290 | | PCB-63 | 33.3 | |
| | | | PCB-32 | 311 | | PCB-73 | 5.87 | | PCB-61/70/74/76 | 1,270 | C |
| **Di** | **Conc.** | **Qualifiers** | PCB-34 | 8.53 | | PCB-43 | 46.5 | | PCB-66 | 684 | |
| PCB-4 | 69.2 | | PCB-23 | (0.557) | | PCB-69/49 | 773 | C | PCB-55 | 11.5 | |
| PCB-10 | 4.47 | | PCB-26/29 | 227 | C | PCB-48 | 215 | | PCB-56 | 328 | |
| PCB-9 | 6.03 | | PCB-25 | 159 | | PCB-44/47/65 | 1,130 | C | PCB-60 | 113 | |
| PCB-7 | 3.74 | | PCB-31 | 940 | | PCB-59/62/75 | 105 | C | PCB-80 | (0.445) | |
| PCB-6 | 38.9 | | PCB-28/20 | 1,250 | C | PCB-42 | 283 | | PCB-79 | 7.07 | |
| PCB-5 | [0.964] | J EMPC | PCB-21/33 | 354 | C | PCB-41 | 70.4 | | PCB-78 | (0.545) | |
| PCB-8 | 96.7 | | PCB-22 | 285 | | PCB-71/40 | 491 | C | PCB-81 | 2.89 | |
| PCB-14 | (0.517) | | PCB-36 | (0.543) | | PCB-64 | 461 | | PCB-77 | 61.3 | |
| PCB-11 | 79.2 | | PCB-39 | 6 | | | | | | | |
| PCB-13/12 | 21.9 | C | PCB-38 | (0.568) | | | | | | | |
| PCB-15 | 110 | | PCB-35 | 15.8 | | | | | | | |
| | | | PCB-37 | 208 | | | | | | | |
| **Conc.** | 430 | | **Conc.** | 5,290 | | | | | **Conc.** | 8,070 | |
| **EMPC** | 431 | | **EMPC** | 5,290 | | | | | **EMPC** | 8,080 | |

| Totals | Conc. | EMPC |
|---|---|---|
| Mono-Tri | 5,720 | 5,720 |
| Tetra-Hexa | 16,100 | 16,100 |
| Hepta-Deca | 1,370 | 1,370 |
| Mono-Deca | 23,200 | 23,200 |

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# Sample ID: LPR6-ECST-Comp01 (EQUALIZED) Method 1668B

| Penta | Conc. | Qualifiers | Penta | Conc. | Qualifiers | Hexa | Conc. | Qualifiers | Hexa | Conc. | Qualifiers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PCB-104 | 3.21 | | PCB-109/119/86… | 511 | C | PCB-155 | 8.29 | | PCB-165 | (0.2) | |
| PCB-96 | 14.1 | | PCB-117 | 19.2 | | PCB-152 | 1.87 | | PCB-146 | 91.5 | |
| PCB-103 | 13.8 | | PCB-116/85 | 111 | C | PCB-150 | 1.62 | | PCB-161 | (0.199) | |
| PCB-94 | 12 | | PCB-110 | 847 | | PCB-136 | 112 | | PCB-153/168 | 493 | C |
| PCB-95 | 677 | | PCB-115 | 31.4 | | PCB-145 | (0.187) | | PCB-141 | 128 | |
| PCB-100/93 | 27 | C | PCB-82 | 94 | | PCB-148 | (0.243) | | PCB-130 | 43.7 | |
| PCB-102 | 36.8 | | PCB-111 | (1.68) | | PCB-151/135 | 286 | C | PCB-137 | 31.1 | |
| PCB-98 | (2.45) | | PCB-120 | (1.73) | | PCB-154 | 11.1 | | PCB-164 | 48.4 | |
| PCB-88 | (2.63) | | PCB-108/124 | 23.7 | C | PCB-144 | 31.8 | | PCB-163/138/129 | 717 | C |
| PCB-91 | 116 | | PCB-107 | 35.3 | | PCB-147/149 | 565 | C | PCB-160 | (0.192) | |
| PCB-84 | 221 | | PCB-123 | 11.5 | | PCB-134 | 47.5 | | PCB-158 | 53.5 | |
| PCB-89 | 13.9 | | PCB-106 | (1.91) | | PCB-143 | (0.243) | | PCB-128/166 | 83.2 | C |
| PCB-121 | (1.65) | | PCB-118 | 568 | | PCB-139/140 | 10.9 | C | PCB-159 | 4.7 | |
| PCB-92 | 163 | | PCB-122 | (2.12) | | PCB-131 | 8.97 | | PCB-162 | [1.91] | EMPC |
| PCB-113/90/101 | 772 | C | PCB-114 | 13.1 | | PCB-142 | (0.284) | | PCB-167 | 18.8 | |
| PCB-83 | 43.6 | | PCB-105 | 209 | | PCB-132 | 242 | | PCB-156/157 | 50.1 | C |
| PCB-99 | 368 | | PCB-127 | (2.01) | | PCB-133 | 11.5 | | PCB-169 | (0.585) | |
| PCB-112 | 2.31 | | PCB-126 | 1.75 | | | | | | | |
| | | | **Conc.** | 4,960 | | | | | **Conc.** | 3,100 | |
| | | | **EMPC** | 4,960 | | | | | **EMPC** | 3,100 | |

| Hepta | Conc. | Qualifiers | Hepta | Conc. | Qualifiers | Octa | Conc. | Qualifiers | Nona | Conc. | Qualifiers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PCB-188 | (0.137) | | PCB-174 | 159 | | PCB-202 | 20.9 | | PCB-208 | 16 | |
| PCB-179 | 74.2 | | PCB-177 | 82.4 | | PCB-201 | 7.61 | | PCB-207 | 2.32 | |
| PCB-184 | (0.14) | | PCB-181 | (0.384) | | PCB-204 | (0.201) | | PCB-206 | 33.8 | |
| PCB-176 | 17.6 | | PCB-171/173 | 31 | C | PCB-197 | 1.34 | | | | |
| PCB-186 | (0.156) | | PCB-172 | 24.6 | | PCB-200 | 7.85 | | **Conc.** | 52.1 | |
| PCB-178 | 32.9 | | PCB-192 | (0.318) | | PCB-198/199 | 67 | C | **EMPC** | 52.1 | |
| PCB-175 | 5.24 | | PCB-180/193 | 221 | C | PCB-196 | 14.7 | | | | |
| PCB-187 | 199 | | PCB-191 | 3.82 | | PCB-203 | 43.2 | | **Deca** | **Conc.** | **Qualifiers** |
| PCB-182 | (0.356) | | PCB-170 | 81.9 | | PCB-195 | 21.2 | | PCB-209 | 30.8 | |
| PCB-183 | 70.8 | | PCB-190 | 19.3 | | PCB-194 | 52.9 | | | | |
| PCB-185 | 18.4 | | PCB-189 | 2.75 | | PCB-205 | 1.93 | | | | |
| | | | **Conc.** | 1,040 | | **Conc.** | 239 | | | | |
| | | | **EMPC** | 1,040 | | **EMPC** | 239 | | | | |

# Sample ID: LPRBG-ECST-Comp01 (EQUALIZED) Method 1668B

| Client Data | | Sample Data | | Laboratory Data | | | |
|---|---|---|---|---|---|---|---|
| Name: | Windward Environmental, LLC | Matrix: | Tissue | Project No.: | A3406 | Date Received: | 02-Aug-2011 |
| Project ID: | Passaic RI/FS Caged Bivalve Study | Weight/Volume: | 10.25 g | Sample ID: | A3406_8929_PCB_002 | Date Extracted: | 15-Aug-2011 |
| Date Collected: | 09-Mar-2011 | | | QC Batch No.: | 8929 | Date Analyzed: | 22-Aug-2011 |

| Analyte | Conc. | DL | EMPC | Qualifier |
|---|---|---|---|---|
| | pg/g | pg/g | pg/g | |
| PCB-77 33'44'-TeCB | EMPC | | 0.561 | J |
| PCB-81 344'5-TeCB | ND | 0.356 | | |
| PCB-105 233'44'-PeCB | 5.5 | | | |
| PCB-114 2344'5-PeCB | ND | 0.345 | | |
| PCB-118 23'44'5-PeCB | 15.3 | | | |
| PCB-123 23'44'5'-PeCB | ND | 0.335 | | |
| PCB-126 33'44'5-PeCB | ND | 0.289 | | |
| PCB-156/157 233'44'5/233'44'5'-HxCB | 2.48 | | | C |
| PCB-167 23'44'55'-HxCB | 1.38 | | | |
| PCB-169 33'44'55'-HxCB | ND | 0.33 | | |
| PCB-189 233'44'55'-HpCB | ND | 0.448 | | |
| | | | | |
| **TEQs (WHO M/H)** | | | | |
| | | | | |
| ND = 0 | 0.000741 | | 0.000797 | |
| ND = 0.5 x DL | 0.0203 | | 0.0203 | |
| | | | | |
| **Totals** | | | | |
| | | | | |
| Mono-CBs | ND | 0.178 | | |
| Di-CBs | 4.5 | | | |
| Tri-CBs | 8.3 | | 12.4 | |
| Tetra-CBs | 21.6 | | 26.6 | |
| Penta-CBs | 88.7 | | 89.8 | |
| Hexa-CBs | 143 | | 148 | |
| Hepta-CBs | 58.6 | | 72.3 | |
| Octa-CBs | 27.3 | | 30.7 | |
| Nona-CBs | 12.7 | | | |
| Deca-CB | 10.3 | | | |
| | | | | |
| Mono-Deca | 375 | | 407 | |
| | | | | |

| Standard | Recovery |
|---|---|
| | % |
| ES PCB-1 | 69.7 |
| ES PCB-3 | 80.3 |
| ES PCB-4 | 81.3 |
| ES PCB-15 | 104 |
| ES PCB-19 | 92.5 |
| ES PCB-37 | 99 |
| ES PCB-54 | 83.1 |
| ES PCB-77 | 103 |
| ES PCB-81 | 99.4 |
| ES PCB-104 | 85.8 |
| ES PCB-105 | 96.6 |
| ES PCB-114 | 92.5 |
| ES PCB-118 | 94.5 |
| ES PCB-123 | 98.2 |
| ES PCB-126 | 95.5 |
| ES PCB-153 | 85.8 |
| ES PCB-155 | 74.2 |
| ES PCB-156/157 | 77.8 |
| ES PCB-167 | 78.4 |
| ES PCB-169 | 85 |
| ES PCB-170 | 87.1 |
| ES PCB-180 | 80 |
| ES PCB-188 | 80.4 |
| ES PCB-189 | 86.7 |
| ES PCB-202 | 79.4 |
| ES PCB-205 | 85.3 |
| ES PCB-206 | 79.5 |
| ES PCB-208 | 81.6 |
| ES PCB-209 | 72.4 |
| CS PCB-28 | 134 V |
| CS PCB-111 | 109 |
| CS PCB-178 | 101 |

Checkcode: 938-643-PDM AP PCB 2011 Rev. A Report Created: 29-Aug-2011 16:54 Analyst: LB

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# Sample ID: LPRBG-ECST-Comp01 (EQUALIZED) Method 1668B

| Client Data | | Sample Data | | Laboratory Data | | | |
|---|---|---|---|---|---|---|---|
| Name: | Windward Environmental, LLC | Matrix: | Tissue | Project No.: | A3406 | Date Received: | 02-Aug-2011 |
| Project ID: | Passaic RI/FS Caged Bivalve Study | Weight/Volume: | 10.25 g | Sample ID: | A3406_8929_PCB_002 | Date Extracted: | 15-Aug-2011 |
| Date Collected: | 09-Mar-2011 | | | QC Batch No.: | 8929 | Date Analyzed: | 22-Aug-2011 |
| | | Units | pg/g | Checkcode: | 938-643-PDM | Time Analyzed: | 14:49:05 |

| Mono | Conc. | Qualifiers | Tri | Conc. | Qualifiers | Tetra | Conc. | Qualifiers | Tetra | Conc. | Qualifiers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PCB-1 | (0.171) | | PCB-19 | (0.225) | | PCB-54 | (0.193) | | PCB-72 | (0.337) | |
| PCB-2 | (0.196) | | PCB-30/18 | 1.75 | J B C | PCB-50/53 | 0.543 | J C | PCB-68 | (0.302) | |
| PCB-3 | (0.184) | | PCB-17 | 0.681 | J | PCB-45 | (0.405) | | PCB-57 | (0.353) | |
| | | | PCB-27 | (0.171) | | PCB-51 | (0.284) | | PCB-58 | (0.332) | |
| **Conc.** | 0 | | PCB-24 | (0.167) | | PCB-46 | (0.37) | | PCB-67 | (0.303) | |
| **EMPC** | 0 | | PCB-16 | 0.89 | J | PCB-52 | 5.27 | B | PCB-63 | (0.33) | |
| | | | PCB-32 | [0.585] | J B EMPC | PCB-73 | (0.238) | | PCB-61/70/74/76 | 6.56 | B C |
| **Di** | **Conc.** | **Qualifiers** | PCB-34 | (0.41) | | PCB-43 | (0.378) | | PCB-66 | [2.84] | EMPC |
| PCB-4 | (0.727) | | PCB-23 | (0.399) | | PCB-69/49 | 2.86 | B C | PCB-55 | (0.342) | |
| PCB-10 | (0.5) | | PCB-26/29 | (0.387) | C | PCB-48 | 0.614 | J | PCB-56 | [0.899] | J EMPC |
| PCB-9 | (0.534) | | PCB-25 | (0.365) | | PCB-44/47/65 | 3.47 | C | PCB-60 | (0.336) | |
| PCB-7 | (0.519) | | PCB-31 | 2.32 | B | PCB-59/62/75 | (0.24) | C | PCB-80 | (0.294) | |
| PCB-6 | (0.544) | | PCB-28/20 | [3.55] | B EMPC C | PCB-42 | [0.636] | J EMPC | PCB-79 | (0.304) | |
| PCB-5 | (0.547) | | PCB-21/33 | 1.06 | J C | PCB-41 | (0.399) | | PCB-78 | (0.36) | |
| PCB-8 | 0.689 | J | PCB-22 | 0.881 | J | PCB-71/40 | 0.841 | J C | PCB-81 | (0.356) | |
| PCB-14 | (0.535) | | PCB-36 | (0.389) | | PCB-64 | 1.47 | | PCB-77 | [0.561] | J EMPC |
| PCB-11 | 3.81 | B | PCB-39 | (0.358) | | | | | | | |
| PCB-13/12 | (0.518) | C | PCB-38 | (0.407) | | | | | | | |
| PCB-15 | (0.524) | | PCB-35 | (0.415) | | | | | | | |
| | | | PCB-37 | 0.728 | J | | | | | | |
| **Conc.** | 4.5 | | **Conc.** | 8.3 | | | | | **Conc.** | 21.6 | |
| **EMPC** | 4.5 | | **EMPC** | 12.4 | | | | | **EMPC** | 26.6 | |

| Totals | Conc. | EMPC |
|---|---|---|
| Mono-Tri | 12.8 | 16.9 |
| Tetra-Hexa | 253 | 264 |
| Hepta-Deca | 109 | 126 |
| Mono-Deca | 375 | 407 |

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# Sample ID: LPRBG-ECST-Comp01 (EQUALIZED) Method 1668B

| Penta | Conc. | Qualifiers | Penta | Conc. | Qualifiers | Hexa | Conc. | Qualifiers | Hexa | Conc. | Qualifiers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PCB-104 | (0.184) | | PCB-109/119/86… | 9.11 | C | PCB-155 | (0.206) | | PCB-165 | (0.252) | |
| PCB-96 | (0.195) | | PCB-117 | [0.409] | J EMPC | PCB-152 | (0.227) | | PCB-146 | 6.58 | |
| PCB-103 | (0.38) | | PCB-116/85 | 2.4 | C | PCB-150 | (0.219) | | PCB-161 | (0.251) | |
| PCB-94 | (0.423) | | PCB-110 | 15.8 | | PCB-136 | 2.74 | | PCB-153/168 | 37.5 | C |
| PCB-95 | 8.5 | | PCB-115 | (0.305) | | PCB-145 | (0.229) | | PCB-141 | [4.74] | EMPC |
| PCB-100/93 | (0.398) | C | PCB-82 | 1.36 | | PCB-148 | (0.307) | | PCB-130 | 2.64 | |
| PCB-102 | (0.356) | | PCB-111 | (0.296) | | PCB-151/135 | 11.1 | C | PCB-137 | (0.312) | |
| PCB-98 | (0.432) | | PCB-120 | (0.305) | | PCB-154 | (0.249) | | PCB-164 | 2.36 | |
| PCB-88 | (0.464) | | PCB-108/124 | [0.728] | J EMPC C | PCB-144 | (0.304) | | PCB-163/138/129 | 44.1 | C |
| PCB-91 | 1.51 | | PCB-107 | 1.03 | | PCB-147/149 | 19.8 | C | PCB-160 | (0.242) | |
| PCB-84 | 2.27 | | PCB-123 | (0.335) | | PCB-134 | (0.397) | | PCB-158 | 1.96 | |
| PCB-89 | (0.46) | | PCB-106 | (0.338) | | PCB-143 | (0.306) | | PCB-128/166 | 3.89 | C |
| PCB-121 | (0.291) | | PCB-118 | 15.3 | | PCB-139/140 | (0.29) | C | PCB-159 | (0.327) | |
| PCB-92 | 3.14 | | PCB-122 | (0.364) | | PCB-131 | (0.353) | | PCB-162 | (0.303) | |
| PCB-113/90/101 | 15.1 | C | PCB-114 | (0.345) | | PCB-142 | (0.358) | | PCB-167 | 1.38 | |
| PCB-83 | (0.504) | | PCB-105 | 5.5 | | PCB-132 | 6.52 | | PCB-156/157 | 2.48 | C |
| PCB-99 | 7.62 | | PCB-127 | (0.364) | | PCB-133 | (0.342) | | PCB-169 | (0.33) | |
| PCB-112 | (0.297) | | PCB-126 | (0.289) | | | | | | | |
| | | | **Conc.** | 88.7 | | | | | **Conc.** | 143 | |
| | | | **EMPC** | 89.8 | | | | | **EMPC** | 148 | |

| Hepta | Conc. | Qualifiers | Hepta | Conc. | Qualifiers | Octa | Conc. | Qualifiers | Nona | Conc. | Qualifiers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PCB-188 | (0.198) | | PCB-174 | [8.54] | EMPC | PCB-202 | 3.69 | | PCB-208 | 3.99 | |
| PCB-179 | 4.38 | | PCB-177 | 5.34 | | PCB-201 | (0.244) | | PCB-207 | (0.61) | |
| PCB-184 | (0.203) | | PCB-181 | (0.453) | | PCB-204 | (0.243) | | PCB-206 | 8.7 | |
| PCB-176 | (0.234) | | PCB-171/173 | 1.19 | J C | PCB-197 | (0.222) | | | | |
| PCB-186 | (0.226) | | PCB-172 | 2.02 | | PCB-200 | [0.936] | J EMPC | **Conc.** | 12.7 | |
| PCB-178 | 3.33 | | PCB-192 | (0.376) | | PCB-198/199 | 10.6 | C | **EMPC** | 12.7 | |
| PCB-175 | (0.456) | | PCB-180/193 | 18.3 | C | PCB-196 | (0.323) | | | | |
| PCB-187 | 18.7 | | PCB-191 | (0.374) | | PCB-203 | 7.39 | | **Deca** | **Conc.** | **Qualifiers** |
| PCB-182 | (0.421) | | PCB-170 | [5.15] | EMPC | PCB-195 | [2.5] | EMPC | PCB-209 | 10.3 | |
| PCB-183 | 3.85 | | PCB-190 | 1.48 | | PCB-194 | 5.56 | | | | |
| PCB-185 | (0.424) | | PCB-189 | (0.448) | | PCB-205 | (0.469) | | | | |
| | | | **Conc.** | 58.6 | | **Conc.** | 27.3 | | | | |
| | | | **EMPC** | 72.3 | | **EMPC** | 30.7 | | | | |

# Sample ID: LPR6-ECST-Comp02 (EQUALIZED) Method 1668B

| Client Data | | Sample Data | | Laboratory Data | | | |
|---|---|---|---|---|---|---|---|
| Name: | Windward Environmental, LLC | Matrix: | Tissue | Project No.: | A3406 | Date Received: | 02-Aug-2011 |
| Project ID: | Passaic RI/FS Caged Bivalve Study | Weight/Volume: | 10.17 g | Sample ID: | A3406_8929_PCB_003 | Date Extracted: | 15-Aug-2011 |
| Date Collected: | 08-Jun-2011 | | | QC Batch No.: | 8929 | Date Analyzed: | 22-Aug-2011 |

| Analyte | Conc. | DL | EMPC | Qualifier | Standard | Recovery |
|---|---|---|---|---|---|---|
| | pg/g | pg/g | pg/g | | | % |
| PCB-77 33'44'-TeCB | 77.9 | | | | ES PCB-1 | 76.9 |
| PCB-81 344'5-TeCB | 3.34 | | | | ES PCB-3 | 85.6 |
| PCB-105 233'44'-PeCB | 267 | | | | ES PCB-4 | 86.4 |
| PCB-114 2344'5-PeCB | 16.2 | | | | ES PCB-15 | 100 |
| PCB-118 23'44'5-PeCB | 696 | | | | ES PCB-19 | 88.1 |
| PCB-123 23'44'5'-PeCB | 13.6 | | | | ES PCB-37 | 103 |
| PCB-126 33'44'5-PeCB | 2.06 | | | | ES PCB-54 | 81.8 |
| PCB-156/157 233'44'5/233'44'5'-HxCB | 63.7 | | | C | ES PCB-77 | 110 V |
| PCB-167 23'44'55'-HxCB | 25.2 | | | | ES PCB-81 | 107 |
| PCB-169 33'44'55'-HxCB | EMPC | | 0.765 | J | ES PCB-104 | 90 |
| PCB-189 233'44'55'-HpCB | 4.15 | | | | ES PCB-105 | 100 |
| | | | | | ES PCB-114 | 97.2 |
| **TEQs (WHO M/H)** | | | | | ES PCB-118 | 100 |
| | | | | | ES PCB-123 | 106 |
| ND = 0 | 0.248 | | 0.271 | | ES PCB-126 | 91.8 |
| ND = 0.5 x DL | 0.256 | | 0.271 | | ES PCB-153 | 92.5 |
| | | | | | ES PCB-155 | 78.3 |
| **Totals** | | | | | ES PCB-156/157 | 76.6 |
| | | | | | ES PCB-167 | 76.1 |
| Mono-CBs | 4.14 | | | | ES PCB-169 | 80.3 |
| Di-CBs | 438 | | | | ES PCB-170 | 90.3 |
| Tri-CBs | 5,910 | | | | ES PCB-180 | 80.2 |
| Tetra-CBs | 9,070 | | 9,080 | | ES PCB-188 | 89.1 |
| Penta-CBs | 6,120 | | | | ES PCB-189 | 88.6 |
| Hexa-CBs | 3,910 | | 3,910 | | ES PCB-202 | 81 |
| Hepta-CBs | 1,480 | | | | ES PCB-205 | 89.7 |
| Octa-CBs | 352 | | | | ES PCB-206 | 89.7 |
| Nona-CBs | 76.2 | | | | ES PCB-208 | 86.1 |
| Deca-CB | 42.1 | | | | ES PCB-209 | 81.3 |
| | | | | | CS PCB-28 | 129 |
| Mono-Deca | 27,400 | | 27,400 | | CS PCB-111 | 111 |
| | | | | | CS PCB-178 | 104 |

Checkcode: 753-798-GGR AP PCB 2011 Rev. A Report Created: 29-Aug-2011 16:59 Analyst: LB

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# Sample ID: LPR6-ECST-Comp02 (EQUALIZED

# Method 1668B

| Client Data | | Sample Data | | Laboratory Data | | | |
|---|---|---|---|---|---|---|---|
| Name: | Windward Environmental, LLC | Matrix: | Tissue | Project No.: | A3406 | Date Received: | 02-Aug-2011 |
| Project ID: | Passaic RI/FS Caged Bivalve Study | Weight/Volume: | 10.17 g | Sample ID: | A3406_8929_PCB_003 | Date Extracted: | 15-Aug-2011 |
| Date Collected: | 08-Jun-2011 | | | QC Batch No.: | 8929 | Date Analyzed: | 22-Aug-2011 |
| | | Units | pg/g | Checkcode: | 753-798-GGR | Time Analyzed: | 15:44:10 |

| Mono | Conc. | Qualifiers | Tri | Conc. | Qualifiers | Tetra | Conc. | Qualifiers | Tetra | Conc. | Qualifiers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PCB-1 | 2.38 | | PCB-19 | 83 | | PCB-54 | 18.1 | | PCB-72 | 13.5 | |
| PCB-2 | 0.719 | J | PCB-30/18 | 785 | C | PCB-50/53 | 256 | C | PCB-68 | 8.3 | |
| PCB-3 | 1.03 | | PCB-17 | 440 | | PCB-45 | 219 | | PCB-57 | [5.8] | EMPC |
| | | | PCB-27 | 86.7 | | PCB-51 | 152 | | PCB-58 | 4.79 | |
| **Conc.** | 4.14 | | PCB-24 | 11.2 | | PCB-46 | 81.6 | | PCB-67 | 37.2 | |
| **EMPC** | 4.14 | | PCB-16 | 313 | | PCB-52 | 1,390 | | PCB-63 | 39.2 | |
| | | | PCB-32 | 355 | | PCB-73 | 9.05 | | PCB-61/70/74/76 | 1,490 | C |
| **Di** | **Conc.** | **Qualifiers** | PCB-34 | 10.1 | | PCB-43 | 48.1 | | PCB-66 | 808 | |
| PCB-4 | 80.5 | | PCB-23 | (0.692) | | PCB-69/49 | 851 | C | PCB-55 | 12.8 | |
| PCB-10 | 4.81 | | PCB-26/29 | 256 | C | PCB-48 | 233 | | PCB-56 | 393 | |
| PCB-9 | 6.05 | | PCB-25 | 169 | | PCB-44/47/65 | 1,250 | C | PCB-60 | 136 | |
| PCB-7 | 3.42 | | PCB-31 | 1,060 | | PCB-59/62/75 | 115 | C | PCB-80 | (0.46) | |
| PCB-6 | 31.2 | | PCB-28/20 | 1,340 | C | PCB-42 | 307 | | PCB-79 | 8.57 | |
| PCB-5 | 0.944 | J | PCB-21/33 | 397 | C | PCB-41 | 80.3 | | PCB-78 | (0.563) | |
| PCB-8 | 95.6 | | PCB-22 | 324 | | PCB-71/40 | 534 | C | PCB-81 | 3.34 | |
| PCB-14 | (0.351) | | PCB-36 | 1.16 | | PCB-64 | 497 | | PCB-77 | 77.9 | |
| PCB-11 | 71.1 | | PCB-39 | 7.71 | | | | | | | |
| PCB-13/12 | 20.8 | C | PCB-38 | (0.706) | | | | | | | |
| PCB-15 | 124 | | PCB-35 | 18.7 | | | | | | | |
| | | | PCB-37 | 248 | | | | | | | |
| **Conc.** | 438 | | **Conc.** | 5,910 | | | | | **Conc.** | 9,070 | |
| **EMPC** | 438 | | **EMPC** | 5,910 | | | | | **EMPC** | 9,080 | |


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| Totals | Conc. | EMPC |
|---|---|---|
| Mono-Tri | 6,350 | 6,350 |
| Tetra-Hexa | 19,100 | 19,100 |
| Hepta-Deca | 1,950 | 1,950 |
| Mono-Deca | 27,400 | 27,400 |

# Sample ID: LPR6-ECST-Comp02 (EQUALIZED) Method 1668B

| Penta | Conc. | Qualifiers | Penta | Conc. | Qualifiers | Hexa | Conc. | Qualifiers | Hexa | Conc. | Qualifiers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PCB-104 | 5.19 | | PCB-109/119/86… | 617 | C | PCB-155 | 8.19 | | PCB-165 | 0.489 | J |
| PCB-96 | 17.1 | | PCB-117 | 27.6 | | PCB-152 | 3.05 | | PCB-146 | 119 | |
| PCB-103 | 19.8 | | PCB-116/85 | 138 | C | PCB-150 | 3.02 | | PCB-161 | (0.161) | |
| PCB-94 | 16.9 | | PCB-110 | 1,050 | | PCB-136 | 143 | | PCB-153/168 | 633 | C |
| PCB-95 | 831 | | PCB-115 | 15.6 | | PCB-145 | (0.154) | | PCB-141 | 158 | |
| PCB-100/93 | 41.3 | C | PCB-82 | 119 | | PCB-148 | 2.92 | | PCB-130 | 52.1 | |
| PCB-102 | 46.6 | | PCB-111 | (2.08) | | PCB-151/135 | 358 | C | PCB-137 | 32.9 | |
| PCB-98 | (3.03) | | PCB-120 | (2.14) | | PCB-154 | 15.3 | | PCB-164 | 61.9 | |
| PCB-88 | (3.25) | | PCB-108/124 | 29.7 | C | PCB-144 | 41.2 | | PCB-163/138/129 | 884 | C |
| PCB-91 | 145 | | PCB-107 | 44.6 | | PCB-147/149 | 738 | C | PCB-160 | (0.155) | |
| PCB-84 | 266 | | PCB-123 | 13.6 | | PCB-134 | 56.9 | | PCB-158 | 67.6 | |
| PCB-89 | 16.3 | | PCB-106 | (2.37) | | PCB-143 | (0.196) | | PCB-128/166 | 109 | C |
| PCB-121 | (2.04) | | PCB-118 | 696 | | PCB-139/140 | 14.6 | C | PCB-159 | (0.52) | |
| PCB-92 | 206 | | PCB-122 | 11.3 | | PCB-131 | 11.8 | | PCB-162 | [2.66] | EMPC |
| PCB-113/90/101 | 949 | C | PCB-114 | 16.2 | | PCB-142 | (0.229) | | PCB-167 | 25.2 | |
| PCB-83 | 55.8 | | PCB-105 | 267 | | PCB-132 | 289 | | PCB-156/157 | 63.7 | C |
| PCB-99 | 460 | | PCB-127 | (2.71) | | PCB-133 | 16.3 | | PCB-169 | [0.765] | J EMPC |
| PCB-112 | (2.08) | | PCB-126 | 2.06 | | | | | | | |
| | | | **Conc.** | 6,120 | | | | | **Conc.** | 3,910 | |
| | | | **EMPC** | 6,120 | | | | | **EMPC** | 3,910 | |

| Hepta | Conc. | Qualifiers | Hepta | Conc. | Qualifiers | Octa | Conc. | Qualifiers | Nona | Conc. | Qualifiers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PCB-188 | 0.596 | J | PCB-174 | 221 | | PCB-202 | 27.6 | | PCB-208 | 22.8 | |
| PCB-179 | 98.9 | | PCB-177 | 118 | | PCB-201 | 9.74 | | PCB-207 | 4.03 | |
| PCB-184 | 1.13 | | PCB-181 | 1.75 | | PCB-204 | (0.174) | | PCB-206 | 49.3 | |
| PCB-176 | 24.7 | | PCB-171/173 | 47.3 | C | PCB-197 | 1.82 | | | | |
| PCB-186 | (0.187) | | PCB-172 | 34 | | PCB-200 | 11.4 | | **Conc.** | 76.2 | |
| PCB-178 | 43.2 | | PCB-192 | (0.362) | | PCB-198/199 | 102 | C | **EMPC** | 76.2 | |
| PCB-175 | 7.9 | | PCB-180/193 | 324 | C | PCB-196 | 25.9 | | | | |
| PCB-187 | 282 | | PCB-191 | 5.37 | | PCB-203 | 62.6 | | **Deca** | **Conc.** | **Qualifiers** |
| PCB-182 | 1.61 | | PCB-170 | 111 | | PCB-195 | 33.6 | | PCB-209 | 42.1 | |
| PCB-183 | 108 | | PCB-190 | 26.6 | | PCB-194 | 74.6 | | | | |
| PCB-185 | 19.2 | | PCB-189 | 4.15 | | PCB-205 | 2.88 | | | | |
| | | | **Conc.** | 1,480 | | **Conc.** | 352 | | | | |
| | | | **EMPC** | 1,480 | | **EMPC** | 352 | | | | |

# Sample ID: LPR6-ECST-Comp02-DUP (EQUALIZED) Method 1668B

| Client Data | | Sample Data | | Laboratory Data | | | |
|---|---|---|---|---|---|---|---|
| Name: | Windward Environmental, LLC | Matrix: | Tissue | Project No.: | A3406 | Date Received: | 02-Aug-2011 |
| Project ID: | Passaic RI/FS Caged Bivalve Study | Weight/Volume: | 10.13 g | Sample ID: | A3406_8929_PCB_003DUP | Date Extracted: | 15-Aug-2011 |
| Date Collected: | 08-Jun-2011 | | | QC Batch No.: | 8929 | Date Analyzed: | 22-Aug-2011 |

| Analyte | Conc. | DL | EMPC | Qualifier | Standard | Recovery |
|---|---|---|---|---|---|---|
| | pg/g | pg/g | pg/g | | | % |
| PCB-77 33'44'-TeCB | 87 | | | | ES PCB-1 | 77.4 |
| PCB-81 344'5-TeCB | 3.51 | | | | ES PCB-3 | 87.4 |
| PCB-105 233'44'-PeCB | 318 | | | | ES PCB-4 | 90.1 |
| PCB-114 2344'5-PeCB | 18.7 | | | | ES PCB-15 | 107 |
| PCB-118 23'44'5-PeCB | 857 | | | | ES PCB-19 | 94.3 |
| PCB-123 23'44'5'-PeCB | 16.5 | | | | ES PCB-37 | 100 |
| PCB-126 33'44'5-PeCB | 2.68 | | | | ES PCB-54 | 84.4 |
| PCB-156/157 233'44'5/233'44'5'-HxCB | 89.6 | | | C | ES PCB-77 | 103 |
| PCB-167 23'44'55'-HxCB | 34.8 | | | | ES PCB-81 | 101 |
| PCB-169 33'44'55'-HxCB | 2.08 | | | | ES PCB-104 | 92.9 |
| PCB-189 233'44'55'-HpCB | 6.33 | | | | ES PCB-105 | 97.7 |
| | | | | | ES PCB-114 | 95.5 |
| **TEQs (WHO M/H)** | | | | | ES PCB-118 | 95.3 |
| | | | | | ES PCB-123 | 102 |
| ND = 0 | 0.381 | | 0.381 | | ES PCB-126 | 95 |
| ND = 0.5 x DL | 0.381 | | 0.381 | | ES PCB-153 | 91.6 |
| | | | | | ES PCB-155 | 88.2 |
| **Totals** | | | | | ES PCB-156/157 | 88.3 |
| | | | | | ES PCB-167 | 86.5 |
| Mono-CBs | 3.92 | | 4.57 | | ES PCB-169 | 91.9 |
| Di-CBs | 441 | | 442 | | ES PCB-170 | 90.7 |
| Tri-CBs | 6,190 | | | | ES PCB-180 | 83.6 |
| Tetra-CBs | 10,400 | | 10,400 | | ES PCB-188 | 93.2 |
| Penta-CBs | 7,470 | | | | ES PCB-189 | 91.8 |
| Hexa-CBs | 5,650 | | 5,650 | | ES PCB-202 | 85.9 |
| Hepta-CBs | 2,330 | | | | ES PCB-205 | 91.1 |
| Octa-CBs | 566 | | | | ES PCB-206 | 95.7 |
| Nona-CBs | 113 | | | | ES PCB-208 | 90.5 |
| Deca-CB | 65.4 | | | | ES PCB-209 | 89.7 |
| | | | | | CS PCB-28 | 121 |
| Mono-Deca | 33,200 | | 33,200 | | CS PCB-111 | 104 |
| | | | | | CS PCB-178 | 102 |

Checkcode: 752-577-HMG AP PCB 2011 Rev. A Report Created: 31-Aug-2011 17:57 Analyst: LB

ANALYTICAL PERSPECTIVES
2714 Exchange Drive T: 910 794-1613
Wilmington F: 910 794-3919
North Carolina 28405 info@ultratrace.com
USA www.ultratrace.com

# Sample ID: LPR6-ECST-Comp02-DUP (EQUALIZED) Method 1668B

| Client Data | | Sample Data | | Laboratory Data | | | |
|---|---|---|---|---|---|---|---|
| Name: | Windward Environmental, LLC | Matrix: | Tissue | Project No.: | A3406 | Date Received: | 02-Aug-2011 |
| Project ID: | Passaic RI/FS Caged Bivalve Study | Weight/Volume: | 10.13 g | Sample ID: | A3406_8929_PCB_003DUP | Date Extracted: | 15-Aug-2011 |
| Date Collected: | 08-Jun-2011 | | | QC Batch No.: | 8929 | Date Analyzed: | 22-Aug-2011 |
| | | Units | pg/g | Checkcode: | 752-577-HMG | Time Analyzed: | 16:39:16 |

| Mono | Conc. | Qualifiers | Tri | Conc. | Qualifiers | Tetra | Conc. | Qualifiers | Tetra | Conc. | Qualifiers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PCB-1 | 2.72 | | PCB-19 | 83.3 | | PCB-54 | 18.9 | | PCB-72 | 15.2 | |
| PCB-2 | [0.65] | J EMPC | PCB-30/18 | 795 | C | PCB-50/53 | 293 | C | PCB-68 | 10.4 | |
| PCB-3 | 1.2 | | PCB-17 | 443 | | PCB-45 | 258 | | PCB-57 | 7.43 | |
| | | | PCB-27 | 89 | | PCB-51 | 162 | | PCB-58 | [4.93] | EMPC |
| **Conc.** | 3.92 | | PCB-24 | 11.9 | | PCB-46 | 93.5 | | PCB-67 | 42.5 | |
| **EMPC** | 4.57 | | PCB-16 | 315 | | PCB-52 | 1,610 | | PCB-63 | 46.1 | |
| | | | PCB-32 | 357 | | PCB-73 | 8.45 | | PCB-61/70/74/76 | 1,690 | C |
| **Di** | **Conc.** | **Qualifiers** | PCB-34 | 11.2 | | PCB-43 | 58.6 | | PCB-66 | 925 | |
| PCB-4 | 80 | | PCB-23 | (0.761) | | PCB-69/49 | 988 | C | PCB-55 | 15.2 | |
| PCB-10 | 4.99 | | PCB-26/29 | 275 | C | PCB-48 | 266 | | PCB-56 | 435 | |
| PCB-9 | 5.91 | | PCB-25 | 182 | | PCB-44/47/65 | 1,420 | C | PCB-60 | 155 | |
| PCB-7 | 3.62 | | PCB-31 | 1,130 | | PCB-59/62/75 | 130 | C | PCB-80 | (0.621) | |
| PCB-6 | 31.5 | | PCB-28/20 | 1,450 | C | PCB-42 | 352 | | PCB-79 | 11.2 | |
| PCB-5 | [1.03] | EMPC | PCB-21/33 | 415 | C | PCB-41 | 95.6 | | PCB-78 | (0.76) | |
| PCB-8 | 97.6 | | PCB-22 | 340 | | PCB-71/40 | 598 | C | PCB-81 | 3.51 | |
| PCB-14 | (0.545) | | PCB-36 | 1.32 | | PCB-64 | 568 | | PCB-77 | 87 | |
| PCB-11 | 68.5 | | PCB-39 | 8.73 | | | | | | | |
| PCB-13/12 | 20.7 | C | PCB-38 | (0.777) | | | | | | | |
| PCB-15 | 128 | | PCB-35 | 19.9 | | | | | | | |
| | | | PCB-37 | 268 | | | | | | | |
| **Conc.** | 441 | | **Conc.** | 6,190 | | | | | **Conc.** | 10,400 | |
| **EMPC** | 442 | | **EMPC** | 6,190 | | | | | **EMPC** | 10,400 | |


ANALYTICAL PERSPECTIVES

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www.ultratrace.com


| Totals | Conc. | EMPC |
|---|---|---|
| Mono-Tri | 6,630 | 6,640 |
| Tetra-Hexa | 23,500 | 23,500 |
| Hepta-Deca | 3,070 | 3,070 |
| Mono-Deca | 33,200 | 33,200 |

# Sample ID: LPR6-ECST-Comp02-DUP (EQUALIZED) Method 1668B

| Penta | Conc. | Qualifiers | Penta | Conc. | Qualifiers | Hexa | Conc. | Qualifiers | Hexa | Conc. | Qualifiers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PCB-104 | 5.71 | | PCB-109/119/86… | 762 | C | PCB-155 | 10.5 | | PCB-165 | (0.253) | |
| PCB-96 | 18.4 | | PCB-117 | 23.8 | | PCB-152 | 3.39 | | PCB-146 | 178 | |
| PCB-103 | 24.4 | | PCB-116/85 | 180 | C | PCB-150 | 3.34 | | PCB-161 | (0.252) | |
| PCB-94 | 21 | | PCB-110 | 1,260 | | PCB-136 | 174 | | PCB-153/168 | 972 | C |
| PCB-95 | 996 | | PCB-115 | 35.2 | | PCB-145 | (0.222) | | PCB-141 | 248 | |
| PCB-100/93 | 50.7 | C | PCB-82 | 137 | | PCB-148 | 4.34 | | PCB-130 | 72.4 | |
| PCB-102 | 58.5 | | PCB-111 | (0.349) | | PCB-151/135 | 533 | C | PCB-137 | 46.1 | |
| PCB-98 | (0.509) | | PCB-120 | (0.359) | | PCB-154 | 22.9 | | PCB-164 | 89.7 | |
| PCB-88 | (0.547) | | PCB-108/124 | 35.1 | C | PCB-144 | 60.5 | | PCB-163/138/129 | 1,290 | C |
| PCB-91 | 175 | | PCB-107 | 53.6 | | PCB-147/149 | 1,050 | C | PCB-160 | (0.243) | |
| PCB-84 | 307 | | PCB-123 | 16.5 | | PCB-134 | 76.3 | | PCB-158 | 101 | |
| PCB-89 | 19.3 | | PCB-106 | (0.398) | | PCB-143 | (0.308) | | PCB-128/166 | 125 | C |
| PCB-121 | (0.343) | | PCB-118 | 857 | | PCB-139/140 | 19.2 | C | PCB-159 | 11.3 | |
| PCB-92 | 254 | | PCB-122 | 12.2 | | PCB-131 | 15 | | PCB-162 | [3.5] | EMPC |
| PCB-113/90/101 | 1,190 | C | PCB-114 | 18.7 | | PCB-142 | (0.36) | | PCB-167 | 34.8 | |
| PCB-83 | 72.2 | | PCB-105 | 318 | | PCB-132 | 391 | | PCB-156/157 | 89.6 | C |
| PCB-99 | 567 | | PCB-127 | (0.428) | | PCB-133 | 21.8 | | PCB-169 | 2.08 | |
| PCB-112 | (0.35) | | PCB-126 | 2.68 | | | | | | | |
| | | | **Conc.** | 7,470 | | | | | **Conc.** | 5,650 | |
| | | | **EMPC** | 7,470 | | | | | **EMPC** | 5,650 | |

| Hepta | Conc. | Qualifiers | Hepta | Conc. | Qualifiers | Octa | Conc. | Qualifiers | Nona | Conc. | Qualifiers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PCB-188 | 0.811 | J | PCB-174 | 328 | | PCB-202 | 42.2 | | PCB-208 | 33.6 | |
| PCB-179 | 139 | | PCB-177 | 180 | | PCB-201 | 15.8 | | PCB-207 | 6.44 | |
| PCB-184 | 1.33 | | PCB-181 | 2.53 | | PCB-204 | (0.252) | | PCB-206 | 72.7 | |
| PCB-176 | 35 | | PCB-171/173 | 71.7 | C | PCB-197 | 2.96 | | | | |
| PCB-186 | (0.21) | | PCB-172 | 56.3 | | PCB-200 | 18.3 | | **Conc.** | 113 | |
| PCB-178 | 65.8 | | PCB-192 | (0.525) | | PCB-198/199 | 157 | C | **EMPC** | 113 | |
| PCB-175 | 11.8 | | PCB-180/193 | 551 | C | PCB-196 | 41.3 | | | | |
| PCB-187 | 425 | | PCB-191 | 9.79 | | PCB-203 | 99.3 | | **Deca** | **Conc.** | **Qualifiers** |
| PCB-182 | 1.94 | | PCB-170 | 186 | | PCB-195 | 54.3 | | PCB-209 | 65.4 | |
| PCB-183 | 175 | | PCB-190 | 47.7 | | PCB-194 | 130 | | | | |
| PCB-185 | 30.4 | | PCB-189 | 6.33 | | PCB-205 | 5.22 | | | | |
| | | | **Conc.** | 2,330 | | **Conc.** | 566 | | | | |
| | | | **EMPC** | 2,330 | | **EMPC** | 566 | | | | |

# Sample ID: LPR7-ECST-Comp03 (EQUALIZED) Method 1668B

| Client Data | | Sample Data | | Laboratory Data | | | |
|---|---|---|---|---|---|---|---|
| Name: | Windward Environmental, LLC | Matrix: | Tissue | Project No.: | A3406 | Date Received: | 02-Aug-2011 |
| Project ID: | Passaic RI/FS Caged Bivalve Study | Weight/Volume: | 10.13 g | Sample ID: | A3406_8929_PCB_004 | Date Extracted: | 15-Aug-2011 |
| Date Collected: | 08-Jun-2011 | | | QC Batch No.: | 8929 | Date Analyzed: | 22-Aug-2011 |

| Analyte | Conc. | DL | EMPC | Qualifier | Standard | Recovery |
|---|---|---|---|---|---|---|
| | pg/g | pg/g | pg/g | | | % |
| PCB-77 33'44'-TeCB | 91.1 | | | | ES PCB-1 | 79.5 |
| PCB-81 344'5-TeCB | 3.57 | | | | ES PCB-3 | 82.4 |
| PCB-105 233'44'-PeCB | 323 | | | | ES PCB-4 | 85.1 |
| PCB-114 2344'5-PeCB | 19.8 | | | | ES PCB-15 | 105 |
| PCB-118 23'44'5-PeCB | 814 | | | | ES PCB-19 | 94 |
| PCB-123 23'44'5'-PeCB | 15.7 | | | | ES PCB-37 | 101 |
| PCB-126 33'44'5-PeCB | 2.02 | | | | ES PCB-54 | 80.6 |
| PCB-156/157 233'44'5/233'44'5'-HxCB | 78.1 | | | C | ES PCB-77 | 114 V |
| PCB-167 23'44'55'-HxCB | 29.1 | | | | ES PCB-81 | 107 |
| PCB-169 33'44'55'-HxCB | ND | 0.57 | | | ES PCB-104 | 80.7 |
| PCB-189 233'44'55'-HpCB | EMPC | | 3.48 | | ES PCB-105 | 93.9 |
| | | | | | ES PCB-114 | 93.1 |
| **TEQs (WHO M/H)** | | | | | ES PCB-118 | 95 |
| | | | | | ES PCB-123 | 101 |
| ND = 0 | 0.25 | | 0.25 | | ES PCB-126 | 90.1 |
| ND = 0.5 x DL | 0.259 | | 0.259 | | ES PCB-153 | 89.7 |
| | | | | | ES PCB-155 | 82.2 |
| **Totals** | | | | | ES PCB-156/157 | 83.7 |
| | | | | | ES PCB-167 | 79.4 |
| Mono-CBs | 4.65 | | | | ES PCB-169 | 87 |
| Di-CBs | 517 | | | | ES PCB-170 | 83.2 |
| Tri-CBs | 6,800 | | | | ES PCB-180 | 73.4 |
| Tetra-CBs | 9,630 | | | | ES PCB-188 | 88.1 |
| Penta-CBs | 6,580 | | | | ES PCB-189 | 90.2 |
| Hexa-CBs | 4,320 | | 4,320 | | ES PCB-202 | 79.4 |
| Hepta-CBs | 1,480 | | 1,480 | | ES PCB-205 | 86.2 |
| Octa-CBs | 358 | | 363 | | ES PCB-206 | 85.5 |
| Nona-CBs | 79.4 | | | | ES PCB-208 | 84.4 |
| Deca-CB | 44.2 | | | | ES PCB-209 | 84.1 |
| | | | | | CS PCB-28 | 122 |
| Mono-Deca | 29,800 | | 29,800 | | CS PCB-111 | 102 |
| | | | | | CS PCB-178 | 97.1 |

Checkcode: 142-102-DPG AP PCB 2011 Rev. A Report Created: 29-Aug-2011 17:01 Analyst: LB

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# Sample ID: LPR7-ECST-Comp03 (EQUALIZED) Method 1668B

| Client Data | | Sample Data | | Laboratory Data | | | |
|---|---|---|---|---|---|---|---|
| Name: | Windward Environmental, LLC | Matrix: | Tissue | Project No.: | A3406 | Date Received: | 02-Aug-2011 |
| Project ID: | Passaic RI/FS Caged Bivalve Study | Weight/Volume: | 10.13 g | Sample ID: | A3406_8929_PCB_004 | Date Extracted: | 15-Aug-2011 |
| Date Collected: | 08-Jun-2011 | | | QC Batch No.: | 8929 | Date Analyzed: | 22-Aug-2011 |
| | | Units | pg/g | Checkcode: | 142-102-DPG | Time Analyzed: | 17:34:21 |

| Mono | Conc. | Qualifiers | Tri | Conc. | Qualifiers | Tetra | Conc. | Qualifiers | Tetra | Conc. | Qualifiers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PCB-1 | 2.97 | | PCB-19 | 87.9 | | PCB-54 | 11.2 | | PCB-72 | 12 | |
| PCB-2 | 0.489 | J | PCB-30/18 | 934 | C | PCB-50/53 | 237 | C | PCB-68 | 6.66 | |
| PCB-3 | 1.2 | | PCB-17 | 487 | | PCB-45 | 249 | | PCB-57 | 7.59 | |
| | | | PCB-27 | 88.4 | | PCB-51 | 95.2 | | PCB-58 | 4.04 | |
| **Conc.** | 4.65 | | PCB-24 | 11.9 | | PCB-46 | 85.1 | | PCB-67 | 40.4 | |
| **EMPC** | 4.65 | | PCB-16 | 378 | | PCB-52 | 1,450 | | PCB-63 | 44.2 | |
| | | | PCB-32 | 384 | | PCB-73 | 6.79 | | PCB-61/70/74/76 | 1,710 | C |
| **Di** | **Conc.** | **Qualifiers** | PCB-34 | 9.9 | | PCB-43 | 51.7 | | PCB-66 | 924 | |
| PCB-4 | 91.3 | | PCB-23 | 1.48 | | PCB-69/49 | 824 | C | PCB-55 | 14.1 | |
| PCB-10 | 5.85 | | PCB-26/29 | 286 | C | PCB-48 | 258 | | PCB-56 | 456 | |
| PCB-9 | 8.55 | | PCB-25 | 159 | | PCB-44/47/65 | 1,220 | C | PCB-60 | 186 | |
| PCB-7 | 5.03 | | PCB-31 | 1,260 | | PCB-59/62/75 | 117 | C | PCB-80 | (0.617) | |
| PCB-6 | 33.9 | | PCB-28/20 | 1,460 | C | PCB-42 | 323 | | PCB-79 | 9.37 | |
| PCB-5 | 1.58 | | PCB-21/33 | 540 | C | PCB-41 | 102 | | PCB-78 | (0.755) | |
| PCB-8 | 136 | | PCB-22 | 380 | | PCB-71/40 | 550 | C | PCB-81 | 3.57 | |
| PCB-14 | (0.4) | | PCB-36 | 1 | | PCB-64 | 541 | | PCB-77 | 91.1 | |
| PCB-11 | 75.1 | | PCB-39 | 7.64 | | | | | | | |
| PCB-13/12 | 17.8 | C | PCB-38 | (0.711) | | | | | | | |
| PCB-15 | 141 | | PCB-35 | 20.7 | | | | | | | |
| | | | PCB-37 | 304 | | | | | | | |
| **Conc.** | 517 | | **Conc.** | 6,800 | | | | | **Conc.** | 9,630 | |
| **EMPC** | 517 | | **EMPC** | 6,800 | | | | | **EMPC** | 9,630 | |


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www.ultratrace.com


| Totals | Conc. | EMPC |
|---|---|---|
| Mono-Tri | 7,320 | 7,320 |
| Tetra-Hexa | 20,500 | 20,500 |
| Hepta-Deca | 1,960 | 1,970 |
| Mono-Deca | 29,800 | 29,800 |

# Sample ID: LPR7-ECST-Comp03 (EQUALIZED) Method 1668B

| Penta | Conc. | Qualifiers | Penta | Conc. | Qualifiers | Hexa | Conc. | Qualifiers | Hexa | Conc. | Qualifiers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PCB-104 | 2.53 | | PCB-109/119/86… | 704 | C | PCB-155 | 1.9 | | PCB-165 | (0.216) | |
| PCB-96 | 16.1 | | PCB-117 | 24.6 | | PCB-152 | 1.85 | | PCB-146 | 128 | |
| PCB-103 | 12.7 | | PCB-116/85 | 160 | C | PCB-150 | [1.61] | EMPC | PCB-161 | (0.215) | |
| PCB-94 | 12.3 | | PCB-110 | 1,130 | | PCB-136 | 144 | | PCB-153/168 | 682 | C |
| PCB-95 | 832 | | PCB-115 | 26.9 | | PCB-145 | (0.178) | | PCB-141 | 180 | |
| PCB-100/93 | 26.3 | C | PCB-82 | 134 | | PCB-148 | [1.82] | EMPC | PCB-130 | 59.7 | |
| PCB-102 | 41.2 | | PCB-111 | (1.6) | | PCB-151/135 | 386 | C | PCB-137 | 36.2 | |
| PCB-98 | (2.33) | | PCB-120 | (1.64) | | PCB-154 | 11.5 | | PCB-164 | 74.4 | |
| PCB-88 | 15.7 | | PCB-108/124 | 35.6 | C | PCB-144 | 48.7 | | PCB-163/138/129 | 993 | C |
| PCB-91 | 131 | | PCB-107 | 51.6 | | PCB-147/149 | 798 | C | PCB-160 | (0.207) | |
| PCB-84 | 275 | | PCB-123 | 15.7 | | PCB-134 | 59.1 | | PCB-158 | 81.1 | |
| PCB-89 | 18.1 | | PCB-106 | (1.82) | | PCB-143 | 3.57 | | PCB-128/166 | 126 | C |
| PCB-121 | (1.57) | | PCB-118 | 814 | | PCB-139/140 | 16.1 | C | PCB-159 | 7.46 | |
| PCB-92 | 206 | | PCB-122 | 10.8 | | PCB-131 | 14.6 | | PCB-162 | [3.03] | EMPC |
| PCB-113/90/101 | 1,010 | C | PCB-114 | 19.8 | | PCB-142 | (0.307) | | PCB-167 | 29.1 | |
| PCB-83 | 71.9 | | PCB-105 | 323 | | PCB-132 | 338 | | PCB-156/157 | 78.1 | C |
| PCB-99 | 457 | | PCB-127 | (1.92) | | PCB-133 | 17 | | PCB-169 | (0.57) | |
| PCB-112 | 8.83 | | PCB-126 | 2.02 | | | | | | | |
| | | | **Conc.** | 6,580 | | | | | **Conc.** | 4,320 | |
| | | | **EMPC** | 6,580 | | | | | **EMPC** | 4,320 | |

| Hepta | Conc. | Qualifiers | Hepta | Conc. | Qualifiers | Octa | Conc. | Qualifiers | Nona | Conc. | Qualifiers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PCB-188 | 0.464 | J | PCB-174 | 222 | | PCB-202 | 28.5 | | PCB-208 | 24.5 | |
| PCB-179 | 95.2 | | PCB-177 | 114 | | PCB-201 | 10.4 | | PCB-207 | 4.07 | |
| PCB-184 | 1.04 | | PCB-181 | (0.547) | | PCB-204 | (0.187) | | PCB-206 | 50.8 | |
| PCB-176 | 24.3 | | PCB-171/173 | 50 | C | PCB-197 | [1.62] | EMPC | | | |
| PCB-186 | (0.203) | | PCB-172 | 35.3 | | PCB-200 | 12.1 | | **Conc.** | 79.4 | |
| PCB-178 | 41.3 | | PCB-192 | (0.454) | | PCB-198/199 | 106 | C | **EMPC** | 79.4 | |
| PCB-175 | 7.51 | | PCB-180/193 | 328 | C | PCB-196 | 26.5 | | | | |
| PCB-187 | 279 | | PCB-191 | 6.23 | | PCB-203 | 64 | | **Deca** | **Conc.** | **Qualifiers** |
| PCB-182 | 1.26 | | PCB-170 | 118 | | PCB-195 | 34 | | PCB-209 | 44.2 | |
| PCB-183 | 109 | | PCB-190 | 28.6 | | PCB-194 | 76.4 | | | | |
| PCB-185 | 19.5 | | PCB-189 | [3.48] | EMPC | PCB-205 | [2.73] | EMPC | | | |
| | | | **Conc.** | 1,480 | | **Conc.** | 358 | | | | |
| | | | **EMPC** | 1,480 | | **EMPC** | 363 | | | | |

# Sample ID: LPR7-ECST-Comp04 (EQUALIZED) Method 1668B

| Client Data | | Sample Data | | Laboratory Data | | | |
|---|---|---|---|---|---|---|---|
| Name: | Windward Environmental, LLC | Matrix: | Tissue | Project No.: | A3406 | Date Received: | 02-Aug-2011 |
| Project ID: | Passaic RI/FS Caged Bivalve Study | Weight/Volume: | 10.05 g | Sample ID: | A3406_8929_PCB_005 | Date Extracted: | 15-Aug-2011 |
| Date Collected: | 08-Jun-2011 | | | QC Batch No.: | 8929 | Date Analyzed: | 22-Aug-2011 |

| Analyte | Conc. | DL | EMPC | Qualifier | Standard | Recovery |
|---|---|---|---|---|---|---|
| | pg/g | pg/g | pg/g | | | % |
| PCB-77 33'44'-TeCB | 53.4 | | | | ES PCB-1 | 79.8 |
| PCB-81 344'5-TeCB | 2.05 | | | | ES PCB-3 | 85.4 |
| PCB-105 233'44'-PeCB | 201 | | | | ES PCB-4 | 85.2 |
| PCB-114 2344'5-PeCB | 11.6 | | | | ES PCB-15 | 99.3 |
| PCB-118 23'44'5-PeCB | 530 | | | | ES PCB-19 | 89.6 |
| PCB-123 23'44'5'-PeCB | 10.3 | | | | ES PCB-37 | 109 |
| PCB-126 33'44'5-PeCB | EMPC | | 1.36 | | ES PCB-54 | 83.6 |
| PCB-156/157 233'44'5/233'44'5'-HxCB | 52.6 | | | C | ES PCB-77 | 125 V |
| PCB-167 23'44'55'-HxCB | 20 | | | | ES PCB-81 | 120 |
| PCB-169 33'44'55'-HxCB | EMPC | | 0.909 | J | ES PCB-104 | 78.9 |
| PCB-189 233'44'55'-HpCB | 2.64 | | | | ES PCB-105 | 96.3 |
| | | | | | ES PCB-114 | 95.1 |
| **TEQs (WHO M/H)** | | | | | ES PCB-118 | 95.7 |
| | | | | | ES PCB-123 | 101 |
| ND = 0 | 0.0308 | | 0.194 | | ES PCB-126 | 94 |
| ND = 0.5 x DL | 0.0715 | | 0.194 | | ES PCB-153 | 93.2 |
| | | | | | ES PCB-155 | 88 |
| **Totals** | | | | | ES PCB-156/157 | 89.6 |
| | | | | | ES PCB-167 | 85.8 |
| Mono-CBs | 4.36 | | | | ES PCB-169 | 93.3 |
| Di-CBs | 345 | | 346 | | ES PCB-170 | 78.9 |
| Tri-CBs | 3,690 | | 3,690 | | ES PCB-180 | 71.5 |
| Tetra-CBs | 5,480 | | | | ES PCB-188 | 92.9 |
| Penta-CBs | 4,560 | | 4,570 | | ES PCB-189 | 93.3 |
| Hexa-CBs | 3,150 | | 3,150 | | ES PCB-202 | 84.2 |
| Hepta-CBs | 1,050 | | 1,050 | | ES PCB-205 | 93 |
| Octa-CBs | 281 | | 283 | | ES PCB-206 | 89.2 |
| Nona-CBs | 80.3 | | | | ES PCB-208 | 85.9 |
| Deca-CB | 50.4 | | | | ES PCB-209 | 86.5 |
| | | | | | CS PCB-28 | 122 |
| Mono-Deca | 18,700 | | 18,700 | | CS PCB-111 | 101 |
| | | | | | CS PCB-178 | 101 |

Checkcode: 748-200-VDJ AP PCB 2011 Rev. A Report Created: 29-Aug-2011 17:02 Analyst: LB

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# Sample ID: LPR7-ECST-Comp04 (EQUALIZED) Method 1668B

| Client Data | | Sample Data | | Laboratory Data | | | |
|---|---|---|---|---|---|---|---|
| Name: | Windward Environmental, LLC | Matrix: | Tissue | Project No.: | A3406 | Date Received: | 02-Aug-2011 |
| Project ID: | Passaic RI/FS Caged Bivalve Study | Weight/Volume: | 10.05 g | Sample ID: | A3406_8929_PCB_005 | Date Extracted: | 15-Aug-2011 |
| Date Collected: | 08-Jun-2011 | | | QC Batch No.: | 8929 | Date Analyzed: | 22-Aug-2011 |
| | | Units | pg/g | Checkcode: | 748-200-VDJ | Time Analyzed: | 18:29:26 |

| Mono | Conc. | Qualifiers | Tri | Conc. | Qualifiers | Tetra | Conc. | Qualifiers | Tetra | Conc. | Qualifiers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PCB-1 | 2.9 | | PCB-19 | 68.4 | | PCB-54 | 9.58 | | PCB-72 | 10 | |
| PCB-2 | 0.406 | J | PCB-30/18 | 478 | C | PCB-50/53 | 147 | C | PCB-68 | 5.92 | |
| PCB-3 | 1.05 | | PCB-17 | 286 | | PCB-45 | 129 | | PCB-57 | 5.07 | |
| | | | PCB-27 | 62.5 | | PCB-51 | 76.1 | | PCB-58 | 2.64 | |
| **Conc.** | 4.36 | | PCB-24 | 9.7 | | PCB-46 | 49.6 | | PCB-67 | 27.9 | |
| **EMPC** | 4.36 | | PCB-16 | 188 | | PCB-52 | 831 | | PCB-63 | 26.5 | |
| | | | PCB-32 | 240 | | PCB-73 | 5.45 | | PCB-61/70/74/76 | 902 | C |
| **Di** | **Conc.** | **Qualifiers** | PCB-34 | 6.59 | | PCB-43 | 28.2 | | PCB-66 | 523 | |
| PCB-4 | 73.6 | | PCB-23 | (0.963) | | PCB-69/49 | 511 | C | PCB-55 | 7.9 | |
| PCB-10 | 4.73 | | PCB-26/29 | 176 | C | PCB-48 | 126 | | PCB-56 | 240 | |
| PCB-9 | 5.24 | | PCB-25 | 111 | | PCB-44/47/65 | 729 | C | PCB-60 | 85.1 | |
| PCB-7 | 3.22 | | PCB-31 | 634 | | PCB-59/62/75 | 71.2 | C | PCB-80 | (0.44) | |
| PCB-6 | 27.1 | | PCB-28/20 | 814 | C | PCB-42 | 187 | | PCB-79 | 6.92 | |
| PCB-5 | [0.722] | J EMPC | PCB-21/33 | 227 | C | PCB-41 | 50.2 | | PCB-78 | (0.539) | |
| PCB-8 | 73 | | PCB-22 | 195 | | PCB-71/40 | 324 | C | PCB-81 | 2.05 | |
| PCB-14 | (0.473) | | PCB-36 | 1.14 | | PCB-64 | 307 | | PCB-77 | 53.4 | |
| PCB-11 | 40.9 | B | PCB-39 | 5.29 | | | | | | | |
| PCB-13/12 | 15.2 | C | PCB-38 | [0.931] | EMPC | | | | | | |
| PCB-15 | 102 | | PCB-35 | 11.8 | | | | | | | |
| | | | PCB-37 | 173 | | | | | | | |
| **Conc.** | 345 | | **Conc.** | 3,690 | | | | | **Conc.** | 5,480 | |
| **EMPC** | 346 | | **EMPC** | 3,690 | | | | | **EMPC** | 5,480 | |


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www.ultratrace.com


| Totals | Conc. | EMPC |
|---|---|---|
| Mono-Tri | 4,040 | 4,040 |
| Tetra-Hexa | 13,200 | 13,200 |
| Hepta-Deca | 1,460 | 1,460 |
| Mono-Deca | 18,700 | 18,700 |

# Sample ID: LPR7-ECST-Comp04 (EQUALIZED) Method 1668B

| Penta | Conc. | Qualifiers | Penta | Conc. | Qualifiers | Hexa | Conc. | Qualifiers | Hexa | Conc. | Qualifiers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PCB-104 | 2.31 | | PCB-109/119/86… | 471 | C | PCB-155 | [1.26] | EMPC | PCB-165 | (0.242) | |
| PCB-96 | 10.7 | | PCB-117 | 18.5 | | PCB-152 | 1.56 | | PCB-146 | 98.3 | |
| PCB-103 | 11 | | PCB-116/85 | 110 | C | PCB-150 | 1.65 | | PCB-161 | (0.241) | |
| PCB-94 | 10.1 | | PCB-110 | 780 | | PCB-136 | 102 | | PCB-153/168 | 502 | C |
| PCB-95 | 609 | | PCB-115 | 33.2 | | PCB-145 | (0.198) | | PCB-141 | 127 | |
| PCB-100/93 | 24.2 | C | PCB-82 | 81.9 | | PCB-148 | 2.11 | | PCB-130 | 45.1 | |
| PCB-102 | 28 | | PCB-111 | (1.41) | | PCB-151/135 | 278 | C | PCB-137 | 27.4 | |
| PCB-98 | 2.53 | | PCB-120 | (1.45) | | PCB-154 | 9.04 | | PCB-164 | 54.1 | |
| PCB-88 | [5.66] | EMPC | PCB-108/124 | 24.3 | C | PCB-144 | 31.4 | | PCB-163/138/129 | 746 | C |
| PCB-91 | 102 | | PCB-107 | 35.1 | | PCB-147/149 | 574 | C | PCB-160 | (0.232) | |
| PCB-84 | 189 | | PCB-123 | 10.3 | | PCB-134 | 43.4 | | PCB-158 | 55.9 | |
| PCB-89 | 10.7 | | PCB-106 | (1.61) | | PCB-143 | 2.55 | | PCB-128/166 | 93.1 | C |
| PCB-121 | (1.39) | | PCB-118 | 530 | | PCB-139/140 | 11.9 | C | PCB-159 | 5.56 | |
| PCB-92 | 151 | | PCB-122 | 7.67 | | PCB-131 | 9.01 | | PCB-162 | 2.23 | |
| PCB-113/90/101 | 715 | C | PCB-114 | 11.6 | | PCB-142 | (0.344) | | PCB-167 | 20 | |
| PCB-83 | 37.8 | | PCB-105 | 201 | | PCB-132 | 243 | | PCB-156/157 | 52.6 | C |
| PCB-99 | 346 | | PCB-127 | (1.72) | | PCB-133 | 12.7 | | PCB-169 | [0.909] | J EMPC |
| PCB-112 | (1.42) | | PCB-126 | 1.36 | EMPC | | | | | | |
| | | | **Conc.** | 4,560 | | | | | **Conc.** | 3,150 | |
| | | | **EMPC** | 4,570 | | | | | **EMPC** | 3,150 | |

| Hepta | Conc. | Qualifiers | Hepta | Conc. | Qualifiers | Octa | Conc. | Qualifiers | Nona | Conc. | Qualifiers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PCB-188 | (0.199) | | PCB-174 | 155 | | PCB-202 | 26.6 | | PCB-208 | 25.3 | |
| PCB-179 | 68.6 | | PCB-177 | 82.5 | | PCB-201 | 7.14 | | PCB-207 | 3.63 | |
| PCB-184 | 1.16 | | PCB-181 | 1.26 | | PCB-204 | (0.216) | | PCB-206 | 51.5 | |
| PCB-176 | 16.5 | | PCB-171/173 | 29.6 | C | PCB-197 | [1.12] | EMPC | | | |
| PCB-186 | (0.227) | | PCB-172 | 24.9 | | PCB-200 | 8.71 | | **Conc.** | 80.3 | |
| PCB-178 | 31.7 | | PCB-192 | (0.434) | | PCB-198/199 | 88.3 | C | **EMPC** | 80.3 | |
| PCB-175 | 4.7 | | PCB-180/193 | 229 | C | PCB-196 | 16.1 | | | | |
| PCB-187 | 212 | | PCB-191 | [3.5] | EMPC | PCB-203 | 52.2 | | **Deca** | **Conc.** | **Qualifiers** |
| PCB-182 | (0.486) | | PCB-170 | 81.9 | | PCB-195 | 23.4 | | PCB-209 | 50.4 | |
| PCB-183 | 72.1 | | PCB-190 | 20.1 | | PCB-194 | 56.9 | | | | |
| PCB-185 | 13.9 | | PCB-189 | 2.64 | | PCB-205 | 2.18 | | | | |
| | | | **Conc.** | 1,050 | | **Conc.** | 281 | | | | |
| | | | **EMPC** | 1,050 | | **EMPC** | 283 | | | | |

# Sample ID: LPR8-ECST-Comp05 (EQUALIZED) Method 1668B

| Client Data | | Sample Data | | Laboratory Data | | | |
|---|---|---|---|---|---|---|---|
| Name: | Windward Environmental, LLC | Matrix: | Tissue | Project No.: | A3406 | Date Received: | 02-Aug-2011 |
| Project ID: | Passaic RI/FS Caged Bivalve Study | Weight/Volume: | 10.19 g | Sample ID: | A3406_8929_PCB_006 | Date Extracted: | 15-Aug-2011 |
| Date Collected: | 08-Jun-2011 | | | QC Batch No.: | 8929 | Date Analyzed: | 22-Aug-2011 |

| Analyte | Conc. | DL | EMPC | Qualifier | Standard | Recovery |
|---|---|---|---|---|---|---|
| | pg/g | pg/g | pg/g | | | % |
| PCB-77 33'44'-TeCB | 46.4 | | | | ES PCB-1 | 79.3 |
| PCB-81 344'5-TeCB | ND | 0.532 | | | ES PCB-3 | 85.8 |
| PCB-105 233'44'-PeCB | 164 | | | | ES PCB-4 | 93.9 |
| PCB-114 2344'5-PeCB | 10.2 | | | | ES PCB-15 | 107 |
| PCB-118 23'44'5-PeCB | 413 | | | | ES PCB-19 | 98.1 |
| PCB-123 23'44'5'-PeCB | 9.5 | | | | ES PCB-37 | 101 |
| PCB-126 33'44'5-PeCB | 1.61 | | | | ES PCB-54 | 96.4 |
| PCB-156/157 233'44'5/233'44'5'-HxCB | 41.2 | | | C | ES PCB-77 | 99.6 |
| PCB-167 23'44'55'-HxCB | 15.6 | | | | ES PCB-81 | 99 |
| PCB-169 33'44'55'-HxCB | ND | 0.502 | | | ES PCB-104 | 102 |
| PCB-189 233'44'55'-HpCB | 2.02 | | | | ES PCB-105 | 99.5 |
| | | | | | ES PCB-114 | 93.9 |
| **TEQs (WHO M/H)** | | | | | ES PCB-118 | 101 |
| | | | | | ES PCB-123 | 103 |
| ND = 0 | 0.186 | | 0.186 | | ES PCB-126 | 98.6 |
| ND = 0.5 x DL | 0.193 | | 0.193 | | ES PCB-153 | 95.1 |
| | | | | | ES PCB-155 | 89.5 |
| **Totals** | | | | | ES PCB-156/157 | 83.4 |
| | | | | | ES PCB-167 | 83.1 |
| Mono-CBs | 5.36 | | | | ES PCB-169 | 84 |
| Di-CBs | 337 | | | | ES PCB-170 | 85 |
| Tri-CBs | 3,590 | | 3,600 | | ES PCB-180 | 82.9 |
| Tetra-CBs | 5,450 | | | | ES PCB-188 | 88.1 |
| Penta-CBs | 3,730 | | | | ES PCB-189 | 98.3 |
| Hexa-CBs | 2,480 | | | | ES PCB-202 | 83.3 |
| Hepta-CBs | 777 | | 781 | | ES PCB-205 | 101 |
| Octa-CBs | 216 | | 217 | | ES PCB-206 | 104 |
| Nona-CBs | 60.9 | | | | ES PCB-208 | 91.8 |
| Deca-CB | 39 | | | | ES PCB-209 | 89.7 |
| | | | | | CS PCB-28 | 125 |
| Mono-Deca | 16,700 | | 16,700 | | CS PCB-111 | 104 |
| | | | | | CS PCB-178 | 98.7 |

Checkcode: 024-610-SRP AP PCB 2011 Rev. A Report Created: 01-Sep-2011 15:50 Analyst: CM

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# Sample ID: LPR8-ECST-Comp05 (EQUALIZED) Method 1668B

| Client Data | | Sample Data | | Laboratory Data | | | |
|---|---|---|---|---|---|---|---|
| Name: | Windward Environmental, LLC | Matrix: | Tisue | Project No.: | A3406 | Date Received: | 02-Aug-2011 |
| Project ID: | Passaic RI/FS Caged Bivalve Study | Weight/Volume: | 10.19 g | Sample ID: | A3406_8929_PCB_006 | Date Extracted: | 15-Aug-2011 |
| Date Collected: | 08-Jun-2011 | | | QC Batch No.: | 8929 | Date Analyzed: | 22-Aug-2011 |
| | | Units | pg/g | Checkcode: | 024-610-SRP | Time Analyzed: | 23:15:19 |

| Mono | Conc. | Qualifiers | Tri | Conc. | Qualifiers | Tetra | Conc. | Qualifiers | Tetra | Conc. | Qualifiers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PCB-1 | 3.33 | | PCB-19 | 62.1 | | PCB-54 | 9.39 | | PCB-72 | 8.76 | |
| PCB-2 | 0.821 | J | PCB-30/18 | 456 | C | PCB-50/53 | 180 | C | PCB-68 | 5.66 | |
| PCB-3 | 1.21 | | PCB-17 | 258 | | PCB-45 | 134 | | PCB-57 | 4.53 | |
| | | | PCB-27 | 60.4 | | PCB-51 | 96.6 | | PCB-58 | 2.73 | |
| **Conc.** | 5.36 | | PCB-24 | [8.46] | EMPC | PCB-46 | 57.8 | | PCB-67 | 22 | |
| **EMPC** | 5.36 | | PCB-16 | 178 | | PCB-52 | 912 | | PCB-63 | 23.4 | |
| | | | PCB-32 | 228 | | PCB-73 | 6.65 | | PCB-61/70/74/76 | 769 | C |
| **Di** | **Conc.** | **Qualifiers** | PCB-34 | 6.06 | | PCB-43 | 29 | | PCB-66 | 434 | |
| PCB-4 | 67.9 | | PCB-23 | (0.845) | | PCB-69/49 | 544 | C | PCB-55 | 6.62 | |
| PCB-10 | 4.37 | | PCB-26/29 | 177 | C | PCB-48 | 130 | | PCB-56 | 201 | |
| PCB-9 | 5.18 | | PCB-25 | 110 | | PCB-44/47/65 | 784 | C | PCB-60 | 71.7 | |
| PCB-7 | 2.78 | | PCB-31 | 606 | | PCB-59/62/75 | 76.4 | C | PCB-80 | (0.438) | |
| PCB-6 | 26.6 | | PCB-28/20 | 862 | C | PCB-42 | 194 | | PCB-79 | 5.59 | |
| PCB-5 | 0.883 | J | PCB-21/33 | 214 | C | PCB-41 | 46.8 | | PCB-78 | (0.537) | |
| PCB-8 | 72.8 | | PCB-22 | 200 | | PCB-71/40 | 329 | C | PCB-81 | (0.532) | |
| PCB-14 | (0.458) | | PCB-36 | (0.83) | | PCB-64 | 314 | | PCB-77 | 46.4 | |
| PCB-11 | 40.3 | B | PCB-39 | [3.61] | EMPC | | | | | | |
| PCB-13/12 | 15.2 | C | PCB-38 | (0.856) | | | | | | | |
| PCB-15 | 101 | | PCB-35 | 9.82 | | | | | | | |
| | | | PCB-37 | 160 | | | | | | | |
| | | | | | | | | | | | |
| **Conc.** | 337 | | **Conc.** | 3,590 | | | | | **Conc.** | 5,450 | |
| **EMPC** | 337 | | **EMPC** | 3,600 | | | | | **EMPC** | 5,450 | |


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www.ultratrace.com


| Totals | Conc. | EMPC |
|---|---|---|
| Mono-Tri | 3,930 | 3,940 |
| Tetra-Hexa | 11,700 | 11,700 |
| Hepta-Deca | 1,090 | 1,100 |
| Mono-Deca | 16,700 | 16,700 |

# Sample ID: LPR8-ECST-Comp05 (EQUALIZED) Method 1668B

| Penta | Conc. | Qualifiers | Penta | Conc. | Qualifiers | Hexa | Conc. | Qualifiers | Hexa | Conc. | Qualifiers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PCB-104 | 2.12 | | PCB-109/119/86… | 398 | C | PCB-155 | 1.13 | | PCB-165 | (0.21) | |
| PCB-96 | 9.22 | | PCB-117 | 15.2 | | PCB-152 | 1.29 | | PCB-146 | 79.2 | |
| PCB-103 | 9.86 | | PCB-116/85 | 95.7 | C | PCB-150 | 1.22 | | PCB-161 | (0.21) | |
| PCB-94 | 8.96 | | PCB-110 | 598 | | PCB-136 | 79.7 | | PCB-153/168 | 369 | C |
| PCB-95 | 545 | | PCB-115 | 12 | | PCB-145 | (0.161) | | PCB-141 | 92.1 | |
| PCB-100/93 | 19.4 | C | PCB-82 | 66.1 | | PCB-148 | 1.57 | | PCB-130 | 36 | |
| PCB-102 | 24.6 | | PCB-111 | (1.52) | | PCB-151/135 | 233 | C | PCB-137 | 24.4 | |
| PCB-98 | (2.59) | | PCB-120 | (1.55) | | PCB-154 | 7.82 | | PCB-164 | 38.6 | |
| PCB-88 | (2.62) | | PCB-108/124 | 19.4 | C | PCB-144 | 26 | | PCB-163/138/129 | 593 | C |
| PCB-91 | 86 | | PCB-107 | 28.6 | | PCB-147/149 | 463 | C | PCB-160 | (0.211) | |
| PCB-84 | 168 | | PCB-123 | 9.5 | | PCB-134 | 35.2 | | PCB-158 | 45.7 | |
| PCB-89 | 8.89 | | PCB-106 | (1.7) | | PCB-143 | (0.285) | | PCB-128/166 | 75.5 | C |
| PCB-121 | (1.48) | | PCB-118 | 413 | | PCB-139/140 | 8.79 | C | PCB-159 | 4.1 | |
| PCB-92 | 127 | | PCB-122 | 6.88 | | PCB-131 | 7.52 | | PCB-162 | 1.76 | |
| PCB-113/90/101 | 584 | C | PCB-114 | 10.2 | | PCB-142 | (0.31) | | PCB-167 | 15.6 | |
| PCB-83 | 35.1 | | PCB-105 | 164 | | PCB-132 | 187 | | PCB-156/157 | 41.2 | C |
| PCB-99 | 263 | | PCB-127 | (1.85) | | PCB-133 | 9.65 | | PCB-169 | (0.502) | |
| PCB-112 | (1.52) | | PCB-126 | 1.61 | | | | | | | |
| | | | **Conc.** | 3,730 | | | | | **Conc.** | 2,480 | |
| | | | **EMPC** | 3,730 | | | | | **EMPC** | 2,480 | |

| Hepta | Conc. | Qualifiers | Hepta | Conc. | Qualifiers | Octa | Conc. | Qualifiers | Nona | Conc. | Qualifiers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PCB-188 | (0.158) | | PCB-174 | 115 | | PCB-202 | 20.7 | | PCB-208 | 19.2 | |
| PCB-179 | 48.5 | | PCB-177 | 62.7 | | PCB-201 | 5.67 | | PCB-207 | 2.56 | |
| PCB-184 | 0.883 | J | PCB-181 | 0.915 | J | PCB-204 | (0.173) | | PCB-206 | 39.2 | |
| PCB-176 | 10.6 | | PCB-171/173 | 21.5 | C | PCB-197 | [0.762] | J EMPC | | | |
| PCB-186 | (0.173) | | PCB-172 | 17.3 | | PCB-200 | 7.92 | | **Conc.** | 60.9 | |
| PCB-178 | 26.2 | | PCB-192 | (0.445) | | PCB-198/199 | 73.1 | C | **EMPC** | 60.9 | |
| PCB-175 | [3.66] | EMPC | PCB-180/193 | 166 | C | PCB-196 | 12.4 | | | | |
| PCB-187 | 158 | | PCB-191 | 2.48 | | PCB-203 | 40 | | **Deca** | **Conc.** | **Qualifiers** |
| PCB-182 | (0.577) | | PCB-170 | 66.1 | | PCB-195 | 16.2 | | PCB-209 | 39 | |
| PCB-183 | 51.8 | | PCB-190 | 15.3 | | PCB-194 | 38.4 | | | | |
| PCB-185 | 12.1 | | PCB-189 | 2.02 | | PCB-205 | 1.54 | | | | |
| | | | **Conc.** | 777 | | **Conc.** | 216 | | | | |
| | | | **EMPC** | 781 | | **EMPC** | 217 | | | | |

# Sample ID: LPR1-GDST-Comp01 (EQUALIZED) Method 1668B

| Client Data | | Sample Data | | Laboratory Data | | | |
|---|---|---|---|---|---|---|---|
| Name: | Windward Environmental, LLC | Matrix: | Tissue | Project No.: | A3406 | Date Received: | 02-Aug-2011 |
| Project ID: | Passaic RI/FS Caged Bivalve Study | Weight/Volume: | 10.03 g | Sample ID: | A3406_8929_PCB_007 | Date Extracted: | 15-Aug-2011 |
| Date Collected: | 09-May-2011 | | | QC Batch No.: | 8929 | Date Analyzed: | 23-Aug-2011 |

| Analyte | Conc. | DL | EMPC | Qualifier | Standard | Recovery |
|---|---|---|---|---|---|---|
| | pg/g | pg/g | pg/g | | | % |
| PCB-77 33'44'-TeCB | 46 | | | | ES PCB-1 | 70.2 |
| PCB-81 344'5-TeCB | 1.68 | | | | ES PCB-3 | 84.4 |
| PCB-105 233'44'-PeCB | 175 | | | | ES PCB-4 | 90.7 |
| PCB-114 2344'5-PeCB | 8.3 | | | | ES PCB-15 | 107 |
| PCB-118 23'44'5-PeCB | 433 | | | | ES PCB-19 | 92.3 |
| PCB-123 23'44'5'-PeCB | 10.2 | | | | ES PCB-37 | 99.3 |
| PCB-126 33'44'5-PeCB | EMPC | | 0.831 | J | ES PCB-54 | 91.6 |
| PCB-156/157 233'44'5/233'44'5'-HxCB | 21.1 | | | C | ES PCB-77 | 100 |
| PCB-167 23'44'55'-HxCB | 15.7 | | | | ES PCB-81 | 96.1 |
| PCB-169 33'44'55'-HxCB | ND | 0.433 | | | ES PCB-104 | 98.3 |
| PCB-189 233'44'55'-HpCB | 1.2 | | | | ES PCB-105 | 96.5 |
| | | | | | ES PCB-114 | 93.7 |
| **TEQs (WHO M/H)** | | | | | ES PCB-118 | 101 |
| | | | | | ES PCB-123 | 102 |
| ND = 0 | 0.025 | | 0.108 | | ES PCB-126 | 97 |
| ND = 0.5 x DL | 0.0505 | | 0.115 | | ES PCB-153 | 96.3 |
| | | | | | ES PCB-155 | 86.5 |
| **Totals** | | | | | ES PCB-156/157 | 81.9 |
| | | | | | ES PCB-167 | 84.3 |
| Mono-CBs | 7.99 | | 10.4 | | ES PCB-169 | 81.7 |
| Di-CBs | 368 | | | | ES PCB-170 | 86.5 |
| Tri-CBs | 3,740 | | | | ES PCB-180 | 85.9 |
| Tetra-CBs | 7,070 | | | | ES PCB-188 | 88.1 |
| Penta-CBs | 4,180 | | 4,180 | | ES PCB-189 | 96.5 |
| Hexa-CBs | 2,430 | | 2,440 | | ES PCB-202 | 86.5 |
| Hepta-CBs | 575 | | | | ES PCB-205 | 101 |
| Octa-CBs | 46.5 | | 46.9 | | ES PCB-206 | 91.2 |
| Nona-CBs | | | 1.93 | | ES PCB-208 | 89.7 |
| Deca-CB | 1.54 | | | | ES PCB-209 | 83.1 |
| | | | | | CS PCB-28 | 125 |
| Mono-Deca | 18,400 | | 18,400 | | CS PCB-111 | 103 |
| | | | | | CS PCB-178 | 97.5 |

Checkcode: 183-309-WWH AP PCB 2011 Rev. A Report Created: 31-Aug-2011 17:58 Analyst: LB

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# Sample ID: LPR1-GDST-Comp01 (EQUALIZED) Method 1668B

| Client Data | | Sample Data | | Laboratory Data | | | |
|---|---|---|---|---|---|---|---|
| Name: | Windward Environmental, LLC | Matrix | Tissue | Project No.: | A3406 | Date Received: | 02-Aug-2011 |
| Project ID: | Passaic RI/FS Caged Bivalve Study | Weight/Volume: | 10.03 g | Sample ID: | A3406_8929_PCB_007 | Date Extracted: | 15-Aug-2011 |
| Date Collected: | 09-May-2011 | | | QC Batch No.: | 8929 | Date Analyzed: | 23-Aug-2011 |
| | | Units | pg/g | Checkcode: | 183-309-WWH | Time Analyzed: | 00:09:59 |

| Mono | Conc. | Qualifiers | Tri | Conc. | Qualifiers | Tetra | Conc. | Qualifiers | Tetra | Conc. | Qualifiers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PCB-1 | 6.66 | | PCB-19 | 57.5 | | PCB-54 | 19.1 | | PCB-72 | 14.7 | |
| PCB-2 | [2.4] | EMPC | PCB-30/18 | 456 | C | PCB-50/53 | 227 | C | PCB-68 | 7.75 | |
| PCB-3 | 1.33 | | PCB-17 | 293 | | PCB-45 | 100 | | PCB-57 | 5.34 | |
| | | | PCB-27 | 81.5 | | PCB-51 | 208 | | PCB-58 | (0.502) | |
| **Conc.** | 7.99 | | PCB-24 | 7.37 | | PCB-46 | 70.5 | | PCB-67 | 31.3 | |
| **EMPC** | 10.4 | | PCB-16 | 178 | | PCB-52 | 1,120 | | PCB-63 | 28.9 | |
| | | | PCB-32 | 248 | | PCB-73 | 6.89 | | PCB-61/70/74/76 | 1,060 | C |
| **Di** | **Conc.** | **Qualifiers** | PCB-34 | 9.51 | | PCB-43 | 38 | | PCB-66 | 562 | |
| PCB-4 | 73.1 | | PCB-23 | 0.844 | J | PCB-69/49 | 740 | C | PCB-55 | 7.84 | |
| PCB-10 | 10.3 | | PCB-26/29 | 209 | C | PCB-48 | 159 | | PCB-56 | 263 | |
| PCB-9 | 6.99 | | PCB-25 | 122 | | PCB-44/47/65 | 1,040 | C | PCB-60 | 92.8 | |
| PCB-7 | 3.01 | | PCB-31 | 686 | | PCB-59/62/75 | 91.7 | C | PCB-80 | (0.439) | |
| PCB-6 | 42.8 | | PCB-28/20 | 855 | C | PCB-42 | 267 | | PCB-79 | 6.13 | |
| PCB-5 | 1.73 | | PCB-21/33 | 213 | C | PCB-41 | 41.7 | | PCB-78 | (0.538) | |
| PCB-8 | 64.7 | | PCB-22 | 185 | | PCB-71/40 | 432 | C | PCB-81 | 1.68 | |
| PCB-14 | (0.365) | | PCB-36 | 1.73 | | PCB-64 | 375 | | PCB-77 | 46 | |
| PCB-11 | 83.2 | | PCB-39 | 4.92 | | | | | | | |
| PCB-13/12 | 17.4 | C | PCB-38 | (0.65) | | | | | | | |
| PCB-15 | 64.6 | | PCB-35 | 11.4 | | | | | | | |
| | | | PCB-37 | 125 | | | | | | | |
| **Conc.** | 368 | | **Conc.** | 3,740 | | | | | **Conc.** | 7,070 | |
| **EMPC** | 368 | | **EMPC** | 3,740 | | | | | **EMPC** | 7,070 | |


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| Totals | Conc. | EMPC |
|---|---|---|
| Mono-Tri | 4,120 | 4,120 |
| Tetra-Hexa | 13,700 | 13,700 |
| Hepta-Deca | 623 | 626 |
| Mono-Deca | 18,400 | 18,400 |

# Sample ID: LPR1-GDST-Comp01 (EQUALIZED) Method 1668B

| Penta | Conc. | Qualifiers | Penta | Conc. | Qualifiers | Hexa | Conc. | Qualifiers | Hexa | Conc. | Qualifiers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PCB-104 | 6.27 | | PCB-109/119/86… | 413 | C | PCB-155 | 5.87 | | PCB-165 | (0.157) | |
| PCB-96 | 12.4 | | PCB-117 | 16.6 | | PCB-152 | 2.64 | | PCB-146 | 102 | |
| PCB-103 | 23.4 | | PCB-116/85 | 102 | C | PCB-150 | 3.62 | | PCB-161 | (0.157) | |
| PCB-94 | 16.3 | | PCB-110 | 598 | | PCB-136 | 96.2 | | PCB-153/168 | 437 | C |
| PCB-95 | 580 | | PCB-115 | 25.9 | | PCB-145 | (0.136) | | PCB-141 | 12.6 | |
| PCB-100/93 | 50.3 | C | PCB-82 | 73.4 | | PCB-148 | 2.96 | | PCB-130 | 30.9 | |
| PCB-102 | 44.7 | | PCB-111 | (0.999) | | PCB-151/135 | 272 | C | PCB-137 | [8.49] | EMPC |
| PCB-98 | (1.71) | | PCB-120 | 2.88 | | PCB-154 | 19.3 | | PCB-164 | 29.4 | |
| PCB-88 | (1.72) | | PCB-108/124 | 18.8 | C | PCB-144 | 5.48 | | PCB-163/138/129 | 527 | C |
| PCB-91 | 111 | | PCB-107 | 32.7 | | PCB-147/149 | 547 | C | PCB-160 | (0.159) | |
| PCB-84 | 187 | | PCB-123 | 10.2 | | PCB-134 | 34.6 | | PCB-158 | 14.1 | |
| PCB-89 | 11.4 | | PCB-106 | (1.12) | | PCB-143 | (0.214) | | PCB-128/166 | 63.1 | C |
| PCB-121 | (0.973) | | PCB-118 | 433 | | PCB-139/140 | 6.6 | C | PCB-159 | (0.397) | |
| PCB-92 | 148 | | PCB-122 | 7.06 | | PCB-131 | 3.31 | | PCB-162 | [2.04] | EMPC |
| PCB-113/90/101 | 680 | C | PCB-114 | 8.3 | | PCB-142 | (0.232) | | PCB-167 | 15.7 | |
| PCB-83 | 49.5 | | PCB-105 | 175 | | PCB-132 | 169 | | PCB-156/157 | 21.1 | C |
| PCB-99 | 336 | | PCB-127 | (1.18) | | PCB-133 | 12.7 | | PCB-169 | (0.433) | |
| PCB-112 | 1.55 | | PCB-126 | 0.831 | J EMPC | | | | | | |
| | | | **Conc.** | 4,180 | | | | | **Conc.** | 2,430 | |
| | | | **EMPC** | 4,180 | | | | | **EMPC** | 2,440 | |

| Hepta | Conc. | Qualifiers | Hepta | Conc. | Qualifiers | Octa | Conc. | Qualifiers | Nona | Conc. | Qualifiers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PCB-188 | 1.07 | | PCB-174 | 17.9 | | PCB-202 | 17.1 | | PCB-208 | [0.444] | J EMPC |
| PCB-179 | 60.1 | | PCB-177 | 78.4 | | PCB-201 | 1.33 | | PCB-207 | (0.383) | |
| PCB-184 | (0.125) | | PCB-181 | (0.321) | | PCB-204 | (0.109) | | PCB-206 | [1.49] | EMPC |
| PCB-176 | 4.26 | | PCB-171/173 | 10.4 | C | PCB-197 | [0.375] | J EMPC | | | |
| PCB-186 | (0.133) | | PCB-172 | 8.49 | | PCB-200 | (0.129) | | **Conc.** | 0 | |
| PCB-178 | 33.3 | | PCB-192 | (0.255) | | PCB-198/199 | 9.11 | C | **EMPC** | 1.93 | |
| PCB-175 | (0.351) | | PCB-180/193 | 93.7 | C | PCB-196 | 1.43 | | | | |
| PCB-187 | 216 | | PCB-191 | (0.267) | | PCB-203 | 3.89 | | **Deca** | **Conc.** | **Qualifiers** |
| PCB-182 | (0.331) | | PCB-170 | 31.6 | | PCB-195 | 1.9 | | PCB-209 | 1.54 | |
| PCB-183 | 14.5 | | PCB-190 | 3.48 | | PCB-194 | 11.7 | | | | |
| PCB-185 | 0.986 | J | PCB-189 | 1.2 | | PCB-205 | (0.28) | | | | |
| | | | **Conc.** | 575 | | **Conc.** | 46.5 | | | | |
| | | | **EMPC** | 575 | | **EMPC** | 46.9 | | | | |

# Sample ID: LPRBG-GDST-Comp01 (EQUALIZED) Method 1668B

| Client Data | | Sample Data | | Laboratory Data | | | |
|---|---|---|---|---|---|---|---|
| Name: | Windward Environmental, LLC | Matrix: | Tissue | Project No.: | A3406 | Date Received: | 02-Aug-2011 |
| Project ID: | Passaic RI/FS Caged Bivalve Study | Weight/Volume: | 10.20 g | Sample ID: | A3406_8929_PCB_008 | Date Extracted: | 15-Aug-2011 |
| Date Collected: | 08-Mar-2011 | | | QC Batch No.: | 8929 | Date Analyzed: | 23-Aug-2011 |

| Analyte | Conc. | DL | EMPC | Qualifier | Standard | Recovery |
|---|---|---|---|---|---|---|
| | pg/g | pg/g | pg/g | | | % |
| PCB-77 33'44'-TeCB | 1.38 | | | | ES PCB-1 | 80.6 |
| PCB-81 344'5-TeCB | ND | 0.184 | | | ES PCB-3 | 81.2 |
| PCB-105 233'44'-PeCB | 7.65 | | | | ES PCB-4 | 96.4 |
| PCB-114 2344'5-PeCB | ND | 0.282 | | | ES PCB-15 | 110 V |
| PCB-118 23'44'5-PeCB | 36.1 | | | | ES PCB-19 | 97.9 |
| PCB-123 23'44'5'-PeCB | EMPC | | 0.573 | J | ES PCB-37 | 103 |
| PCB-126 33'44'5-PeCB | ND | 0.277 | | | ES PCB-54 | 86.1 |
| PCB-156/157 233'44'5/233'44'5'-HxCB | 0.966 | | | J C | ES PCB-77 | 109 |
| PCB-167 23'44'55'-HxCB | 2.81 | | | | ES PCB-81 | 107 |
| PCB-169 33'44'55'-HxCB | ND | 0.273 | | | ES PCB-104 | 94.6 |
| PCB-189 233'44'55'-HpCB | ND | 0.389 | | | ES PCB-105 | 99.4 |
| | | | | | ES PCB-114 | 95.2 |
| **TEQs (WHO M/H)** | | | | | ES PCB-118 | 102 |
| | | | | | ES PCB-123 | 103 |
| ND = 0 | 0.00156 | | 0.00158 | | ES PCB-126 | 94.6 |
| ND = 0.5 x DL | 0.0196 | | 0.0196 | | ES PCB-153 | 97.4 |
| | | | | | ES PCB-155 | 93 |
| **Totals** | | | | | ES PCB-156/157 | 85.2 |
| | | | | | ES PCB-167 | 85.4 |
| Mono-CBs | 2.67 | | | | ES PCB-169 | 87.3 |
| Di-CBs | 28.9 | | | | ES PCB-170 | 87.5 |
| Tri-CBs | 47.5 | | 61.2 | | ES PCB-180 | 83.3 |
| Tetra-CBs | 107 | | 110 | | ES PCB-188 | 97.9 |
| Penta-CBs | 188 | | 191 | | ES PCB-189 | 97 |
| Hexa-CBs | 263 | | 272 | | ES PCB-202 | 91.7 |
| Hepta-CBs | 94.7 | | | | ES PCB-205 | 105 |
| Octa-CBs | 10.5 | | | | ES PCB-206 | 102 |
| Nona-CBs | ND | 0.681 | | | ES PCB-208 | 98.7 |
| Deca-CB | ND | 0.374 | | | ES PCB-209 | 96.8 |
| | | | | | CS PCB-28 | 122 |
| Mono-Deca | 741 | | 771 | | CS PCB-111 | 103 |
| | | | | | CS PCB-178 | 107 |

Checkcode: 939-239-HCG AP PCB 2011 Rev. A Report Created: 01-Sep-2011 15:49 Analyst: CM

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# Sample ID: LPRBG-GDST-Comp01 (EQUALIZED) Method 1668B

| Client Data | | Sample Data | | Laboratory Data | | | |
|---|---|---|---|---|---|---|---|
| Name: | Windward Environmental, LLC | Matrix | Tissue | Project No.: | A3406 | Date Received: | 02-Aug-2011 |
| Project ID: | Passaic RI/FS Caged Bivalve Study | Weight/Volume: | 10.20 g | Sample ID: | A3406_8929_PCB_008 | Date Extracted: | 15-Aug-2011 |
| Date Collected: | 08-Mar-2011 | | | QC Batch No.: | 8929 | Date Analyzed: | 23-Aug-2011 |
| | | Units | pg/g | Checkcode: | 939-239-HCG | Time Analyzed: | 01:05:02 |

| Mono | Conc. | Qualifiers | Tri | Conc. | Qualifiers | Tetra | Conc. | Qualifiers | Tetra | Conc. | Qualifiers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PCB-1 | 0.938 | J | PCB-19 | 0.485 | J | PCB-54 | (0.139) | | PCB-72 | [0.636] | J EMPC |
| PCB-2 | 1.12 | | PCB-30/18 | 5.85 | C | PCB-50/53 | 2.54 | C | PCB-68 | [0.347] | J EMPC |
| PCB-3 | 0.617 | J | PCB-17 | 4.79 | | PCB-45 | 1.03 | | PCB-57 | (0.186) | |
| | | | PCB-27 | [0.816] | J EMPC | PCB-51 | [0.873] | J EMPC | PCB-58 | (0.174) | |
| **Conc.** | 2.67 | | PCB-24 | (0.141) | | PCB-46 | 0.463 | J | PCB-67 | 1.07 | |
| **EMPC** | 2.67 | | PCB-16 | 2.65 | | PCB-52 | 21.5 | | PCB-63 | 0.763 | J |
| | | | PCB-32 | 2.97 | B | PCB-73 | 0.15 | J | PCB-61/70/74/76 | 24.7 | C |
| **Di** | **Conc.** | **Qualifiers** | PCB-34 | (0.312) | | PCB-43 | 0.476 | J | PCB-66 | 11.5 | |
| PCB-4 | 1.54 | | PCB-23 | (0.297) | | PCB-69/49 | 11.7 | C | PCB-55 | (0.178) | |
| PCB-10 | (0.272) | | PCB-26/29 | 3.59 | C | PCB-48 | 2.45 | | PCB-56 | 3.73 | |
| PCB-9 | 0.401 | J | PCB-25 | 1.98 | | PCB-44/47/65 | 10.1 | C | PCB-60 | 1.47 | |
| PCB-7 | 0.254 | J | PCB-31 | 14.7 | | PCB-59/62/75 | [0.752] | J EMPC C | PCB-80 | (0.152) | |
| PCB-6 | 1.53 | | PCB-28/20 | [10.4] | EMPC C | PCB-42 | 2.08 | | PCB-79 | 0.306 | J |
| PCB-5 | 0.245 | J | PCB-21/33 | 6.79 | C | PCB-41 | [0.59] | J EMPC | PCB-78 | (0.186) | |
| PCB-8 | 4.87 | | PCB-22 | 3.06 | | PCB-71/40 | 5.46 | C | PCB-81 | (0.184) | |
| PCB-14 | (0.399) | | PCB-36 | [0.507] | J EMPC | PCB-64 | 3.96 | | PCB-77 | 1.38 | |
| PCB-11 | 18 | B | PCB-39 | (0.268) | | | | | | | |
| PCB-13/12 | 0.706 | J C | PCB-38 | (0.301) | | | | | | | |
| PCB-15 | 1.31 | | PCB-35 | 0.592 | J | | | | | | |
| | | | PCB-37 | [2.01] | EMPC | | | | | | |
| **Conc.** | 28.9 | | **Conc.** | 47.5 | | | | | **Conc.** | 107 | |
| **EMPC** | 28.9 | | **EMPC** | 61.2 | | | | | **EMPC** | 110 | |


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| Totals | Conc. | EMPC |
|---|---|---|
| Mono-Tri | 79 | 92.8 |
| Tetra-Hexa | 557 | 573 |
| Hepta-Deca | 105 | 105 |
| Mono-Deca | 741 | 771 |

# Sample ID: LPRBG-GDST-Comp01 (EQUALIZED) Method 1668B

| Penta | Conc. | Qualifiers | Penta | Conc. | Qualifiers | Hexa | Conc. | Qualifiers | Hexa | Conc. | Qualifiers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PCB-104 | (0.122) | | PCB-109/119/86… | 14.3 | C | PCB-155 | 0.334 | J | PCB-165 | (0.15) | |
| PCB-96 | 0.185 | J | PCB-117 | 0.552 | J | PCB-152 | (0.121) | | PCB-146 | 26.1 | |
| PCB-103 | 0.646 | J | PCB-116/85 | 3.65 | C | PCB-150 | 0.63 | J | PCB-161 | (0.15) | |
| PCB-94 | (0.335) | | PCB-110 | 22.6 | | PCB-136 | 4.23 | | PCB-153/168 | 80.6 | C |
| PCB-95 | 18.7 | | PCB-115 | (0.249) | | PCB-145 | (0.12) | | PCB-141 | (0.172) | |
| PCB-100/93 | 0.69 | J C | PCB-82 | 1.16 | | PCB-148 | [0.821] | J EMPC | PCB-130 | [2.72] | EMPC |
| PCB-102 | 1.3 | | PCB-111 | (0.231) | | PCB-151/135 | 21.6 | C | PCB-137 | (0.195) | |
| PCB-98 | (0.394) | | PCB-120 | [0.803] | J EMPC | PCB-154 | 5.28 | | PCB-164 | 1.51 | |
| PCB-88 | (0.398) | | PCB-108/124 | 1.08 | J C | PCB-144 | (0.19) | | PCB-163/138/129 | 60.5 | C |
| PCB-91 | 2.6 | | PCB-107 | 4.12 | | PCB-147/149 | 45.4 | C | PCB-160 | (0.151) | |
| PCB-84 | 3.26 | | PCB-123 | [0.573] | J EMPC | PCB-134 | [1.68] | EMPC | PCB-158 | (0.133) | |
| PCB-89 | (0.35) | | PCB-106 | (0.258) | | PCB-143 | (0.204) | | PCB-128/166 | 5.43 | C |
| PCB-121 | (0.225) | | PCB-118 | 36.1 | | PCB-139/140 | [0.348] | J EMPC C | PCB-159 | (0.247) | |
| PCB-92 | 7.22 | | PCB-122 | (0.306) | | PCB-131 | (0.212) | | PCB-162 | 0.566 | J |
| PCB-113/90/101 | 38.3 | C | PCB-114 | (0.282) | | PCB-142 | (0.221) | | PCB-167 | 2.81 | |
| PCB-83 | [1.7] | EMPC | PCB-105 | 7.65 | | PCB-132 | 6.93 | | PCB-156/157 | 0.966 | J C |
| PCB-99 | 23.4 | | PCB-127 | (0.274) | | PCB-133 | [3.67] | EMPC | PCB-169 | (0.273) | |
| PCB-112 | (0.231) | | PCB-126 | (0.277) | | | | | | | |
| | | | **Conc.** | 188 | | | | | **Conc.** | 263 | |
| | | | **EMPC** | 191 | | | | | **EMPC** | 272 | |

| Hepta | Conc. | Qualifiers | Hepta | Conc. | Qualifiers | Octa | Conc. | Qualifiers | Nona | Conc. | Qualifiers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PCB-188 | 1.35 | | PCB-174 | (0.339) | | PCB-202 | 10.5 | | PCB-208 | (0.574) | |
| PCB-179 | 6.3 | | PCB-177 | 11.6 | | PCB-201 | (0.123) | | PCB-207 | (0.601) | |
| PCB-184 | (0.104) | | PCB-181 | (0.334) | | PCB-204 | (0.114) | | PCB-206 | (0.788) | |
| PCB-176 | (0.11) | | PCB-171/173 | (0.384) | C | PCB-197 | (0.107) | | | | |
| PCB-186 | (0.112) | | PCB-172 | (0.381) | | PCB-200 | (0.136) | | **Conc.** | 0 | |
| PCB-178 | 10.4 | | PCB-192 | (0.265) | | PCB-198/199 | (0.16) | C | **EMPC** | 0 | |
| PCB-175 | (0.365) | | PCB-180/193 | 4.84 | C | PCB-196 | (0.155) | | | | |
| PCB-187 | 60.3 | | PCB-191 | (0.278) | | PCB-203 | (0.133) | | **Deca** | **Conc.** | **Qualifiers** |
| PCB-182 | (0.344) | | PCB-170 | (0.286) | | PCB-195 | (0.941) | | PCB-209 | (0.374) | |
| PCB-183 | (0.345) | | PCB-190 | (0.222) | | PCB-194 | (0.856) | | | | |
| PCB-185 | (0.375) | | PCB-189 | (0.389) | | PCB-205 | (0.545) | | | | |
| | | | **Conc.** | 94.7 | | **Conc.** | 10.5 | | | | |
| | | | **EMPC** | 94.7 | | **EMPC** | 10.5 | | | | |

# Sample ID: LPR2-GDST-Comp02 (EQUALIZED) Method 1668B

| Client Data | | Sample Data | | Laboratory Data | | | |
|---|---|---|---|---|---|---|---|
| Name: | Windward Environmental, LLC | Matrix: | Tissue | Project No.: | A3406 | Date Received: | 02-Aug-2011 |
| Project ID: | Passaic RI/FS Caged Bivalve Study | Weight/Volume: | 10.13 g | Sample ID: | A3406_8929_PCB_009 | Date Extracted: | 15-Aug-2011 |
| Date Collected: | 09-May-2011 | | | QC Batch No.: | 8929 | Date Analyzed: | 23-Aug-2011 |

| Analyte | Conc. | DL | EMPC | Qualifier | Standard | Recovery |
|---|---|---|---|---|---|---|
| | pg/g | pg/g | pg/g | | | % |
| PCB-77 33'44'-TeCB | 18.3 | | | | ES PCB-1 | 82.1 |
| PCB-81 344'5-TeCB | 0.734 | | | J | ES PCB-3 | 89.2 |
| PCB-105 233'44'-PeCB | 59.1 | | | | ES PCB-4 | 101 |
| PCB-114 2344'5-PeCB | 3.07 | | | | ES PCB-15 | 116 V |
| PCB-118 23'44'5-PeCB | 154 | | | | ES PCB-19 | 103 |
| PCB-123 23'44'5'-PeCB | EMPC | | 2.82 | | ES PCB-37 | 104 |
| PCB-126 33'44'5-PeCB | 0.383 | | | J | ES PCB-54 | 91.1 |
| PCB-156/157 233'44'5/233'44'5'-HxCB | 6.71 | | | C | ES PCB-77 | 114 V |
| PCB-167 23'44'55'-HxCB | 5.16 | | | | ES PCB-81 | 111 |
| PCB-169 33'44'55'-HxCB | ND | 0.204 | | | ES PCB-104 | 98.3 |
| PCB-189 233'44'55'-HpCB | 0.431 | | | J | ES PCB-105 | 103 |
| | | | | | ES PCB-114 | 99.3 |
| **TEQs (WHO M/H)** | | | | | ES PCB-118 | 105 |
| | | | | | ES PCB-123 | 107 |
| ND = 0 | 0.0473 | | 0.0473 | | ES PCB-126 | 99.5 |
| ND = 0.5 x DL | 0.0503 | | 0.0504 | | ES PCB-153 | 98.3 |
| | | | | | ES PCB-155 | 89.6 |
| **Totals** | | | | | ES PCB-156/157 | 84.6 |
| | | | | | ES PCB-167 | 84.7 |
| Mono-CBs | 12.5 | | | | ES PCB-169 | 87.8 |
| Di-CBs | 260 | | | | ES PCB-170 | 81.3 |
| Tri-CBs | 1,900 | | 1,900 | | ES PCB-180 | 80.8 |
| Tetra-CBs | 2,760 | | 2,770 | | ES PCB-188 | 98.1 |
| Penta-CBs | 1,430 | | 1,440 | | ES PCB-189 | 95.2 |
| Hexa-CBs | 827 | | 829 | | ES PCB-202 | 87.7 |
| Hepta-CBs | 209 | | | | ES PCB-205 | 99.3 |
| Octa-CBs | 18.7 | | 21.5 | | ES PCB-206 | 97.1 |
| Nona-CBs | | | 1.43 | | ES PCB-208 | 94.1 |
| Deca-CB | 1.13 | | | | ES PCB-209 | 93.9 |
| | | | | | CS PCB-28 | 124 |
| Mono-Deca | 7,420 | | 7,440 | | CS PCB-111 | 102 |
| | | | | | CS PCB-178 | 105 |

Checkcode: 325-779-TCJ AP PCB 2011 Rev. A Report Created: 31-Aug-2011 17:59 Analyst: LB

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# Sample ID: LPR2-GDST-Comp02 (EQUALIZED) Method 1668B

| Client Data | | Sample Data | | Laboratory Data | | | |
|---|---|---|---|---|---|---|---|
| Name: | Windward Environmental, LLC | Matrix: | Tissue | Project No.: | A3406 | Date Received: | 02-Aug-2011 |
| Project ID: | Passaic RI/FS Caged Bivalve Study | Weight/Volume: | 10.13 g | Sample ID: | A3406_8929_PCB_009 | Date Extracted: | 15-Aug-2011 |
| Date Collected: | 09-May-2011 | | | QC Batch No.: | 8929 | Date Analyzed: | 23-Aug-2011 |
| | | Units | pg/g | Checkcode: | 325-779-TCJ | Time Analyzed: | 02:00:04 |

| Mono | Conc. | Qualifiers | Tri | Conc. | Qualifiers | Tetra | Conc. | Qualifiers | Tetra | Conc. | Qualifiers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PCB-1 | 8.5 | | PCB-19 | 37.6 | | PCB-54 | 10.7 | | PCB-72 | 4.85 | |
| PCB-2 | 2.03 | | PCB-30/18 | 250 | C | PCB-50/53 | 103 | C | PCB-68 | [2.74] | EMPC |
| PCB-3 | 1.95 | | PCB-17 | 159 | | PCB-45 | 44.7 | | PCB-57 | 1.85 | |
| | | | PCB-27 | 41.5 | | PCB-51 | 94 | | PCB-58 | 1.16 | |
| **Conc.** | 12.5 | | PCB-24 | 3.94 | | PCB-46 | 30.3 | | PCB-67 | 9.92 | |
| **EMPC** | 12.5 | | PCB-16 | 108 | | PCB-52 | 422 | | PCB-63 | 11.1 | |
| | | | PCB-32 | 137 | | PCB-73 | 2.98 | | PCB-61/70/74/76 | 390 | C |
| **Di** | **Conc.** | **Qualifiers** | PCB-34 | 3.74 | | PCB-43 | 13.4 | | PCB-66 | 224 | |
| PCB-4 | 63.7 | | PCB-23 | [0.358] | J EMPC | PCB-69/49 | 278 | C | PCB-55 | [3.06] | EMPC |
| PCB-10 | 6.25 | | PCB-26/29 | 91.1 | C | PCB-48 | 63.6 | | PCB-56 | 106 | |
| PCB-9 | 4.34 | | PCB-25 | 58.5 | | PCB-44/47/65 | 413 | C | PCB-60 | 39 | |
| PCB-7 | 2.36 | | PCB-31 | 327 | | PCB-59/62/75 | 34.1 | C | PCB-80 | (0.224) | |
| PCB-6 | 24.8 | | PCB-28/20 | 405 | C | PCB-42 | 107 | | PCB-79 | 2.48 | |
| PCB-5 | 1.07 | | PCB-21/33 | 110 | C | PCB-41 | 18.2 | | PCB-78 | (0.274) | |
| PCB-8 | 50.4 | | PCB-22 | 98.9 | | PCB-71/40 | 171 | C | PCB-81 | 0.734 | J |
| PCB-14 | (0.324) | | PCB-36 | 0.64 | J | PCB-64 | 145 | | PCB-77 | 18.3 | |
| PCB-11 | 51.7 | | PCB-39 | 2.39 | | | | | | | |
| PCB-13/12 | 11.3 | C | PCB-38 | (0.24) | | | | | | | |
| PCB-15 | 44.1 | | PCB-35 | 5.25 | | | | | | | |
| | | | PCB-37 | 62.4 | | | | | | | |
| **Conc.** | 260 | | **Conc.** | 1,900 | | | | | **Conc.** | 2,760 | |
| **EMPC** | 260 | | **EMPC** | 1,900 | | | | | **EMPC** | 2,770 | |

| Totals | Conc. | EMPC |
|---|---|---|
| Mono-Tri | 2,170 | 2,170 |
| Tetra-Hexa | 5,020 | 5,030 |
| Hepta-Deca | 229 | 233 |
| Mono-Deca | 7,420 | 7,440 |

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# Sample ID: LPR2-GDST-Comp02 (EQUALIZED) Method 1668B

| Penta | Conc. | Qualifiers | Penta | Conc. | Qualifiers | Hexa | Conc. | Qualifiers | Hexa | Conc. | Qualifiers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PCB-104 | 2.34 | | PCB-109/119/86… | 141 | C | PCB-155 | 2.03 | | PCB-165 | (0.104) | |
| PCB-96 | 4.82 | | PCB-117 | 6.77 | | PCB-152 | 0.845 | J | PCB-146 | 38.4 | |
| PCB-103 | 7.87 | | PCB-116/85 | 35.4 | C | PCB-150 | 1.28 | | PCB-161 | (0.104) | |
| PCB-94 | 5.77 | | PCB-110 | 209 | | PCB-136 | 31 | | PCB-153/168 | 151 | C |
| PCB-95 | 200 | | PCB-115 | 1.62 | | PCB-145 | (0.0885) | | PCB-141 | 6.72 | |
| PCB-100/93 | 16.6 | C | PCB-82 | 27.7 | | PCB-148 | 1.4 | | PCB-130 | 10.3 | |
| PCB-102 | 15.2 | | PCB-111 | (0.456) | | PCB-151/135 | 89.7 | C | PCB-137 | 4.12 | |
| PCB-98 | (0.779) | | PCB-120 | 1.19 | | PCB-154 | 7.3 | | PCB-164 | 9.24 | |
| PCB-88 | (0.786) | | PCB-108/124 | 6.3 | C | PCB-144 | 2.24 | | PCB-163/138/129 | 177 | C |
| PCB-91 | 37.3 | | PCB-107 | 12.4 | | PCB-147/149 | 183 | C | PCB-160 | (0.104) | |
| PCB-84 | 67.2 | | PCB-123 | [2.82] | EMPC | PCB-134 | 11.7 | | PCB-158 | 4.89 | |
| PCB-89 | 3.82 | | PCB-106 | (0.51) | | PCB-143 | (0.141) | | PCB-128/166 | 21.6 | C |
| PCB-121 | (0.443) | | PCB-118 | 154 | | PCB-139/140 | 1.95 | J C | PCB-159 | (0.184) | |
| PCB-92 | 49.3 | | PCB-122 | [2.28] | EMPC | PCB-131 | [0.796] | J EMPC | PCB-162 | [0.752] | J EMPC |
| PCB-113/90/101 | 232 | C | PCB-114 | 3.07 | | PCB-142 | (0.153) | | PCB-167 | 5.16 | |
| PCB-83 | 15.5 | | PCB-105 | 59.1 | | PCB-132 | 54 | | PCB-156/157 | 6.71 | C |
| PCB-99 | 112 | | PCB-127 | (0.514) | | PCB-133 | 5.52 | | PCB-169 | (0.204) | |
| PCB-112 | [1.72] | EMPC | PCB-126 | 0.383 | J | | | | | | |
| | | | **Conc.** | 1,430 | | | | | **Conc.** | 827 | |
| | | | **EMPC** | 1,440 | | | | | **EMPC** | 829 | |

| Hepta | Conc. | Qualifiers | Hepta | Conc. | Qualifiers | Octa | Conc. | Qualifiers | Nona | Conc. | Qualifiers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PCB-188 | 0.695 | J | PCB-174 | 9.75 | | PCB-202 | 7.54 | | PCB-208 | (0.573) | |
| PCB-179 | 17.1 | | PCB-177 | 25 | | PCB-201 | [0.449] | J EMPC | PCB-207 | (0.601) | |
| PCB-184 | (0.112) | | PCB-181 | (0.297) | | PCB-204 | (0.0824) | | PCB-206 | [1.43] | EMPC |
| PCB-176 | 1.43 | | PCB-171/173 | 3.82 | C | PCB-197 | [0.157] | J EMPC | | | |
| PCB-186 | (0.12) | | PCB-172 | 3.2 | | PCB-200 | 0.238 | J | **Conc.** | 0 | |
| PCB-178 | 12.2 | | PCB-192 | (0.236) | | PCB-198/199 | 4.28 | C | **EMPC** | 1.43 | |
| PCB-175 | (0.324) | | PCB-180/193 | 33 | C | PCB-196 | [1.03] | EMPC | | | |
| PCB-187 | 82.3 | | PCB-191 | (0.246) | | PCB-203 | 1.96 | | **Deca** | **Conc.** | **Qualifiers** |
| PCB-182 | (0.306) | | PCB-170 | 11.4 | | PCB-195 | [1.16] | EMPC | PCB-209 | 1.13 | |
| PCB-183 | 6.98 | | PCB-190 | 1.58 | | PCB-194 | 4.7 | | | | |
| PCB-185 | (0.333) | | PCB-189 | 0.431 | J | PCB-205 | (0.241) | | | | |
| | | | **Conc.** | 209 | | **Conc.** | 18.7 | | | | |
| | | | **EMPC** | 209 | | **EMPC** | 21.5 | | | | |

# Sample ID: LPR3-GDST-Comp03 (EQUALIZED) Method 1668B

| Client Data | | Sample Data | | Laboratory Data | | | |
|---|---|---|---|---|---|---|---|
| Name: | Windward Environmental, LLC | Matrix: | Tissue | Project No.: | A3406 | Date Received: | 02-Aug-2011 |
| Project ID: | Passaic RI/FS Caged Bivalve Study | Weight/Volume: | 10.09 g | Sample ID: | A3406_8929_PCB_010 | Date Extracted: | 15-Aug-2011 |
| Date Collected: | 09-May-2011 | | | QC Batch No.: | 8929 | Date Analyzed: | 23-Aug-2011 |

| Analyte | Conc. | DL | EMPC | Qualifier | Standard | Recovery |
|---|---|---|---|---|---|---|
| | pg/g | pg/g | pg/g | | | % |
| PCB-77 33'44'-TeCB | 5.7 | | | | ES PCB-1 | 94.8 |
| PCB-81 344'5-TeCB | ND | 0.395 | | | ES PCB-3 | 97.2 |
| PCB-105 233'44'-PeCB | 19.4 | | | | ES PCB-4 | 102 |
| PCB-114 2344'5-PeCB | EMPC | | 0.994 | | ES PCB-15 | 96.1 |
| PCB-118 23'44'5-PeCB | 56.2 | | | | ES PCB-19 | 92.3 |
| PCB-123 23'44'5'-PeCB | 1.02 | | | | ES PCB-37 | 97.4 |
| PCB-126 33'44'5-PeCB | ND | 0.619 | | | ES PCB-54 | 82.8 |
| PCB-156/157 233'44'5/233'44'5'-HxCB | 3.47 | | | C | ES PCB-77 | 105 |
| PCB-167 23'44'55'-HxCB | 2.59 | | | | ES PCB-81 | 102 |
| PCB-169 33'44'55'-HxCB | ND | 0.372 | | | ES PCB-104 | 90.9 |
| PCB-189 233'44'55'-HpCB | ND | 0.407 | | | ES PCB-105 | 106 |
| | | | | | ES PCB-114 | 102 |
| **TEQs (WHO M/H)** | | | | | ES PCB-118 | 108 |
| | | | | | ES PCB-123 | 111 |
| ND = 0 | 0.00305 | | 0.00308 | | ES PCB-126 | 104 |
| ND = 0.5 x DL | 0.0396 | | 0.0397 | | ES PCB-153 | 93.4 |
| | | | | | ES PCB-155 | 82.1 |
| **Totals** | | | | | ES PCB-156/157 | 93.6 |
| | | | | | ES PCB-167 | 92.3 |
| Mono-CBs | 5.31 | | 6.81 | | ES PCB-169 | 102 |
| Di-CBs | 122 | | | | ES PCB-170 | 96.6 |
| Tri-CBs | 690 | | 693 | | ES PCB-180 | 92.2 |
| Tetra-CBs | 862 | | 864 | | ES PCB-188 | 92.1 |
| Penta-CBs | 431 | | 439 | | ES PCB-189 | 101 |
| Hexa-CBs | 355 | | 362 | | ES PCB-202 | 89.2 |
| Hepta-CBs | 108 | | 112 | | ES PCB-205 | 104 |
| Octa-CBs | 13.7 | | 20.2 | | ES PCB-206 | 101 |
| Nona-CBs | 1.7 | | | | ES PCB-208 | 95.6 |
| Deca-CB | 1.3 | | | | ES PCB-209 | 95 |
| | | | | | CS PCB-28 | 118 |
| Mono-Deca | 2,590 | | 2,620 | | CS PCB-111 | 103 |
| | | | | | CS PCB-178 | 102 |

Checkcode: 674-686-WWN AP PCB 2011 Rev. A Report Created: 31-Aug-2011 17:59 Analyst: LB

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# Sample ID: LPR3-GDST-Comp03 (EQUALIZED) Method 1668B

| Client Data | | Sample Data | | Laboratory Data | | | |
|---|---|---|---|---|---|---|---|
| Name: | Windward Environmental, LLC | Matrix: | Tissue | Project No.: | A3406 | Date Received: | 02-Aug-2011 |
| Project ID: | Passaic RI/FS Caged Bivalve Study | Weight/Volume: | 10.09 g | Sample ID: | A3406_8929_PCB_010 | Date Extracted: | 15-Aug-2011 |
| Date Collected: | 09-May-2011 | | | QC Batch No.: | 8929 | Date Analyzed: | 23-Aug-2011 |
| | | Units | pg/g | Checkcode: | 674-686-WWN | Time Analyzed: | 02:55:07 |

| Mono | Conc. | Qualifiers | Tri | Conc. | Qualifiers | Tetra | Conc. | Qualifiers | Tetra | Conc. | Qualifiers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PCB-1 | 4.02 | | PCB-19 | 16 | | PCB-54 | 4.95 | | PCB-72 | [1.21] | EMPC |
| PCB-2 | [1.49] | EMPC | PCB-30/18 | 89.9 | C | PCB-50/53 | 36.5 | C | PCB-68 | 1.05 | |
| PCB-3 | 1.3 | | PCB-17 | 60.1 | | PCB-45 | 14.2 | | PCB-57 | (0.399) | |
| | | | PCB-27 | 13.6 | | PCB-51 | 36.9 | | PCB-58 | (0.373) | |
| **Conc.** | 5.31 | | PCB-24 | 1.68 | | PCB-46 | 9.32 | | PCB-67 | 3.12 | |
| **EMPC** | 6.81 | | PCB-16 | 41.2 | | PCB-52 | 135 | | PCB-63 | 3.26 | |
| | | | PCB-32 | 46.9 | | PCB-73 | 1.2 | | PCB-61/70/74/76 | 119 | C |
| **Di** | **Conc.** | **Qualifiers** | PCB-34 | [1.17] | EMPC | PCB-43 | 3.96 | | PCB-66 | 67.4 | |
| PCB-4 | 27.5 | | PCB-23 | (0.274) | | PCB-69/49 | 88 | C | PCB-55 | 1.12 | |
| PCB-10 | 2.48 | | PCB-26/29 | 30.3 | C | PCB-48 | 20.3 | | PCB-56 | 29 | |
| PCB-9 | 2.24 | | PCB-25 | 19.9 | | PCB-44/47/65 | 126 | C | PCB-60 | 11 | |
| PCB-7 | 1.26 | | PCB-31 | 116 | | PCB-59/62/75 | 10.7 | C | PCB-80 | (0.326) | |
| PCB-6 | 10.9 | | PCB-28/20 | 152 | C | PCB-42 | 29.5 | | PCB-79 | [0.621] | J EMPC |
| PCB-5 | (0.626) | | PCB-21/33 | 41.6 | C | PCB-41 | 6.48 | | PCB-78 | (0.4) | |
| PCB-8 | 28.2 | | PCB-22 | 35.3 | | PCB-71/40 | 53.4 | C | PCB-81 | (0.395) | |
| PCB-14 | (0.614) | | PCB-36 | (0.269) | | PCB-64 | 44.7 | | PCB-77 | 5.7 | |
| PCB-11 | 24.4 | B | PCB-39 | 0.941 | J | | | | | | |
| PCB-13/12 | 4.79 | C | PCB-38 | (0.278) | | | | | | | |
| PCB-15 | 20.5 | | PCB-35 | [2.05] | EMPC | | | | | | |
| | | | PCB-37 | 24.8 | | | | | | | |
| **Conc.** | 122 | | **Conc.** | 690 | | | | | **Conc.** | 862 | |
| **EMPC** | 122 | | **EMPC** | 693 | | | | | **EMPC** | 864 | |


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| Totals | Conc. | EMPC |
|---|---|---|
| Mono-Tri | 817 | 822 |
| Tetra-Hexa | 1,650 | 1,670 |
| Hepta-Deca | 125 | 135 |
| Mono-Deca | 2,590 | 2,620 |

# Sample ID: LPR3-GDST-Comp03 (EQUALIZED) Method 1668B

| Penta | Conc. | Qualifiers | Penta | Conc. | Qualifiers | Hexa | Conc. | Qualifiers | Hexa | Conc. | Qualifiers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PCB-104 | [0.876] | J EMPC | PCB-109/119/86… | 41.3 | C | PCB-155 | 0.706 | J | PCB-165 | (0.248) | |
| PCB-96 | [1.59] | EMPC | PCB-117 | 1.85 | | PCB-152 | (0.206) | | PCB-146 | 23.5 | |
| PCB-103 | 2.84 | | PCB-116/85 | 10.3 | C | PCB-150 | (0.194) | | PCB-161 | (0.248) | |
| PCB-94 | 1.71 | | PCB-110 | 58.9 | | PCB-136 | 9.63 | | PCB-153/168 | 82.5 | C |
| PCB-95 | 60.4 | | PCB-115 | 1.23 | | PCB-145 | (0.205) | | PCB-141 | 5.1 | |
| PCB-100/93 | 4.73 | C | PCB-82 | 7.52 | | PCB-148 | (0.314) | | PCB-130 | [3.69] | EMPC |
| PCB-102 | 4.85 | | PCB-111 | (0.362) | | PCB-151/135 | 32.8 | C | PCB-137 | 1.77 | |
| PCB-98 | (0.619) | | PCB-120 | (0.369) | | PCB-154 | 4.73 | | PCB-164 | 3.24 | |
| PCB-88 | (0.624) | | PCB-108/124 | 2.27 | C | PCB-144 | 1.51 | | PCB-163/138/129 | 80.5 | C |
| PCB-91 | 10.3 | | PCB-107 | 4.95 | | PCB-147/149 | 68.5 | C | PCB-160 | (0.25) | |
| PCB-84 | 17.1 | | PCB-123 | 1.02 | | PCB-134 | 3.78 | | PCB-158 | [2.94] | EMPC |
| PCB-89 | (0.55) | | PCB-106 | (0.405) | | PCB-143 | (0.338) | | PCB-128/166 | 8.87 | C |
| PCB-121 | (0.352) | | PCB-118 | 56.2 | | PCB-139/140 | (0.3) | C | PCB-159 | (0.381) | |
| PCB-92 | 14 | | PCB-122 | [0.664] | J EMPC | PCB-131 | (0.352) | | PCB-162 | (0.341) | |
| PCB-113/90/101 | 71.3 | C | PCB-114 | [0.994] | EMPC | PCB-142 | (0.367) | | PCB-167 | 2.59 | |
| PCB-83 | [3.67] | EMPC | PCB-105 | 19.4 | | PCB-132 | 18.8 | | PCB-156/157 | 3.47 | C |
| PCB-99 | 39 | | PCB-127 | (0.428) | | PCB-133 | 3.32 | | PCB-169 | (0.372) | |
| PCB-112 | (0.362) | | PCB-126 | (0.619) | | | | | | | |
| | | | **Conc.** | 431 | | | | | **Conc.** | 355 | |
| | | | **EMPC** | 439 | | | | | **EMPC** | 362 | |

| Hepta | Conc. | Qualifiers | Hepta | Conc. | Qualifiers | Octa | Conc. | Qualifiers | Nona | Conc. | Qualifiers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PCB-188 | 0.738 | J | PCB-174 | 6.76 | | PCB-202 | 7.96 | | PCB-208 | (1.21) | |
| PCB-179 | 7.8 | | PCB-177 | 10.4 | | PCB-201 | (0.322) | | PCB-207 | (1.27) | |
| PCB-184 | (0.212) | | PCB-181 | (0.455) | | PCB-204 | (0.299) | | PCB-206 | 1.7 | |
| PCB-176 | [0.718] | J EMPC | PCB-171/173 | [1.87] | J EMPC C | PCB-197 | (0.279) | | | | |
| PCB-186 | (0.226) | | PCB-172 | [1.65] | EMPC | PCB-200 | (0.354) | | **Conc.** | 1.7 | |
| PCB-178 | 8.2 | | PCB-192 | (0.362) | | PCB-198/199 | 4.14 | C | **EMPC** | 1.7 | |
| PCB-175 | (0.497) | | PCB-180/193 | 16.4 | C | PCB-196 | 1.56 | | | | |
| PCB-187 | 46.8 | | PCB-191 | (0.378) | | PCB-203 | [1.76] | EMPC | **Deca** | **Conc.** | **Qualifiers** |
| PCB-182 | (0.469) | | PCB-170 | 5.87 | | PCB-195 | [1.66] | EMPC | PCB-209 | 1.3 | |
| PCB-183 | 4.88 | | PCB-190 | (0.344) | | PCB-194 | [3.11] | EMPC | | | |
| PCB-185 | (0.511) | | PCB-189 | (0.407) | | PCB-205 | (0.644) | | | | |
| | | | **Conc.** | 108 | | **Conc.** | 13.7 | | | | |
| | | | **EMPC** | 112 | | **EMPC** | 20.2 | | | | |

# Sample ID: CARP2 SRM (EQUALIZED) — Method 1668B

| Client Data | | Sample Data | | Laboratory Data | | | |
|---|---|---|---|---|---|---|---|
| Name: | Windward Environmental, LLC | Matrix: | Tissue | Project No.: | A3406 | Date Received: | n/a |
| Project ID: | Passaic RI/FS Caged Bivalve Study | Weight/Volume: | 10.78 g | Sample ID: | A3406_8929_PCB_011-sp10 | Date Extracted: | 15-Aug-2011 |
| Date Collected: | n/a | | | QC Batch No.: | 8929 | Date Analyzed: | 23-Aug-2011 |

| Analyte | Conc. | DL | EMPC | Qualifier | Standard | Recovery |
|---|---|---|---|---|---|---|
| | pg/g | pg/g | pg/g | | | % |
| PCB-77 33'44'-TeCB | 1,470 | | | | ES PCB-1 | 74.2 |
| PCB-81 344'5-TeCB | 195 | | | | ES PCB-3 | 76.5 |
| PCB-105 233'44'-PeCB | 60,800 | | | E | ES PCB-4 | 82.2 |
| PCB-114 2344'5-PeCB | 5,640 | | | E | ES PCB-15 | 102 |
| PCB-118 23'44'5-PeCB | 143,000 | | | E | ES PCB-19 | 81.7 |
| PCB-123 23'44'5'-PeCB | 4,480 | | | E | ES PCB-37 | 95.8 |
| PCB-126 33'44'5-PeCB | 455 | | | | ES PCB-54 | 74.8 |
| PCB-156/157 233'44'5/233'44'5'-HxCB | 11,500 | | | E C | ES PCB-77 | 101 |
| PCB-167 23'44'55'-HxCB | 5,090 | | | E | ES PCB-81 | 96.5 |
| PCB-169 33'44'55'-HxCB | 179 | | | | ES PCB-104 | 74.1 |
| PCB-189 233'44'55'-HpCB | 1,070 | | | | ES PCB-105 | 89.5 |
| | | | | | ES PCB-114 | 86.9 |
| **TEQs (WHO M/H)** | | | | | ES PCB-118 | 90.8 |
| | | | | | ES PCB-123 | 84.2 |
| ND = 0 | 58 | | 58 | | ES PCB-126 | 83.2 |
| ND = 0.5 x DL | 58 | | 58 | | ES PCB-153 | 85.7 |
| | | | | | ES PCB-155 | 79.5 |
| **Totals** | | | | | ES PCB-156/157 | 87.1 |
| | | | | | ES PCB-167 | 85.7 |
| Mono-CBs | 452 | | | | ES PCB-169 | 84.3 |
| Di-CBs | 17,300 | | | | ES PCB-170 | 85.8 |
| Tri-CBs | 211,000 | | | | ES PCB-180 | 86.2 |
| Tetra-CBs | 949,000 | | | | ES PCB-188 | 69.8 |
| Penta-CBs | 1,040,000 | | 1,040,000 | | ES PCB-189 | 85.6 |
| Hexa-CBs | 489,000 | | | | ES PCB-202 | 74.5 |
| Hepta-CBs | 211,000 | | | | ES PCB-205 | 82.8 |
| Octa-CBs | 55,300 | | | | ES PCB-206 | 160 V |
| Nona-CBs | 5,310 | | | | ES PCB-208 | 77 |
| Deca-CB | 5,520 | | | E | ES PCB-209 | 75 |
| | | | | | CS PCB-28 | 118 |
| Mono-Deca | 2,980,000 | | 2,980,000 | | CS PCB-111 | 99.2 |
| | | | | | CS PCB-178 | 93.7 |

Checkcode: 457-533-TJP AP PCB 2011 Rev. A Report Created: 29-Aug-2011 17:07 Analyst: LB

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# Sample ID: CARP2 SRM (EQUALIZED) Method 1668B

| Client Data | | Sample Data | | Laboratory Data | | | |
|---|---|---|---|---|---|---|---|
| Name: | Windward Environmental, LLC | Matrix: | Tissue | Project No.: | A3406 | Date Received: | n/a |
| Project ID: | Passaic RI/FS Caged Bivalve Study | Weight/Volume: | 10.78 g | Sample ID: | A3406_8929_PCB_011-sp10 | Date Extracted: | 15-Aug-2011 |
| Date Collected: | n/a | | | QC Batch No.: | 8929 | Date Analyzed: | 23-Aug-2011 |
| | | Units | pg/g | Checkcode: | 457-533-TJP | Time Analyzed: | 12:22:56 |

| Mono | Conc. | Qualifiers | Tri | Conc. | Qualifiers | Tetra | Conc. | Qualifiers | Tetra | Conc. | Qualifiers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PCB-1 | 396 | | PCB-19 | 3,300 | | PCB-54 | 111 | | PCB-72 | 2,840 | |
| PCB-2 | 13.9 | | PCB-30/18 | 33,300 | E C | PCB-50/53 | 11,400 | E C | PCB-68 | 1,710 | |
| PCB-3 | 42.5 | | PCB-17 | 13,600 | E | PCB-45 | 10,500 | E | PCB-57 | 868 | |
| | | | PCB-27 | 4,190 | E | PCB-51 | 3,190 | | PCB-58 | 772 | |
| **Conc.** | 452 | | PCB-24 | 219 | | PCB-46 | 2,930 | | PCB-67 | 751 | |
| **EMPC** | 452 | | PCB-16 | 4,630 | E | PCB-52 | 150,000 | E | PCB-63 | 10,100 | E |
| | | | PCB-32 | 17,300 | E | PCB-73 | 510 | | PCB-61/70/74/76 | 123,000 | E C |
| **Di** | **Conc.** | **Qualifiers** | PCB-34 | 988 | | PCB-43 | 4,710 | E | PCB-66 | 146,000 | E |
| PCB-4 | 7,180 | E | PCB-23 | (7.57) | | PCB-69/49 | 123,000 | E C | PCB-55 | 408 | |
| PCB-10 | 243 | | PCB-26/29 | 30,600 | E C | PCB-48 | 12,200 | E | PCB-56 | 19,500 | E |
| PCB-9 | 334 | | PCB-25 | 9,680 | E | PCB-44/47/65 | 137,000 | E C | PCB-60 | 25,500 | E |
| PCB-7 | 149 | | PCB-31 | 38,500 | E | PCB-59/62/75 | 11,700 | E C | PCB-80 | (14.3) | |
| PCB-6 | 3,840 | E | PCB-28/20 | 42,700 | E C | PCB-42 | 39,200 | E | PCB-79 | 1,210 | |
| PCB-5 | 18.9 | | PCB-21/33 | 3,920 | C | PCB-41 | 1,540 | | PCB-78 | (17.6) | |
| PCB-8 | 4,750 | E | PCB-22 | 6,390 | E | PCB-71/40 | 48,700 | E C | PCB-81 | 195 | |
| PCB-14 | (5.49) | | PCB-36 | (7.57) | | PCB-64 | 57,400 | E | PCB-77 | 1,470 | |
| PCB-11 | 63.2 | | PCB-39 | 219 | | | | | | | |
| PCB-13/12 | 169 | C | PCB-38 | 107 | | | | | | | |
| PCB-15 | 526 | | PCB-35 | (7.89) | | | | | | | |
| | | | PCB-37 | 883 | | | | | | | |
| **Conc.** | 17,300 | | **Conc.** | 211,000 | | | | | **Conc.** | 949,000 | |
| **EMPC** | 17,300 | | **EMPC** | 211,000 | | | | | **EMPC** | 949,000 | |

| Totals | Conc. | EMPC |
|---|---|---|
| Mono-Tri | 228,000 | 228,000 |
| Tetra-Hexa | 2,480,000 | 2,480,000 |
| Hepta-Deca | 278,000 | 278,000 |
| Mono-Deca | 2,980,000 | 2,980,000 |

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# Sample ID: CARP2 SRM (EQUALIZED) Method 1668B

| Penta | Conc. | Qualifiers | Penta | Conc. | Qualifiers | Hexa | Conc. | Qualifiers | Hexa | Conc. | Qualifiers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PCB-104 | [19.1] | EMPC | PCB-109/119/86… | 120,000 | E C | PCB-155 | 40.5 | | PCB-165 | 315 | |
| PCB-96 | 901 | | PCB-117 | (4.58) | | PCB-152 | 83.1 | | PCB-146 | 22,800 | E |
| PCB-103 | 1,480 | | PCB-116/85 | 55,000 | E C | PCB-150 | 152 | | PCB-161 | (2.98) | |
| PCB-94 | 771 | | PCB-110 | 154,000 | E | PCB-136 | 6,590 | E | PCB-153/168 | 92,700 | E C |
| PCB-95 | 70,500 | E | PCB-115 | (4.32) | | PCB-145 | 34.2 | | PCB-141 | 16,800 | E |
| PCB-100/93 | 2,300 | C | PCB-82 | 25,800 | E | PCB-148 | 270 | | PCB-130 | 10,800 | E |
| PCB-102 | 5,150 | E | PCB-111 | (4.11) | | PCB-151/135 | 28,700 | E C | PCB-137 | 6,500 | E |
| PCB-98 | 292 | | PCB-120 | 909 | | PCB-154 | 1,700 | | PCB-164 | 4,780 | E |
| PCB-88 | (6.42) | | PCB-108/124 | 3,210 | C | PCB-144 | 3,900 | E | PCB-163/138/129 | 140,000 | E C |
| PCB-91 | 27,000 | E | PCB-107 | 14,300 | E | PCB-147/149 | 65,100 | E C | PCB-160 | (2.79) | |
| PCB-84 | 28,900 | E | PCB-123 | 4,480 | E | PCB-134 | 5,440 | E | PCB-158 | 10,600 | E |
| PCB-89 | 2,060 | | PCB-106 | (4.32) | | PCB-143 | 220 | | PCB-128/166 | 21,100 | E C |
| PCB-121 | (4.09) | | PCB-118 | 143,000 | E | PCB-139/140 | 2,420 | C | PCB-159 | 674 | |
| PCB-92 | 31,900 | E | PCB-122 | 1,120 | | PCB-131 | 1,270 | | PCB-162 | 780 | |
| PCB-113/90/101 | 151,000 | E C | PCB-114 | 5,640 | E | PCB-142 | 67.5 | | PCB-167 | 5,090 | E |
| PCB-83 | 11,300 | E | PCB-105 | 60,800 | E | PCB-132 | 26,000 | E | PCB-156/157 | 11,500 | E C |
| PCB-99 | 115,000 | E | PCB-127 | (4.71) | | PCB-133 | 2,930 | | PCB-169 | 179 | |
| PCB-112 | 713 | | PCB-126 | 455 | | | | | | | |
| | | | **Conc.** | 1,040,000 | | | | | **Conc.** | 489,000 | |
| | | | **EMPC** | 1,040,000 | | | | | **EMPC** | 489,000 | |

| Hepta | Conc. | Qualifiers | Hepta | Conc. | Qualifiers | Octa | Conc. | Qualifiers | Nona | Conc. | Qualifiers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PCB-188 | 88.6 | | PCB-174 | 16,700 | E | PCB-202 | 2,430 | | PCB-208 | 1,730 | |
| PCB-179 | 7,470 | E | PCB-177 | 17,300 | E | PCB-201 | 1,360 | | PCB-207 | 1,200 | |
| PCB-184 | 65.5 | | PCB-181 | 275 | | PCB-204 | 41.1 | | PCB-206 | 2,390 | |
| PCB-176 | 2,280 | | PCB-171/173 | 7,980 | E C | PCB-197 | 468 | | | | |
| PCB-186 | (2.58) | | PCB-172 | 6,730 | E | PCB-200 | 1,150 | | **Conc.** | 5,310 | |
| PCB-178 | 7,030 | E | PCB-192 | 78.2 | | PCB-198/199 | 14,400 | E C | **EMPC** | 5,310 | |
| PCB-175 | 1,210 | | PCB-180/193 | 52,800 | E C | PCB-196 | 5,960 | E | | | |
| PCB-187 | 42,500 | E | PCB-191 | 1,010 | | PCB-203 | 7,680 | E | **Deca** | **Conc.** | **Qualifiers** |
| PCB-182 | 357 | | PCB-170 | 20,600 | E | PCB-195 | 5,440 | E | PCB-209 | 5,520 | E |
| PCB-183 | 18,800 | E | PCB-190 | 4,940 | E | PCB-194 | 15,600 | E | | | |
| PCB-185 | 2,170 | | PCB-189 | 1,070 | | PCB-205 | 741 | | | | |
| | | | **Conc.** | 211,000 | | **Conc.** | 55,300 | | | | |
| | | | **EMPC** | 211,000 | | **EMPC** | 55,300 | | | | |

## Sample Summary

ANALYTICAL PERSPECTIVES

**1668B**

| Analyte | Method Blank | LPR6-ECST-Comp01 | LPRBG-ECST-Comp01 | LPR6-ECST-Comp02 | LPR6-ECST-Comp02-DUP | LPR7-ECST-Comp03 | LPR7-ECST-Comp04 | LPR8-ECST-Comp05 | LPR1-GDST-Comp01 | LPRBG-GDST-Comp01 | LPR2-GDST-Comp02 | LPR3-GDST-Comp03 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Conc. pg/g | Conc. pg/g | Conc. pg/g | Conc. pg/g | Conc. pg/g | Conc. pg/g | Conc. pg/g | Conc. pg/g | Conc. pg/g | Conc. pg/g | Conc. pg/g | Conc. pg/g |
| PCB-77 | (0.227) | 61.3 | [0.563] | 77.8 | 87.3 | 91.4 | 53.5 | 46.5 | 46.2 | 1.38 | 18.4 | 5.72 |
| PCB-81 | (0.225) | 2.90 | (0.355) | 3.32 | 3.80 | 3.52 | 2.02 | (0.541) | 1.68 | (0.23) | 0.743 | (0.383) |
| PCB-105 | (0.213) | 209 | 5.50 | 267 | 320 | 321 | 201 | 163 | 175 | 7.55 | 58.9 | 19.3 |
| PCB-114 | (0.211) | 13.1 | (0.376) | 16.3 | 18.7 | 19.7 | 11.7 | 10.3 | 8.29 | (0.267) | 3.06 | [0.99] |
| PCB-118 | (0.209) | 568 | 15.4 | 701 | 860 | 815 | 534 | 415 | 434 | 36.8 | 154 | 56.3 |
| PCB-123 | (0.212) | 11.5 | (0.384) | 13.7 | 16.7 | 16.0 | 10.6 | 9.57 | 10.2 | [0.588] | 3.06 | 1.02 |
| PCB-126 | (0.225) | 1.78 | (0.287) | 2.09 | 2.72 | 2.02 | [1.37] | 1.61 | [0.837] | (0.277) | 0.387 | (0.469) |
| PCB-156/157 | (0.319) | 50.0 | 2.48 | 63.5 | 89.5 | 77.9 | 52.4 | 41.2 | 21.1 | 0.973 | 6.78 | 3.47 |
| PCB-167 | (0.231) | 18.7 | 1.40 | 25.1 | 34.7 | 28.6 | 20.1 | 15.6 | 15.0 | 2.68 | 4.93 | 2.43 |
| PCB-169 | (0.271) | (0.566) | (0.382) | [0.709] | 2.07 | (0.656) | [0.9] | (0.585) | (0.48) | (0.324) | (0.245) | (0.453) |
| PCB-189 | (0.222) | 2.69 | (0.395) | 4.02 | 6.16 | [3.38] | 2.56 | 1.96 | 1.18 | (0.391) | 0.411 | (0.399) |
| Total Mono-CBs | (0.139) | 4.54 | (0.175) | 4.13 | 3.91 | 4.64 | 4.36 | 5.36 | 7.96 | 2.68 | 12.5 | 5.32 |
| Total Di-CBs | 4.49 | 432 | 4.64 | 447 | 448 | 524 | 347 | 340 | 369 | 30.5 | 267 | 121 |
| Total Tri-CBs | 1.78 | 4420 | 7.50 | 4690 | 4890 | 5350 | 3230 | 2890 | 3200 | 37.0 | 1580 | 624 |
| Total Tetra-CBs | 2.1 | 8240 | 22.4 | 9850 | 11300 | 11000 | 6230 | 5730 | 7490 | 130 | 3220 | 975 |
| Total Penta-CBs | 0.729 | 5100 | 93.3 | 5920 | 7800 | 7260 | 4920 | 3980 | 4400 | 209 | 1580 | 464 |
| Total Hexa-CBs | 0.684 | 3110 | 144 | 3890 | 5600 | 4300 | 3160 | 2430 | 2430 | 248 | 812 | 361 |
| Total Hepta-CBs | 0.45 | 1030 | 59.7 | 1470 | 2350 | 1460 | 1050 | 768 | 557 | 91.0 | 204 | 114 |
| Total Octa-CBs | (0.24) | 235 | 24.3 | 337 | 537 | 341 | 266 | 197 | 45.6 | 10.9 | 17.6 | 12.3 |
| Total Nona-CBs | (0.323) | 52.3 | 12.9 | 76.7 | 114 | 79.4 | 80.2 | 61.3 | [1.94] | (0.655) | [1.43] | 1.71 |
| PCB-209 | (0.309) | 31.5 | 10.5 | 43.1 | 67.9 | 45.8 | 51.5 | 40.0 | 1.54 | (0.425) | 1.18 | 1.28 |
| TEQs (WHO 2005 M/H) | | | | | | | | | | | | |
| ND = 0; EMPC = 0 | 0.00 | 0.211 | 0.000744 | 0.250 | 0.385 | 0.250 | 0.0309 | 0.186 | 0.0250 | 0.00158 | 0.0477 | 0.00305 |
| ND = 0; EMPC = EMPC | 0.00 | 0.211 | 0.000801 | 0.271 | 0.385 | 0.251 | 0.195 | 0.186 | 0.109 | 0.00159 | 0.0477 | 0.00308 |
| ND = DL/2; EMPC = 0 | 0.0154 | 0.219 | 0.0209 | 0.258 | 0.385 | 0.260 | 0.0642 | 0.195 | 0.0485 | 0.0203 | 0.0513 | 0.0334 |
| ND = DL/2; EMPC = EMPC | 0.0154 | 0.219 | 0.0210 | 0.271 | 0.385 | 0.260 | 0.195 | 0.195 | 0.116 | 0.0203 | 0.0513 | 0.0334 |
| ND = DL; EMPC = 0 | 0.0308 | 0.228 | 0.0411 | 0.266 | 0.385 | 0.270 | 0.0975 | 0.204 | 0.0719 | 0.0391 | 0.0550 | 0.0637 |
| ND = DL; EMPC = EMPC | 0.0308 | 0.228 | 0.0411 | 0.271 | 0.385 | 0.270 | 0.195 | 0.204 | 0.123 | 0.0391 | 0.0550 | 0.0637 |
| Checkcode | 535-338-KQZ | 231-940-PRG | 195-721-RHZ | 744-863-LYK | 972-166-GBB | 528-849-CXZ | 298-713-LYT | 693-411-CPH | 973-021-HTN | 604-952-MFT | 621-662-ZHN | 098-234-LDB |

() = DL
[] = EMPC

# PCB Recoveries

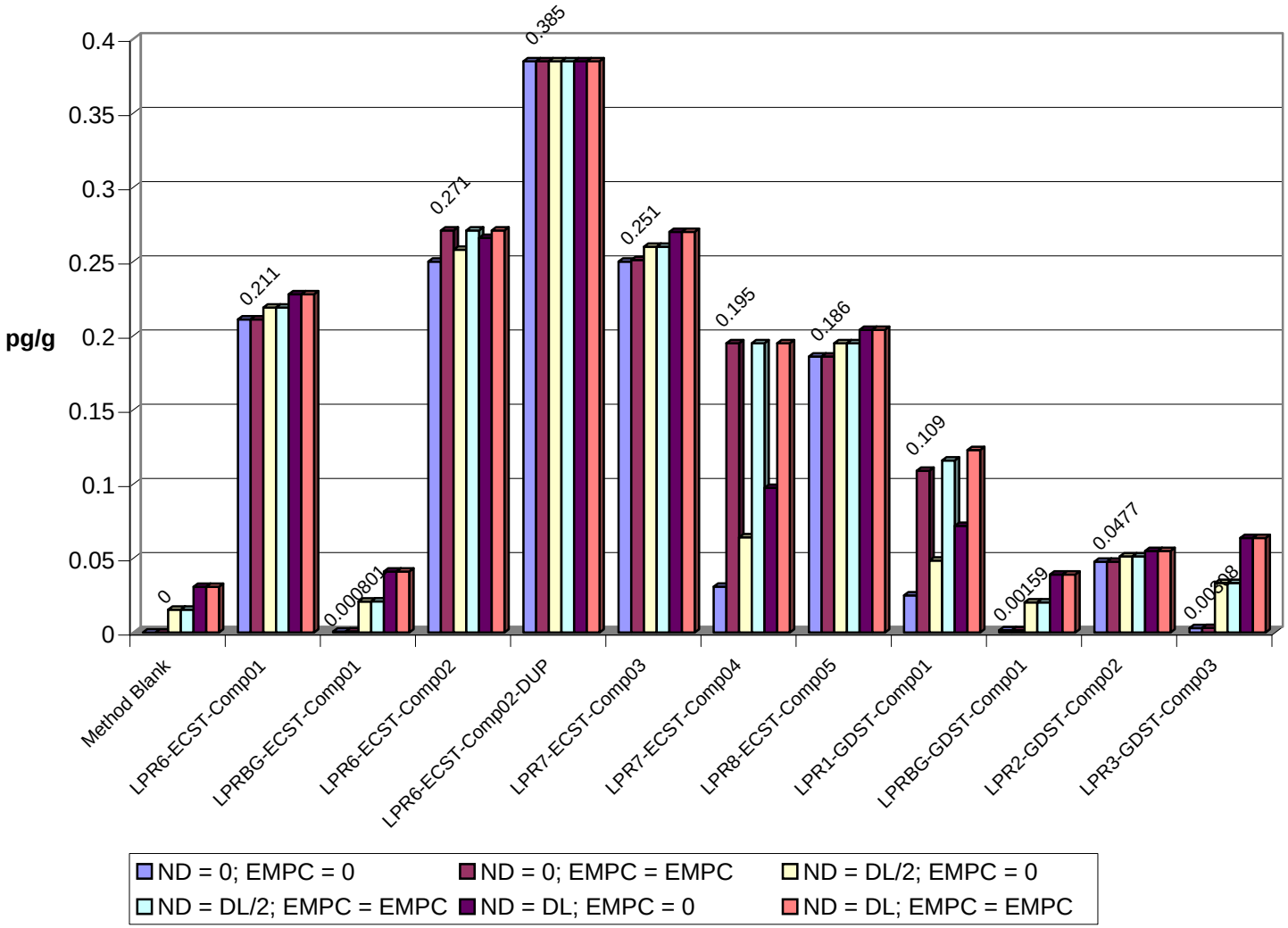
ANALYTICAL PERSPECTIVES

**1668B**

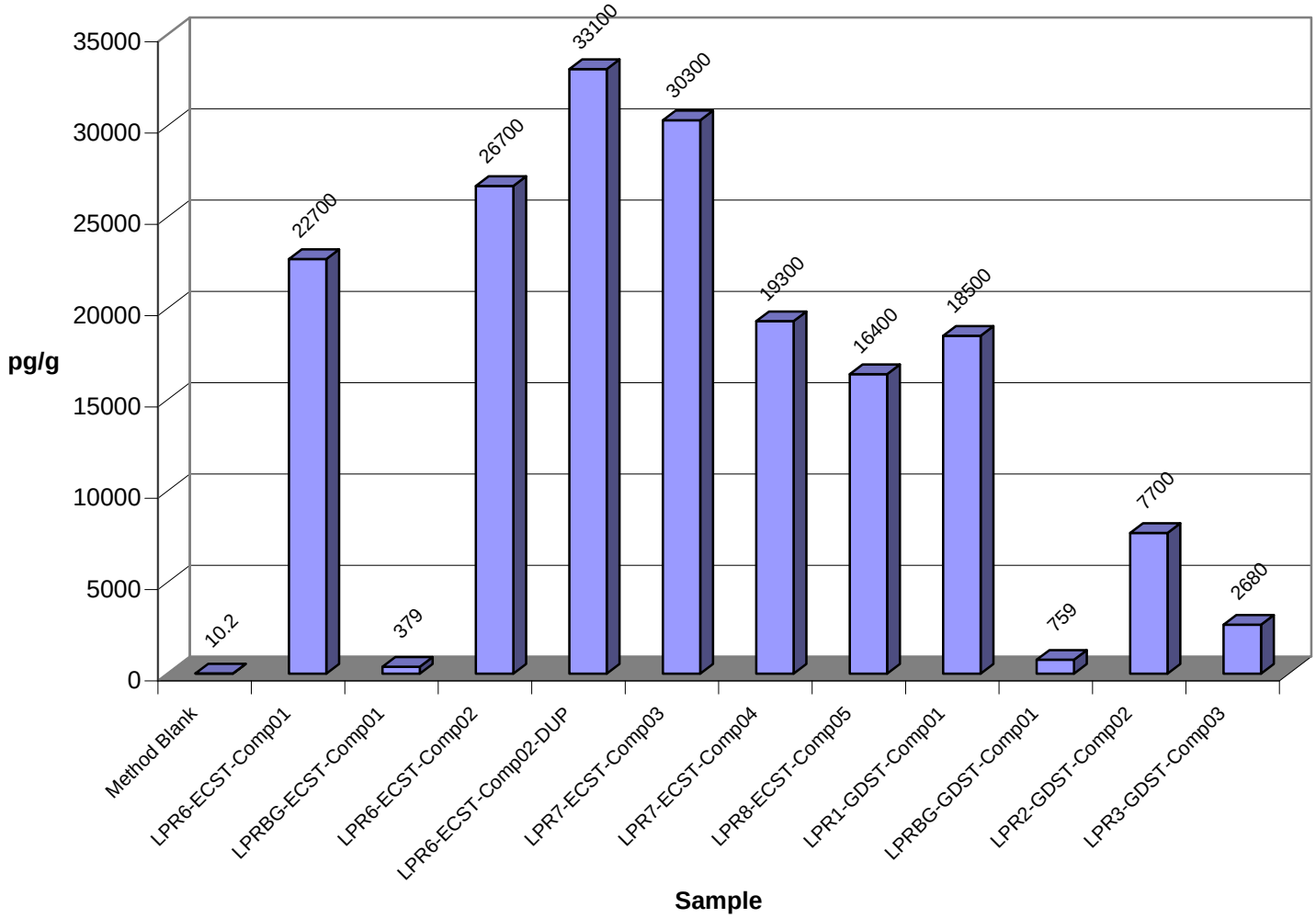
| Standard | Method Blank | LPR6-ECST-Comp01 | LPRBG-ECST-Comp01 | LPR6-ECST-Comp02 | LPR6-ECST-Comp02-DUP | LPR7-ECST-Comp03 | LPR7-ECST-Comp04 | LPR8-ECST-Comp05 | LPR1-GDST-Comp01 | LPRBG-GDST-Comp01 | LPR2-GDST-Comp02 | LPR3-GDST-Comp03 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ES PCB-1 | 82.1 | 60.7 | 72.9 | 75.5 | 75.9 | 76.8 | 79.7 | 80.6 | 67.7 | 89.4 | 81.6 | 81.8 |
| ES PCB-3 | 88.7 | 70.4 | 84.5 | 85.6 | 87.6 | 86.4 | 87.0 | 88.8 | 81.6 | 95.0 | 93.1 | 89.9 |
| ES PCB-4 | 91 | 71.6 | 83.8 | 85.6 | 88.3 | 88.1 | 86.1 | 96.0 | 87.2 | 109 | 103 | 96.3 |
| ES PCB-15 | 102 | 82.1 | 98.3 | 95.0 | 101 | 101 | 95.4 | 102 | 103 | 112 | 113 | 103 |
| ES PCB-19 | 96.4 | 75.3 | 91.1 | 87.9 | 91.8 | 93.4 | 88.5 | 97.1 | 89.6 | 107 | 103 | 94.0 |
| ES PCB-37 | 100 | 81.9 | 97.7 | 100 | 99.9 | 99.8 | 98.1 | 100 | 98.0 | 99.0 | 101 | 94.4 |
| ES PCB-54 | 88.9 | 68.1 | 76.6 | 76.4 | 78.6 | 76.2 | 78.5 | 88.7 | 87.2 | 76.7 | 86.8 | 81.3 |
| ES PCB-77 | 103 | 80.7 | 95.4 | 98.9 | 96.1 | 96.9 | 103 | 95.2 | 93.4 | 87.3 | 94.7 | 90.3 |
| ES PCB-81 | 97.6 | 77.1 | 92.4 | 94.3 | 91.0 | 90.7 | 96.4 | 92.9 | 89.4 | 83.3 | 90.0 | 87.3 |
| ES PCB-104 | 91.8 | 75.0 | 83.5 | 90.8 | 90.1 | 83.7 | 82.1 | 96.2 | 94.0 | 97.1 | 97.2 | 92.5 |
| ES PCB-105 | 99.5 | 82.3 | 90.9 | 111 | 96.6 | 92.4 | 97.7 | 94.8 | 90.6 | 102 | 94.1 | 96.3 |
| ES PCB-114 | 96 | 79.3 | 89.1 | 106 | 96.2 | 90.3 | 95.1 | 89.9 | 89.2 | 101 | 91.6 | 94.1 |
| ES PCB-118 | 97.9 | 79.6 | 88.6 | 108 | 94.9 | 89.5 | 94.1 | 96.0 | 95.4 | 104 | 95.6 | 101 |
| ES PCB-123 | 99.4 | 80.8 | 89.6 | 108 | 93.1 | 86.6 | 91.5 | 92.2 | 92.4 | 85.2 | 90.5 | 98.3 |
| ES PCB-126 | 97 | 79.2 | 89.0 | 106 | 96.9 | 92.4 | 99.8 | 92.8 | 91.1 | 100 | 92.7 | 91.9 |
| ES PCB-153 | 85.7 | 72.8 | 85.9 | 88.9 | 88.7 | 85.0 | 89.3 | 96.6 | 96.4 | 96.5 | 98.5 | 97.2 |
| ES PCB-155 | 82.2 | 67.0 | 80.1 | 69.5 | 87.1 | 82.0 | 87.5 | 97.7 | 97.3 | 91.5 | 97.2 | 98.2 |
| ES PCB-156/157 | 85.2 | 71.9 | 83.3 | 85.6 | 92.9 | 90.0 | 97.2 | 91.2 | 91.0 | 94.0 | 93.8 | 93.7 |
| ES PCB-167 | 84.8 | 71.6 | 82.1 | 84.3 | 90.0 | 87.2 | 95.4 | 92.1 | 91.4 | 93.9 | 95.2 | 95.8 |
| ES PCB-169 | 82.7 | 68.3 | 80.7 | 77.8 | 82.8 | 79.3 | 87.1 | 82.5 | 85.1 | 80.9 | 84.2 | 85.9 |
| ES PCB-170 | 109 | 126 | 155 | 206 | 209 | 199 | 203 | 197 | 149 | 280 | 205 | 189 |
| ES PCB-180 | 107 | 124 | 149 | 199 | 206 | 196 | 203 | 208 | 151 | 291 | 215 | 192 |
| ES PCB-188 | 82.1 | 70.9 | 84.5 | 87.7 | 93.2 | 86.0 | 90.3 | 93.0 | 93.8 | 104 | 103 | 103 |
| ES PCB-189 | 92.2 | 98.1 | 118 | 139 | 147 | 137 | 156 | 151 | 122 | 154 | 151 | 151 |
| ES PCB-202 | 97.8 | 72.4 | 84.9 | 89.9 | 91.1 | 85.8 | 90.8 | 91.2 | 93.1 | 94.9 | 96.1 | 93.2 |
| ES PCB-205 | 97.9 | 76.9 | 92.6 | 95.3 | 97.7 | 87.8 | 99.6 | 103 | 101 | 104 | 103 | 106 |
| ES PCB-206 | 104 | 90.7 | 108 | 120 | 121 | 108 | 118 | 132 | 114 | 123 | 122 | 129 |
| ES PCB-208 | 102 | 96.6 | 118 | 147 | 157 | 140 | 155 | 147 | 120 | 169 | 162 | 153 |
| ES PCB-209 | 95.6 | 87.0 | 106 | 121 | 126 | 110 | 116 | 139 | 115 | 122 | 130 | 135 |
| Checkcode | 535-338-KQZ | 231-940-PRG | 195-721-RHZ | 744-863-LYK | 972-166-GBB | 528-849-CXZ | 298-713-LYT | 693-411-CPH | 973-021-HTN | 604-952-MFT | 621-662-ZHN | 098-234-LDB |

() = DL
[] = EMPC

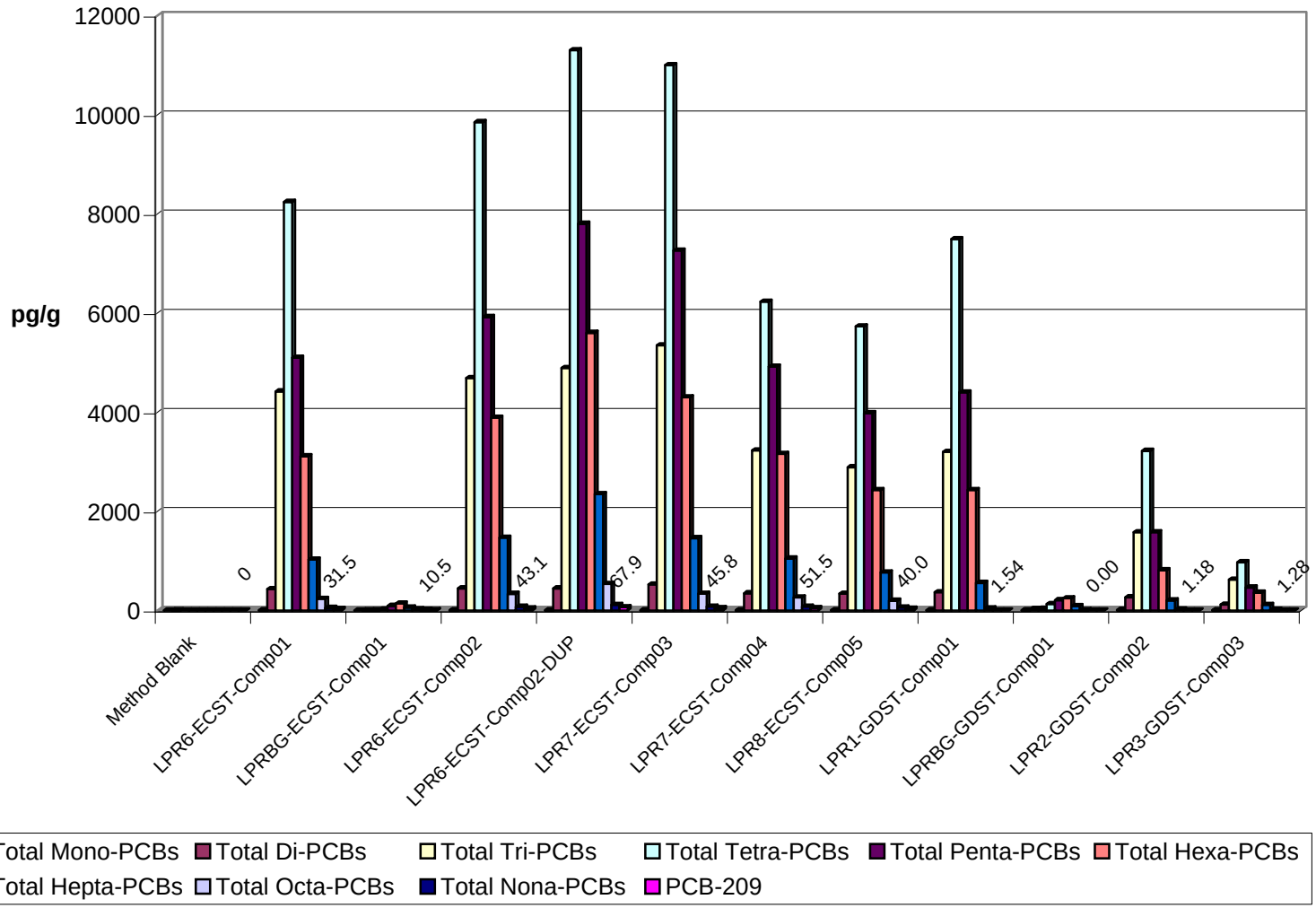
**PCB TEQ**
**Project ID: Passaic RI/FS Caged Bivalve Study**
**A3406**



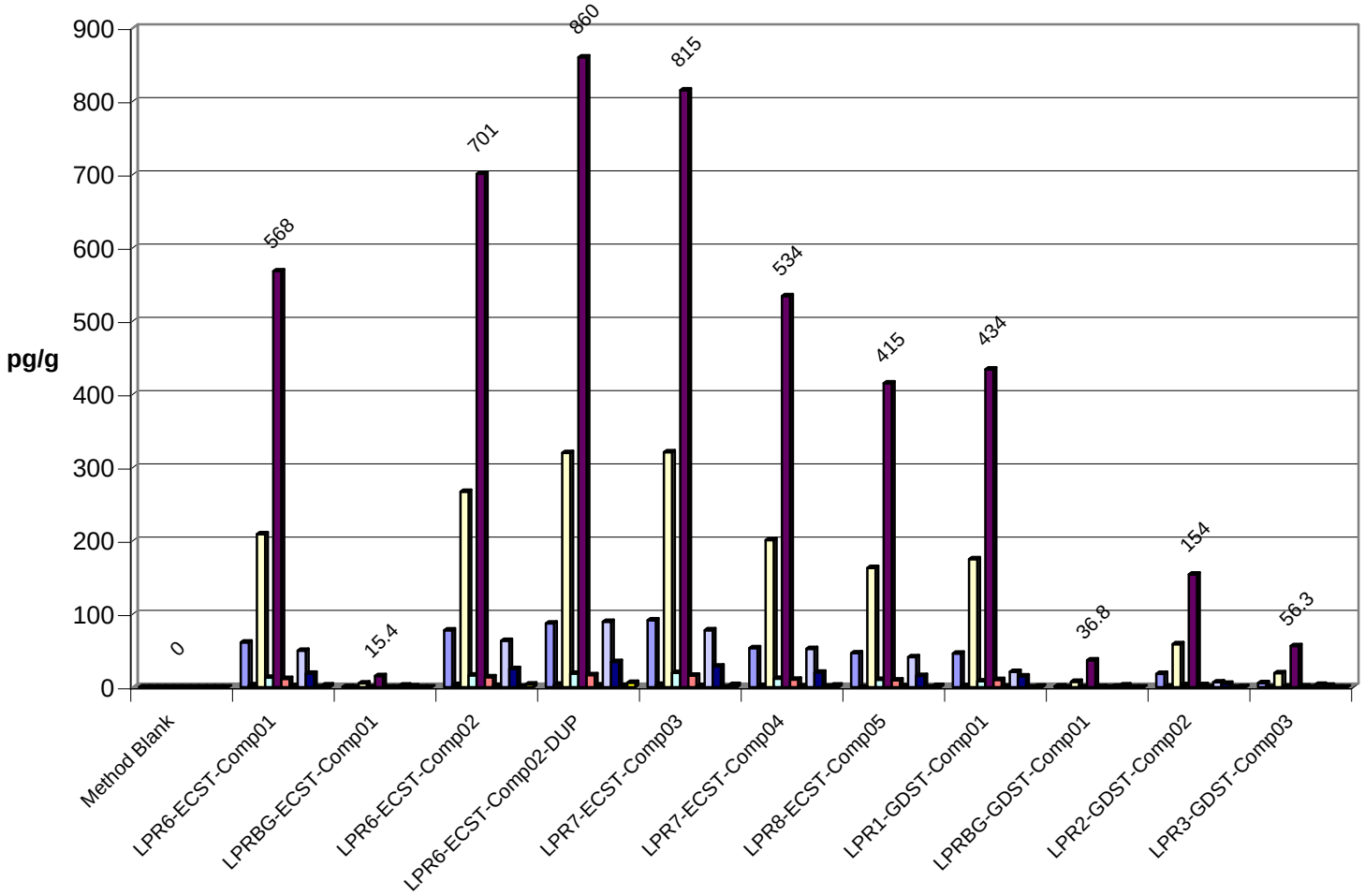
**PCB Totals**
**Project ID: Passaic RI/FS Caged Bivalve Study**
**A3406**



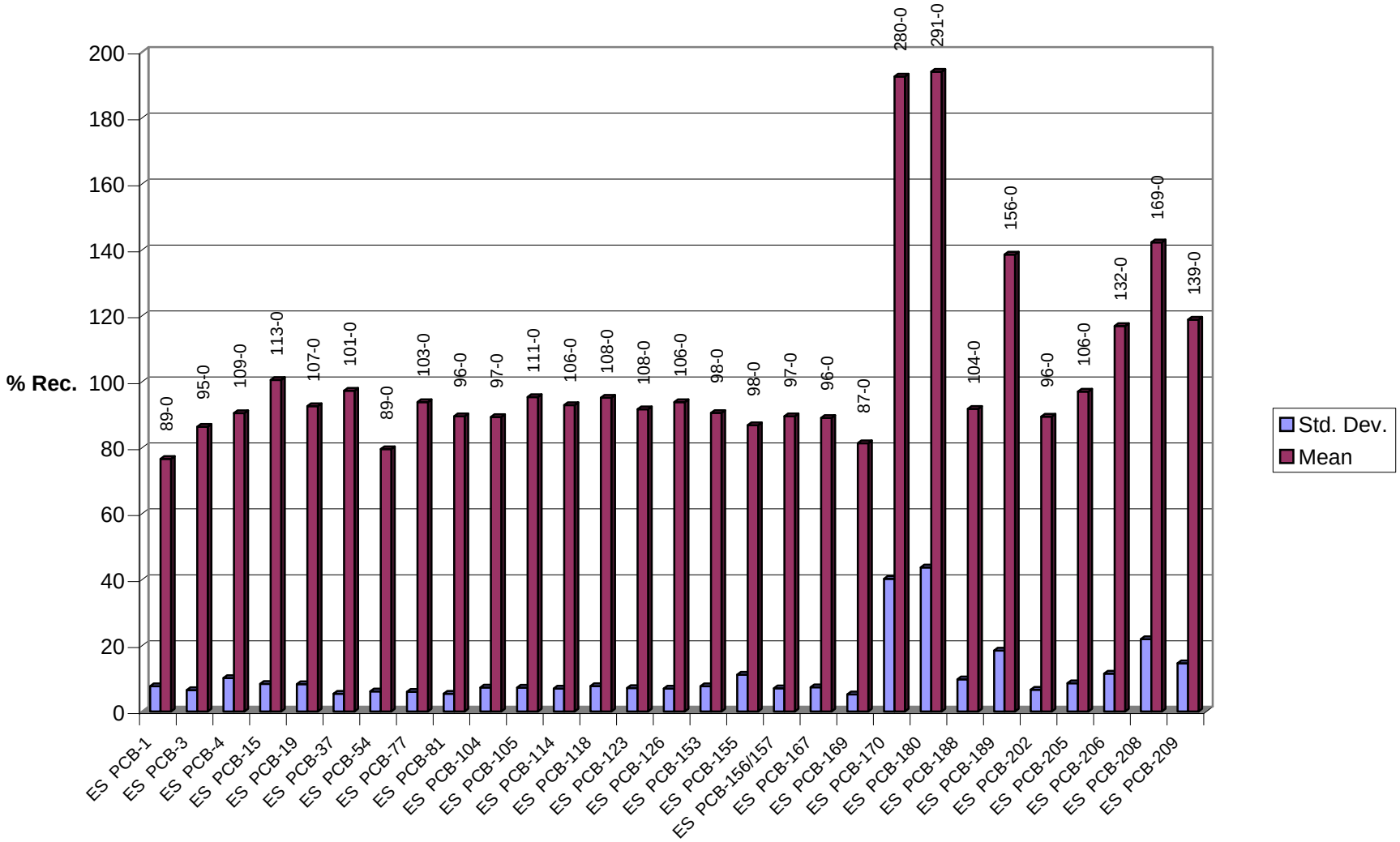
**PCB Homologues**
**Project ID: Passaic RI/FS Caged Bivalve Study**
**A3406**



**PCB WHO**
**Project ID: Passaic RI/FS Caged Bivalve Study**
**A3406**



**Mean Recoveries of Extraction Standards (N=12)**
**Project ID: Passaic RI/FS Caged Bivalve Study**
**A3406**



# CARP2 SRM

ANALYTICAL PERSPECTIVES

# Method 1668

## Lab ID: A3406_8929_PCB_011-sp10

| Analyte | AP Analyte | Conc. | Assigned Value | PD from Assigned value |
|---|---|---|---|---|
| | | (pg/g) | (pg/g) | % |
| PCB-8 | PCB-8 | 4,890 | 4,800 | 2% |
| PCB-18 ‡ | PCB-30/18 | 51,900 | 27,300 | 90% |
| PCB-28 * | PCB-28/20 | 28,800 | 34,000 | -15% |
| PCB-44 * | PCB-44/47/65 | 128,000 | 86,600 | 48% |
| PCB-52 | PCB-52 | 151,000 | 138,000 | 9% |
| PCB-66/95 * | PCB-66 / PCB-95 | 213,300 | 174,000 | 23% |
| PCB-101/90 * | PCB-113/90/101 | 146,000 | 145,000 | 1% |
| PCB-105 | PCB-105 | 61,100 | 53,200 | 15% |
| PCB-118 | PCB-118 | 142,000 | 148,000 | -4% |
| PCB-128 * | PCB-128/166 | 20,000 | 20,400 | -2% |
| PCB-138/163/164 * | PCB-163/138/129 | 138,000 | 103,000 | 34% |
| PCB-153 * | PCB-153/168 | 92,700 | 105,000 | -12% |
| PCB-170/190 * | PCB-170 | 20,700 | 20,600 | 0% |
| PCB-180 * | PCB-180/193 | 52,900 | 53,300 | -1% |
| PCB-187/159/182 * | PCB-187 | 41,000 | 37,100 | 11% |
| PCB-194 | PCB-194 | 14,200 | 10,900 | 30% |
| PCB-206 | PCB-206 | 2,390 | 4,400 | -46% |
| PCB-209 | PCB-209 | 5,590 | 4,600 | 22% |

‡ PCB-18 coelutes with PCB-30 and therefore will not match the SRM values for PCB-18
* Denotes variance in co-elution profile

Reviewer KAM
Date 01 Sep 11

# Sample DUP

ANALYTICAL PERSPECTIVES

Method HR-PCB

## Sample ID: LPR6-ECST-Comp02

| Analyte | A3406_8929_PCB_003 pg/g | A3406_8929_PCB_003DUP (DUP) pg/g | RPD |
|---|---|---|---|
| PCB-77 33'44'-TeCB | 77.8 | 87.3 | 11.5% |
| PCB-81 344'5-TeCB | 3.32 | 3.80 | 13.5% |
| PCB-105 233'44'-PeCB | 267 | 320 | 18.1% |
| PCB-114 2344'5-PeCB | 16.3 | 18.7 | 13.7% |
| PCB-118 23'44'5-PeCB | 701 | 860 | 20.4% |
| PCB-123 2'344'5-PeCB | 13.7 | 16.7 | 19.7% |
| PCB-126 33'44'5-PeCB | 2.09 | 2.72 | 26.2% |
| PCB-156/157 233'44'5/233'44'5' | 63.5 | 89.5 | 34.0% |
| PCB-167 23'44'55'-HxCB | 25.1 | 34.7 | 32.1% |
| PCB-169 33'44'55'-HxCB | 0.709 | 2.07 | 97.9% |
| PCB-189 233'44'55'-HpCB | 4.02 | 6.16 | 42.0% |
| **TEQs** | | | |
| ND = 0 | 0.271 | 0.385 | 34.8% |
| ND = 0.5 x DL | 0.271 | 0.385 | 34.8% |
| **Totals** | | | |
| Mono-CBs | 4.13 | 4.56 | 9.90% |
| Di-CBs | 447 | 449 | 0.446% |
| Tri-CBs | 4,690 | 4,890 | 4.18% |
| Tetra-CBs | 9,860 | 11,300 | 13.6% |
| Penta-CBs | 5,920 | 7,800 | 27.4% |
| Hexa-CBs | 3,900 | 5,610 | 36.0% |
| Hepta-CBs | 1,470 | 2,350 | 46.1% |
| Octa-CBs | 337 | 537 | 45.8% |
| Nona-CBs | 76.7 | 114.0 | 39.1% |
| PCB-209 DeCB | 43.1 | 67.9 | 44.7% |

# Sample ID: Method Blank

# Method 1668B

| Client Data | | Sample Data | | Laboratory Data | | | |
|---|---|---|---|---|---|---|---|
| Name: | Windward Environmental, LLC | Matrix: | Tissue | Project No.: | A3406 | Date Received: | n/a |
| Project ID: | Passaic RI/FS Caged Bivalve Study | Weight/Volume: | 10.00 g | Sample ID: | MB1_8929_PCB_SDS | Date Extracted: | 15-Aug-2011 |
| Date Collected: | n/a | | | QC Batch No.: | 8929 | Date Analyzed: | 22-Aug-2011 |

| Analyte | Conc. | DL | EMPC | Qualifier | Standard | Recovery |
|---|---|---|---|---|---|---|
| | pg/g | pg/g | pg/g | | | % |
| PCB-77 33'44'-TeCB | ND | 0.227 | | | ES PCB-1 | 82.1 |
| PCB-81 344'5-TeCB | ND | 0.225 | | | ES PCB-3 | 88.7 |
| PCB-105 233'44'-PeCB | ND | 0.213 | | | ES PCB-4 | 91 |
| PCB-114 2344'5-PeCB | ND | 0.211 | | | ES PCB-15 | 102 |
| PCB-118 23'44'5-PeCB | ND | 0.209 | | | ES PCB-19 | 96.4 |
| PCB-123 23'44'5'-PeCB | ND | 0.212 | | | ES PCB-37 | 100 |
| PCB-126 33'44'5-PeCB | ND | 0.225 | | | ES PCB-54 | 88.9 |
| PCB-156/157 233'44'5/233'44'5'-HxCB | ND | 0.319 | | C | ES PCB-77 | 103 |
| PCB-167 23'44'55'-HxCB | ND | 0.231 | | | ES PCB-81 | 97.6 |
| PCB-169 33'44'55'-HxCB | ND | 0.271 | | | ES PCB-104 | 91.8 |
| PCB-189 233'44'55'-HpCB | ND | 0.222 | | | ES PCB-105 | 99.5 |
| | | | | | ES PCB-114 | 96 |
| **TEQs (WHO M/H)** | | | | | ES PCB-118 | 97.9 |
| | | | | | ES PCB-123 | 99.4 |
| ND = 0 | 0 | | 0 | | ES PCB-126 | 97 |
| ND = 0.5 x DL | 0.0154 | | 0.0154 | | ES PCB-153 | 85.7 |
| | | | | | ES PCB-155 | 82.2 |
| **Totals** | | | | | ES PCB-156/157 | 85.2 |
| | | | | | ES PCB-167 | 84.8 |
| Mono-CBs | ND | 0.139 | | | ES PCB-169 | 82.7 |
| Di-CBs | 4.49 | | | | ES PCB-170 | 109 |
| Tri-CBs | 1.78 | | 2.35 | | ES PCB-180 | 107 |
| Tetra-CBs | 2.1 | | | | ES PCB-188 | 82.1 |
| Penta-CBs | 0.729 | | | | ES PCB-189 | 92.2 |
| Hexa-CBs | 0.684 | | 1.22 | | ES PCB-202 | 97.8 |
| Hepta-CBs | 0.45 | | | | ES PCB-205 | 97.9 |
| Octa-CBs | ND | 0.24 | | | ES PCB-206 | 104 |
| Nona-CBs | ND | 0.323 | | | ES PCB-208 | 102 |
| Deca-CB | ND | 0.309 | | | ES PCB-209 | 95.6 |
| | | | | | CS PCB-28 | 103 |
| Mono-Deca | 10.2 | | 11.3 | | CS PCB-111 | 107 |
| | | | | | CS PCB-178 | 108 |

Checkcode: 535-338-KQZ AP PCB 2011 Rev. A Report Created: 25-Aug-2011 16:36 Analyst: LB

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# Sample ID: Method Blank — Method 1668B

| Client Data | | Sample Data | | Laboratory Data | | | |
|---|---|---|---|---|---|---|---|
| Name: | Windward Environmental, LLC | Matrix: | Tissue | Project No.: | A3406 | Date Received: | n/a |
| Project ID: | Passaic RI/FS Caged Bivalve Study | Weight/Volume: | 10.00 g | Sample ID: | MB1_8929_PCB_SDS | Date Extracted: | 15-Aug-2011 |
| Date Collected: | n/a | | | QC Batch No.: | 8929 | Date Analyzed: | 22-Aug-2011 |
| | | Units | pg/g | Checkcode: | 535-338-KQZ | Time Analyzed: | 12:58:59 |

| Mono | Conc. | Qualifiers | Tri | Conc. | Qualifiers | Tetra | Conc. | Qualifiers | Tetra | Conc. | Qualifiers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PCB-1 | (0.132) | | PCB-19 | (0.214) | | PCB-54 | (0.117) | | PCB-72 | (0.205) | |
| PCB-2 | (0.152) | | PCB-30/18 | [0.576] | J EMPC C | PCB-50/53 | (0.217) | C | PCB-68 | (0.185) | |
| PCB-3 | (0.145) | | PCB-17 | (0.218) | | PCB-45 | (0.281) | | PCB-57 | (0.216) | |
| | | | PCB-27 | (0.165) | | PCB-51 | (0.197) | | PCB-58 | (0.204) | |
| **Conc.** | 0 | | PCB-24 | (0.161) | | PCB-46 | (0.256) | | PCB-67 | (0.186) | |
| **EMPC** | 0 | | PCB-16 | (0.275) | | PCB-52 | 0.973 | J | PCB-63 | (0.203) | |
| | | | PCB-32 | 0.443 | J | PCB-73 | (0.167) | | PCB-61/70/74/76 | 0.674 | J C |
| **Di** | **Conc.** | **Qualifiers** | PCB-34 | (0.19) | | PCB-43 | (0.266) | | PCB-66 | (0.209) | |
| PCB-4 | (0.653) | | PCB-23 | (0.186) | | PCB-69/49 | 0.454 | J C | PCB-55 | (0.211) | |
| PCB-10 | (0.449) | | PCB-26/29 | (0.18) | C | PCB-48 | (0.219) | | PCB-56 | (0.209) | |
| PCB-9 | (0.508) | | PCB-25 | (0.171) | | PCB-44/47/65 | (0.202) | C | PCB-60 | (0.208) | |
| PCB-7 | (0.49) | | PCB-31 | 0.518 | J | PCB-59/62/75 | (0.172) | C | PCB-80 | (0.183) | |
| PCB-6 | (0.517) | | PCB-28/20 | 0.816 | J C | PCB-42 | (0.239) | | PCB-79 | (0.191) | |
| PCB-5 | (0.521) | | PCB-21/33 | (0.189) | C | PCB-41 | (0.287) | | PCB-78 | (0.225) | |
| PCB-8 | (0.509) | | PCB-22 | (0.184) | | PCB-71/40 | (0.21) | C | PCB-81 | (0.225) | |
| PCB-14 | (0.517) | | PCB-36 | (0.186) | | PCB-64 | (0.171) | | PCB-77 | (0.227) | |
| PCB-11 | 4.49 | | PCB-39 | (0.171) | | | | | | | |
| PCB-13/12 | (0.502) | C | PCB-38 | (0.197) | | | | | | | |
| PCB-15 | (0.51) | | PCB-35 | (0.2) | | | | | | | |
| | | | PCB-37 | (0.224) | | | | | | | |
| **Conc.** | 4.49 | | **Conc.** | 1.78 | | | | | **Conc.** | 2.1 | |
| **EMPC** | 4.49 | | **EMPC** | 2.35 | | | | | **EMPC** | 2.1 | |


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| Totals | Conc. | EMPC |
|---|---|---|
| Mono-Tri | 6.26 | 6.84 |
| Tetra-Hexa | 3.51 | 4.05 |
| Hepta-Deca | 0.45 | 0.45 |
| Mono-Deca | 10.2 | 11.3 |

# Sample ID: Method Blank — Method 1668B

| Penta | Conc. | Qualifiers | Penta | Conc. | Qualifiers | Hexa | Conc. | Qualifiers | Hexa | Conc. | Qualifiers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PCB-104 | (0.133) | | PCB-109/119/86… | (0.226) | C | PCB-155 | (0.157) | | PCB-165 | (0.209) | |
| PCB-96 | (0.142) | | PCB-117 | (0.214) | | PCB-152 | (0.174) | | PCB-146 | (0.229) | |
| PCB-103 | (0.236) | | PCB-116/85 | (0.224) | C | PCB-150 | (0.168) | | PCB-161 | (0.207) | |
| PCB-94 | (0.264) | | PCB-110 | (0.202) | | PCB-136 | (0.179) | | PCB-153/168 | [0.532] | J EMPC C |
| PCB-95 | (0.253) | | PCB-115 | (0.195) | | PCB-145 | (0.176) | | PCB-141 | (0.254) | |
| PCB-100/93 | (0.247) | C | PCB-82 | (0.319) | | PCB-148 | (0.256) | | PCB-130 | (0.307) | |
| PCB-102 | (0.222) | | PCB-111 | (0.19) | | PCB-151/135 | (0.257) | C | PCB-137 | (0.257) | |
| PCB-98 | (0.272) | | PCB-120 | (0.195) | | PCB-154 | (0.209) | | PCB-164 | (0.201) | |
| PCB-88 | (0.29) | | PCB-108/124 | (0.208) | C | PCB-144 | (0.253) | | PCB-163/138/129 | 0.684 | J C |
| PCB-91 | (0.232) | | PCB-107 | (0.175) | | PCB-147/149 | (0.237) | C | PCB-160 | (0.2) | |
| PCB-84 | (0.278) | | PCB-123 | (0.212) | | PCB-134 | (0.33) | | PCB-158 | (0.181) | |
| PCB-89 | (0.287) | | PCB-106 | (0.213) | | PCB-143 | (0.254) | | PCB-128/166 | (0.273) | C |
| PCB-121 | (0.183) | | PCB-118 | (0.209) | | PCB-139/140 | (0.242) | C | PCB-159 | (0.237) | |
| PCB-92 | (0.272) | | PCB-122 | (0.224) | | PCB-131 | (0.293) | | PCB-162 | (0.219) | |
| PCB-113/90/101 | 0.729 | J C | PCB-114 | (0.211) | | PCB-142 | (0.297) | | PCB-167 | (0.231) | |
| PCB-83 | (0.321) | | PCB-105 | (0.213) | | PCB-132 | (0.281) | | PCB-156/157 | (0.319) | C |
| PCB-99 | (0.235) | | PCB-127 | (0.206) | | PCB-133 | (0.282) | | PCB-169 | (0.271) | |
| PCB-112 | (0.189) | | PCB-126 | (0.225) | | | | | | | |
| | | | **Conc.** | 0.729 | | | | | **Conc.** | 0.684 | |
| | | | **EMPC** | 0.729 | | | | | **EMPC** | 1.22 | |

| Hepta | Conc. | Qualifiers | Hepta | Conc. | Qualifiers | Octa | Conc. | Qualifiers | Nona | Conc. | Qualifiers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PCB-188 | (0.167) | | PCB-174 | (0.34) | | PCB-202 | (0.196) | | PCB-208 | (0.283) | |
| PCB-179 | (0.19) | | PCB-177 | (0.372) | | PCB-201 | (0.206) | | PCB-207 | (0.294) | |
| PCB-184 | (0.172) | | PCB-181 | (0.334) | | PCB-204 | (0.206) | | PCB-206 | (0.363) | |
| PCB-176 | (0.197) | | PCB-171/173 | (0.374) | C | PCB-197 | (0.19) | | | | |
| PCB-186 | (0.19) | | PCB-172 | (0.388) | | PCB-200 | (0.215) | | **Conc.** | 0 | |
| PCB-178 | (0.257) | | PCB-192 | (0.285) | | PCB-198/199 | (0.277) | C | **EMPC** | 0 | |
| PCB-175 | (0.342) | | PCB-180/193 | 0.45 | J C | PCB-196 | (0.283) | | | | |
| PCB-187 | (0.301) | | PCB-191 | (0.285) | | PCB-203 | (0.247) | | **Deca** | **Conc.** | **Qualifiers** |
| PCB-182 | (0.312) | | PCB-170 | (0.317) | | PCB-195 | (0.496) | | PCB-209 | (0.309) | |
| PCB-183 | (0.333) | | PCB-190 | (0.259) | | PCB-194 | (0.464) | | | | |
| PCB-185 | (0.315) | | PCB-189 | (0.222) | | PCB-205 | (0.283) | | | | |
| | | | **Conc.** | 0.45 | | **Conc.** | 0 | | | | |
| | | | **EMPC** | 0.45 | | **EMPC** | 0 | | | | |

# Sample ID: LPR6-ECST-Comp01

# Method 1668B

| Client Data | | Sample Data | | Laboratory Data | | | |
|---|---|---|---|---|---|---|---|
| Name: | Windward Environmental, LLC | Matrix: | Tissue | Project No.: | A3406 | Date Received: | 02-Aug-2011 |
| Project ID: | Passaic RI/FS Caged Bivalve Study | Weight/Volume: | 10.11 g | Sample ID: | A3406_8929_PCB_001 | Date Extracted: | 15-Aug-2011 |
| Date Collected: | 08-Jun-2011 | | | QC Batch No.: | 8929 | Date Analyzed: | 22-Aug-2011 |

| Analyte | Conc. | DL | EMPC | Qualifier | Standard | Recovery |
|---|---|---|---|---|---|---|
| | pg/g | pg/g | pg/g | | | % |
| PCB-77 33'44'-TeCB | 61.3 | | | | ES PCB-1 | 60.7 |
| PCB-81 344'5-TeCB | 2.9 | | | | ES PCB-3 | 70.4 |
| PCB-105 233'44'-PeCB | 209 | | | | ES PCB-4 | 71.6 |
| PCB-114 2344'5-PeCB | 13.1 | | | | ES PCB-15 | 82.1 |
| PCB-118 23'44'5-PeCB | 568 | | | | ES PCB-19 | 75.3 |
| PCB-123 23'44'5'-PeCB | 11.5 | | | | ES PCB-37 | 81.9 |
| PCB-126 33'44'5-PeCB | 1.78 | | | | ES PCB-54 | 68.1 |
| PCB-156/157 233'44'5/233'44'5'-HxCB | 50 | | | C | ES PCB-77 | 80.7 |
| PCB-167 23'44'55'-HxCB | 18.7 | | | | ES PCB-81 | 77.1 |
| PCB-169 33'44'55'-HxCB | ND | 0.566 | | | ES PCB-104 | 75 |
| PCB-189 233'44'55'-HpCB | 2.69 | | | | ES PCB-105 | 82.3 |
| | | | | | ES PCB-114 | 79.3 |
| **TEQs (WHO M/H)** | | | | | ES PCB-118 | 79.6 |
| | | | | | ES PCB-123 | 80.8 |
| ND = 0 | 0.211 | | 0.211 | | ES PCB-126 | 79.2 |
| ND = 0.5 x DL | 0.219 | | 0.219 | | ES PCB-153 | 72.8 |
| | | | | | ES PCB-155 | 67 |
| **Totals** | | | | | ES PCB-156/157 | 71.9 |
| | | | | | ES PCB-167 | 71.6 |
| Mono-CBs | 4.54 | | | | ES PCB-169 | 68.3 |
| Di-CBs | 432 | | 433 | | ES PCB-170 | 126 |
| Tri-CBs | 4,420 | | | | ES PCB-180 | 124 |
| Tetra-CBs | 8,240 | | 8,250 | | ES PCB-188 | 70.9 |
| Penta-CBs | 5,100 | | | | ES PCB-189 | 98.1 |
| Hexa-CBs | 3,110 | | 3,110 | | ES PCB-202 | 72.4 |
| Hepta-CBs | 1,030 | | | | ES PCB-205 | 76.9 |
| Octa-CBs | 235 | | | | ES PCB-206 | 90.7 |
| Nona-CBs | 52.3 | | | | ES PCB-208 | 96.6 |
| Deca-CB | 31.5 | | | | ES PCB-209 | 87 |
| | | | | | CS PCB-28 | 82.9 |
| Mono-Deca | 22,700 | | 22,700 | | CS PCB-111 | 103 |
| | | | | | CS PCB-178 | 102 |

Checkcode: 231-940-PRG AP PCB 2011 Rev. A Report Created: 31-Aug-2011 17:25 Analyst: LB

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# Sample ID: LPR6-ECST-Comp01 — Method 1668B

| Client Data | | Sample Data | | Laboratory Data | | | |
|---|---|---|---|---|---|---|---|
| Name: | Windward Environmental, LLC | Matrix: | Tissue | Project No.: | A3406 | Date Received: | 02-Aug-2011 |
| Project ID: | Passaic RI/FS Caged Bivalve Study | Weight/Volume: | 10.11 g | Sample ID: | A3406_8929_PCB_001 | Date Extracted: | 15-Aug-2011 |
| Date Collected: | 08-Jun-2011 | | | QC Batch No.: | 8929 | Date Analyzed: | 22-Aug-2011 |
| | | Units | pg/g | Checkcode: | 231-940-PRG | Time Analyzed: | 13:53:59 |

| Mono | Conc. | Qualifiers | Tri | Conc. | Qualifiers | Tetra | Conc. | Qualifiers | Tetra | Conc. | Qualifiers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PCB-1 | 2.47 | | PCB-19 | 71.6 | | PCB-54 | 12.8 | | PCB-72 | 8.94 | |
| PCB-2 | 0.888 | J | PCB-30/18 | 687 | C | PCB-50/53 | 190 | C | PCB-68 | [6.44] | EMPC |
| PCB-3 | 1.19 | | PCB-17 | 380 | | PCB-45 | 175 | | PCB-57 | 5.51 | |
| | | | PCB-27 | 70.3 | | PCB-51 | 117 | | PCB-58 | 4.48 | |
| **Conc.** | 4.54 | | PCB-24 | 11.3 | | PCB-46 | 71.2 | | PCB-67 | 33 | |
| **EMPC** | 4.54 | | PCB-16 | 271 | | PCB-52 | 1,330 | | PCB-63 | 34.9 | |
| | | | PCB-32 | 284 | | PCB-73 | 6.1 | | PCB-61/70/74/76 | 1,340 | C |
| **Di** | **Conc.** | **Qualifiers** | PCB-34 | 6.6 | | PCB-43 | 47.9 | | PCB-66 | 715 | |
| PCB-4 | 69.5 | | PCB-23 | (0.431) | | PCB-69/49 | 743 | C | PCB-55 | 12.1 | |
| PCB-10 | 4.41 | | PCB-26/29 | 177 | C | PCB-48 | 220 | | PCB-56 | 341 | |
| PCB-9 | 6.2 | | PCB-25 | 125 | | PCB-44/47/65 | 1,170 | C | PCB-60 | 117 | |
| PCB-7 | 3.72 | | PCB-31 | 806 | | PCB-59/62/75 | 111 | C | PCB-80 | (0.437) | |
| PCB-6 | 40.7 | | PCB-28/20 | 741 | C | PCB-42 | 294 | | PCB-79 | 7.1 | |
| PCB-5 | [0.979] | J EMPC | PCB-21/33 | 299 | C | PCB-41 | 71 | | PCB-78 | (0.538) | |
| PCB-8 | 95.9 | | PCB-22 | 265 | | PCB-71/40 | 505 | C | PCB-81 | 2.9 | |
| PCB-14 | (0.519) | | PCB-36 | (0.431) | | PCB-64 | 487 | | PCB-77 | 61.3 | |
| PCB-11 | 80.5 | | PCB-39 | 5.84 | | | | | | | |
| PCB-13/12 | 21.2 | C | PCB-38 | (0.459) | | | | | | | |
| PCB-15 | 110 | | PCB-35 | 15.6 | | | | | | | |
| | | | PCB-37 | 209 | | | | | | | |
| **Conc.** | 432 | | **Conc.** | 4,420 | | | | | **Conc.** | 8,240 | |
| **EMPC** | 433 | | **EMPC** | 4,420 | | | | | **EMPC** | 8,250 | |

| Totals | Conc. | EMPC |
|---|---|---|
| Mono-Tri | 4,860 | 4,860 |
| Tetra-Hexa | 16,500 | 16,500 |
| Hepta-Deca | 1,350 | 1,350 |
| Mono-Deca | 22,700 | 22,700 |

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# Sample ID: LPR6-ECST-Comp01 Method 1668B

| Penta | Conc. | Qualifiers | Penta | Conc. | Qualifiers | Hexa | Conc. | Qualifiers | Hexa | Conc. | Qualifiers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PCB-104 | 3.23 | | PCB-109/119/86… | 520 | C | PCB-155 | 8.15 | | PCB-165 | (0.209) | |
| PCB-96 | 14.6 | | PCB-117 | 19.6 | | PCB-152 | 1.89 | | PCB-146 | 93.9 | |
| PCB-103 | 14.5 | | PCB-116/85 | 115 | C | PCB-150 | 1.59 | | PCB-161 | (0.208) | |
| PCB-94 | 13 | | PCB-110 | 853 | | PCB-136 | 109 | | PCB-153/168 | 493 | C |
| PCB-95 | 715 | | PCB-115 | 31.9 | | PCB-145 | (0.189) | | PCB-141 | 129 | |
| PCB-100/93 | 28.3 | C | PCB-82 | 95 | | PCB-148 | (0.256) | | PCB-130 | 42.7 | |
| PCB-102 | 38.7 | | PCB-111 | (1.81) | | PCB-151/135 | 287 | C | PCB-137 | 31.1 | |
| PCB-98 | (2.59) | | PCB-120 | (1.85) | | PCB-154 | 11.2 | | PCB-164 | 47.4 | |
| PCB-88 | (2.76) | | PCB-108/124 | 24.1 | C | PCB-144 | 32 | | PCB-163/138/129 | 713 | C |
| PCB-91 | 124 | | PCB-107 | 36.1 | | PCB-147/149 | 571 | C | PCB-160 | (0.2) | |
| PCB-84 | 234 | | PCB-123 | 11.5 | | PCB-134 | 48.2 | | PCB-158 | 53 | |
| PCB-89 | 15 | | PCB-106 | (2.03) | | PCB-143 | (0.254) | | PCB-128/166 | 83.6 | C |
| PCB-121 | (1.75) | | PCB-118 | 568 | | PCB-139/140 | 11.3 | C | PCB-159 | 4.72 | |
| PCB-92 | 168 | | PCB-122 | (2.19) | | PCB-131 | 8.97 | | PCB-162 | [1.91] | EMPC |
| PCB-113/90/101 | 807 | C | PCB-114 | 13.1 | | PCB-142 | (0.298) | | PCB-167 | 18.7 | |
| PCB-83 | 43.7 | | PCB-105 | 209 | | PCB-132 | 248 | | PCB-156/157 | 50 | C |
| PCB-99 | 381 | | PCB-127 | (2.06) | | PCB-133 | 11.9 | | PCB-169 | (0.566) | |
| PCB-112 | 2.41 | | PCB-126 | 1.78 | | | | | | | |
| | | | **Conc.** | 5,100 | | | | | **Conc.** | 3,110 | |
| | | | **EMPC** | 5,100 | | | | | **EMPC** | 3,110 | |

| Hepta | Conc. | Qualifiers | Hepta | Conc. | Qualifiers | Octa | Conc. | Qualifiers | Nona | Conc. | Qualifiers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PCB-188 | (0.137) | | PCB-174 | 155 | | PCB-202 | 21 | | PCB-208 | 16.3 | |
| PCB-179 | 75.2 | | PCB-177 | 80.6 | | PCB-201 | 7.41 | | PCB-207 | 2.05 | |
| PCB-184 | (0.141) | | PCB-181 | (0.375) | | PCB-204 | (0.208) | | PCB-206 | 33.9 | |
| PCB-176 | 17.4 | | PCB-171/173 | 30.5 | C | PCB-197 | 1.37 | | | | |
| PCB-186 | (0.156) | | PCB-172 | 24.2 | | PCB-200 | 8.07 | | **Conc.** | 52.3 | |
| PCB-178 | 32.4 | | PCB-192 | (0.32) | | PCB-198/199 | 68.5 | C | **EMPC** | 52.3 | |
| PCB-175 | 5.04 | | PCB-180/193 | 221 | C | PCB-196 | 13.2 | | | | |
| PCB-187 | 194 | | PCB-191 | 3.85 | | PCB-203 | 37.9 | | **Deca** | **Conc.** | **Qualifiers** |
| PCB-182 | (0.35) | | PCB-170 | 81.8 | | PCB-195 | 28.7 | | PCB-209 | 31.5 | |
| PCB-183 | 69.9 | | PCB-190 | 19 | | PCB-194 | 46.8 | | | | |
| PCB-185 | 17.9 | | PCB-189 | 2.69 | | PCB-205 | 1.89 | | | | |
| | | | **Conc.** | 1,030 | | **Conc.** | 235 | | | | |
| | | | **EMPC** | 1,030 | | **EMPC** | 235 | | | | |

# Sample ID: LPRBG-ECST-Comp01

# Method 1668B

| Client Data | | Sample Data | | Laboratory Data | | | |
|---|---|---|---|---|---|---|---|
| Name: | Windward Environmental, LLC | Matrix: | Tissue | Project No.: | A3406 | Date Received: | 02-Aug-2011 |
| Project ID: | Passaic RI/FS Caged Bivalve Study | Weight/Volume: | 10.25 g | Sample ID: | A3406_8929_PCB_002 | Date Extracted: | 15-Aug-2011 |
| Date Collected: | 09-Mar-2011 | | | QC Batch No.: | 8929 | Date Analyzed: | 22-Aug-2011 |

| Analyte | Conc. | DL | EMPC | Qualifier | Standard | Recovery |
|---|---|---|---|---|---|---|
| | pg/g | pg/g | pg/g | | | % |
| PCB-77 33'44'-TeCB | EMPC | | 0.563 | J | ES PCB-1 | 72.9 |
| PCB-81 344'5-TeCB | ND | 0.355 | | | ES PCB-3 | 84.5 |
| PCB-105 233'44'-PeCB | 5.5 | | | | ES PCB-4 | 83.8 |
| PCB-114 2344'5-PeCB | ND | 0.376 | | | ES PCB-15 | 98.3 |
| PCB-118 23'44'5-PeCB | 15.4 | | | | ES PCB-19 | 91.1 |
| PCB-123 23'44'5'-PeCB | ND | 0.384 | | | ES PCB-37 | 97.7 |
| PCB-126 33'44'5-PeCB | ND | 0.287 | | | ES PCB-54 | 76.6 |
| PCB-156/157 233'44'5/233'44'5'-HxCB | 2.48 | | | C | ES PCB-77 | 95.4 |
| PCB-167 23'44'55'-HxCB | 1.4 | | | | ES PCB-81 | 92.4 |
| PCB-169 33'44'55'-HxCB | ND | 0.382 | | | ES PCB-104 | 83.5 |
| PCB-189 233'44'55'-HpCB | ND | 0.395 | | | ES PCB-105 | 90.9 |
| | | | | | ES PCB-114 | 89.1 |
| **TEQs (WHO M/H)** | | | | | ES PCB-118 | 88.6 |
| | | | | | ES PCB-123 | 89.6 |
| ND = 0 | 0.000744 | | 0.000801 | | ES PCB-126 | 89 |
| ND = 0.5 x DL | 0.0209 | | 0.021 | | ES PCB-153 | 85.9 |
| | | | | | ES PCB-155 | 80.1 |
| **Totals** | | | | | ES PCB-156/157 | 83.3 |
| | | | | | ES PCB-167 | 82.1 |
| Mono-CBs | ND | 0.175 | | | ES PCB-169 | 80.7 |
| Di-CBs | 4.64 | | | | ES PCB-170 | 155 V |
| Tri-CBs | 7.5 | | 10 | | ES PCB-180 | 149 |
| Tetra-CBs | 22.4 | | 28.3 | | ES PCB-188 | 84.5 |
| Penta-CBs | 93.3 | | 94.4 | | ES PCB-189 | 118 V |
| Hexa-CBs | 144 | | 148 | | ES PCB-202 | 84.9 |
| Hepta-CBs | 59.7 | | 73.9 | | ES PCB-205 | 92.6 |
| Octa-CBs | 24.3 | | 28.5 | | ES PCB-206 | 108 |
| Nona-CBs | 12.9 | | | | ES PCB-208 | 118 |
| Deca-CB | 10.5 | | | | ES PCB-209 | 106 |
| | | | | | CS PCB-28 | 83.6 |
| Mono-Deca | 379 | | 412 | | CS PCB-111 | 101 |
| | | | | | CS PCB-178 | 101 |

Checkcode: 195-721-RHZ AP PCB 2011 Rev. A Report Created: 31-Aug-2011 17:25 Analyst: LB

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# Sample ID: LPRBG-ECST-Comp01 — Method 1668B

| Client Data | | Sample Data | | Laboratory Data | | | |
|---|---|---|---|---|---|---|---|
| Name: | Windward Environmental, LLC | Matrix: | Tissue | Project No.: | A3406 | Date Received: | 02-Aug-2011 |
| Project ID: | Passaic RI/FS Caged Bivalve Study | Weight/Volume: | 10.25 g | Sample ID: | A3406_8929_PCB_002 | Date Extracted: | 15-Aug-2011 |
| Date Collected: | 09-Mar-2011 | | | QC Batch No.: | 8929 | Date Analyzed: | 22-Aug-2011 |
| | | Units | pg/g | Checkcode: | 195-721-RHZ | Time Analyzed: | 14:49:05 |

| Mono | Conc. | Qualifiers | Tri | Conc. | Qualifiers | Tetra | Conc. | Qualifiers | Tetra | Conc. | Qualifiers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PCB-1 | (0.17) | | PCB-19 | (0.224) | | PCB-54 | (0.207) | | PCB-72 | (0.324) | |
| PCB-2 | (0.19) | | PCB-30/18 | 1.71 | J C | PCB-50/53 | 0.412 | J C | PCB-68 | (0.292) | |
| PCB-3 | (0.181) | | PCB-17 | 0.664 | J | PCB-45 | (0.344) | | PCB-57 | (0.342) | |
| | | | PCB-27 | (0.172) | | PCB-51 | (0.241) | | PCB-58 | (0.323) | |
| **Conc.** | 0 | | PCB-24 | (0.168) | | PCB-46 | (0.314) | | PCB-67 | (0.294) | |
| **EMPC** | 0 | | PCB-16 | 0.845 | J | PCB-52 | 5.67 | | PCB-63 | (0.321) | |
| | | | PCB-32 | [0.534] | J EMPC | PCB-73 | (0.205) | | PCB-61/70/74/76 | 7.3 | C |
| **Di** | **Conc.** | **Qualifiers** | PCB-34 | (0.301) | | PCB-43 | (0.325) | | PCB-66 | [3.09] | EMPC |
| PCB-4 | (0.739) | | PCB-23 | (0.294) | | PCB-69/49 | 2.83 | C | PCB-55 | (0.334) | |
| PCB-10 | (0.508) | | PCB-26/29 | (0.286) | C | PCB-48 | [0.586] | J EMPC | PCB-56 | [0.983] | EMPC |
| PCB-9 | (0.547) | | PCB-25 | (0.27) | | PCB-44/47/65 | 3.73 | C | PCB-60 | (0.329) | |
| PCB-7 | (0.527) | | PCB-31 | 1.9 | | PCB-59/62/75 | (0.211) | C | PCB-80 | (0.289) | |
| PCB-6 | (0.557) | | PCB-28/20 | [2] | EMPC C | PCB-42 | [0.675] | J EMPC | PCB-79 | (0.302) | |
| PCB-5 | (0.561) | | PCB-21/33 | 0.84 | J C | PCB-41 | (0.351) | | PCB-78 | (0.356) | |
| PCB-8 | 0.694 | J | PCB-22 | 0.806 | J | PCB-71/40 | 0.898 | J C | PCB-81 | (0.355) | |
| PCB-14 | (0.557) | | PCB-36 | (0.294) | | PCB-64 | 1.6 | | PCB-77 | [0.563] | J EMPC |
| PCB-11 | 3.95 | | PCB-39 | (0.272) | | | | | | | |
| PCB-13/12 | (0.541) | C | PCB-38 | (0.313) | | | | | | | |
| PCB-15 | (0.549) | | PCB-35 | (0.318) | | | | | | | |
| | | | PCB-37 | 0.732 | J | | | | | | |
| **Conc.** | 4.64 | | **Conc.** | 7.5 | | | | | **Conc.** | 22.4 | |
| **EMPC** | 4.64 | | **EMPC** | 10 | | | | | **EMPC** | 28.3 | |


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| Totals | Conc. | EMPC |
|---|---|---|
| Mono-Tri | 12.1 | 14.7 |
| Tetra-Hexa | 259 | 271 |
| Hepta-Deca | 107 | 126 |
| Mono-Deca | 379 | 412 |

# Sample ID: LPRBG-ECST-Comp01 Method 1668B

| Penta | Conc. | Qualifiers | Penta | Conc. | Qualifiers | Hexa | Conc. | Qualifiers | Hexa | Conc. | Qualifiers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PCB-104 | (0.189) | | PCB-109/119/86… | 9.45 | C | PCB-155 | (0.193) | | PCB-165 | (0.263) | |
| PCB-96 | (0.202) | | PCB-117 | [0.412] | J EMPC | PCB-152 | (0.214) | | PCB-146 | 6.78 | |
| PCB-103 | (0.427) | | PCB-116/85 | 2.49 | C | PCB-150 | (0.206) | | PCB-161 | (0.26) | |
| PCB-94 | (0.478) | | PCB-110 | 16.3 | | PCB-136 | 2.61 | | PCB-153/168 | 37.5 | C |
| PCB-95 | 9.3 | | PCB-115 | (0.354) | | PCB-145 | (0.215) | | PCB-141 | [4.82] | EMPC |
| PCB-100/93 | (0.448) | C | PCB-82 | 1.37 | | PCB-148 | (0.322) | | PCB-130 | 2.56 | |
| PCB-102 | (0.402) | | PCB-111 | (0.344) | | PCB-151/135 | 11.3 | C | PCB-137 | (0.323) | |
| PCB-98 | (0.492) | | PCB-120 | (0.352) | | PCB-154 | (0.262) | | PCB-164 | 2.32 | |
| PCB-88 | (0.526) | | PCB-108/124 | [0.744] | J EMPC C | PCB-144 | (0.318) | | PCB-163/138/129 | 43.9 | C |
| PCB-91 | 1.72 | | PCB-107 | 1.05 | | PCB-147/149 | 20.1 | C | PCB-160 | (0.251) | |
| PCB-84 | 2.54 | | PCB-123 | (0.384) | | PCB-134 | (0.415) | | PCB-158 | 1.94 | |
| PCB-89 | (0.521) | | PCB-106 | (0.387) | | PCB-143 | (0.319) | | PCB-128/166 | 3.95 | C |
| PCB-121 | (0.332) | | PCB-118 | 15.4 | | PCB-139/140 | (0.304) | C | PCB-159 | (0.336) | |
| PCB-92 | 3.39 | | PCB-122 | (0.399) | | PCB-131 | (0.368) | | PCB-162 | (0.311) | |
| PCB-113/90/101 | 16.5 | C | PCB-114 | (0.376) | | PCB-142 | (0.374) | | PCB-167 | 1.4 | |
| PCB-83 | (0.581) | | PCB-105 | 5.5 | | PCB-132 | 6.79 | | PCB-156/157 | 2.48 | C |
| PCB-99 | 8.14 | | PCB-127 | (0.402) | | PCB-133 | (0.355) | | PCB-169 | (0.382) | |
| PCB-112 | (0.343) | | PCB-126 | (0.287) | | | | | | | |
| | | | **Conc.** | 93.3 | | | | | **Conc.** | 144 | |
| | | | **EMPC** | 94.4 | | | | | **EMPC** | 148 | |

| Hepta | Conc. | Qualifiers | Hepta | Conc. | Qualifiers | Octa | Conc. | Qualifiers | Nona | Conc. | Qualifiers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PCB-188 | (0.218) | | PCB-174 | [9.04] | EMPC | PCB-202 | 3.73 | | PCB-208 | 4.08 | |
| PCB-179 | 4.36 | | PCB-177 | 5.35 | | PCB-201 | (0.242) | | PCB-207 | (0.435) | |
| PCB-184 | (0.224) | | PCB-181 | (0.469) | | PCB-204 | (0.243) | | PCB-206 | 8.8 | |
| PCB-176 | (0.256) | | PCB-171/173 | 1.23 | J C | PCB-197 | (0.223) | | | | |
| PCB-186 | (0.248) | | PCB-172 | 2.09 | | PCB-200 | [0.923] | J EMPC | **Conc.** | 12.9 | |
| PCB-178 | 3.19 | | PCB-192 | (0.4) | | PCB-198/199 | 9.64 | C | **EMPC** | 12.9 | |
| PCB-175 | (0.48) | | PCB-180/193 | 18.3 | C | PCB-196 | (0.334) | | | | |
| PCB-187 | 19.7 | | PCB-191 | (0.4) | | PCB-203 | 6.1 | | **Deca** | **Conc.** | **Qualifiers** |
| PCB-182 | (0.438) | | PCB-170 | [5.12] | EMPC | PCB-195 | [3.28] | EMPC | PCB-209 | 10.5 | |
| PCB-183 | 4.07 | | PCB-190 | 1.41 | | PCB-194 | 4.86 | | | | |
| PCB-185 | (0.442) | | PCB-189 | (0.395) | | PCB-205 | (0.601) | | | | |
| | | | **Conc.** | 59.7 | | **Conc.** | 24.3 | | | | |
| | | | **EMPC** | 73.9 | | **EMPC** | 28.5 | | | | |

# Sample ID: LPR6-ECST-Comp02

# Method 1668B

| Client Data | | Sample Data | | Laboratory Data | | | |
|---|---|---|---|---|---|---|---|
| Name: | Windward Environmental, LLC | Matrix: | Tissue | Project No.: | A3406 | Date Received: | 02-Aug-2011 |
| Project ID: | Passaic RI/FS Caged Bivalve Study | Weight/Volume: | 10.17 g | Sample ID: | A3406_8929_PCB_003 | Date Extracted: | 15-Aug-2011 |
| Date Collected: | 08-Jun-2011 | | | QC Batch No.: | 8929 | Date Analyzed: | 22-Aug-2011 |

| Analyte | Conc. | DL | EMPC | Qualifier | Standard | Recovery |
|---|---|---|---|---|---|---|
| | pg/g | pg/g | pg/g | | | % |
| PCB-77 33'44'-TeCB | 77.8 | | | | ES PCB-1 | 75.5 |
| PCB-81 344'5-TeCB | 3.32 | | | | ES PCB-3 | 85.6 |
| PCB-105 233'44'-PeCB | 267 | | | | ES PCB-4 | 85.6 |
| PCB-114 2344'5-PeCB | 16.3 | | | | ES PCB-15 | 95 |
| PCB-118 23'44'5-PeCB | 701 | | | | ES PCB-19 | 87.9 |
| PCB-123 23'44'5'-PeCB | 13.7 | | | | ES PCB-37 | 100 |
| PCB-126 33'44'5-PeCB | 2.09 | | | | ES PCB-54 | 76.4 |
| PCB-156/157 233'44'5/233'44'5'-HxCB | 63.5 | | | C | ES PCB-77 | 98.9 |
| PCB-167 23'44'55'-HxCB | 25.1 | | | | ES PCB-81 | 94.3 |
| PCB-169 33'44'55'-HxCB | EMPC | | 0.709 | J | ES PCB-104 | 90.8 |
| PCB-189 233'44'55'-HpCB | 4.02 | | | | ES PCB-105 | 111 |
| | | | | | ES PCB-114 | 106 |
| **TEQs (WHO M/H)** | | | | | ES PCB-118 | 108 |
| | | | | | ES PCB-123 | 108 |
| ND = 0 | 0.25 | | 0.271 | | ES PCB-126 | 106 |
| ND = 0.5 x DL | 0.258 | | 0.271 | | ES PCB-153 | 88.9 |
| | | | | | ES PCB-155 | 69.5 |
| **Totals** | | | | | ES PCB-156/157 | 85.6 |
| | | | | | ES PCB-167 | 84.3 |
| Mono-CBs | 4.13 | | | | ES PCB-169 | 77.8 |
| Di-CBs | 447 | | | | ES PCB-170 | 206 V |
| Tri-CBs | 4,690 | | | | ES PCB-180 | 199 V |
| Tetra-CBs | 9,850 | | 9,860 | | ES PCB-188 | 87.7 |
| Penta-CBs | 5,920 | | | | ES PCB-189 | 139 V |
| Hexa-CBs | 3,890 | | 3,900 | | ES PCB-202 | 89.9 |
| Hepta-CBs | 1,470 | | | | ES PCB-205 | 95.3 |
| Octa-CBs | 337 | | | | ES PCB-206 | 120 |
| Nona-CBs | 76.7 | | | | ES PCB-208 | 147 V |
| Deca-CB | 43.1 | | | | ES PCB-209 | 121 V |
| | | | | | CS PCB-28 | 73.7 |
| Mono-Deca | 26,700 | | 26,700 | | CS PCB-111 | 105 |
| | | | | | CS PCB-178 | 105 |

Checkcode: 744-863-LYK AP PCB 2011 Rev. A Report Created: 31-Aug-2011 17:26 Analyst: LB

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# Sample ID: LPR6-ECST-Comp02 — Method 1668B

| Client Data | | Sample Data | | Laboratory Data | | | |
|---|---|---|---|---|---|---|---|
| Name: | Windward Environmental, LLC | Matrix: | Tissue | Project No.: | A3406 | Date Received: | 02-Aug-2011 |
| Project ID: | Passaic RI/FS Caged Bivalve Study | Weight/Volume: | 10.17 g | Sample ID: | A3406_8929_PCB_003 | Date Extracted: | 15-Aug-2011 |
| Date Collected: | 08-Jun-2011 | | | QC Batch No.: | 8929 | Date Analyzed: | 22-Aug-2011 |
| | | Units | pg/g | Checkcode: | 744-863-LYK | Time Analyzed: | 15:44:10 |

| Mono | Conc. | Qualifiers | Tri | Conc. | Qualifiers | Tetra | Conc. | Qualifiers | Tetra | Conc. | Qualifiers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PCB-1 | 2.36 | | PCB-19 | 83.3 | | PCB-54 | 18.1 | | PCB-72 | 10.8 | |
| PCB-2 | 0.721 | J | PCB-30/18 | 762 | C | PCB-50/53 | 200 | C | PCB-68 | 9.01 | |
| PCB-3 | 1.05 | | PCB-17 | 424 | | PCB-45 | 201 | | PCB-57 | [5.97] | EMPC |
| | | | PCB-27 | 78.2 | | PCB-51 | 136 | | PCB-58 | 4.35 | |
| **Conc.** | 4.13 | | PCB-24 | 10.4 | | PCB-46 | 77.3 | | PCB-67 | 40.7 | |
| **EMPC** | 4.13 | | PCB-16 | 295 | | PCB-52 | 1,570 | | PCB-63 | 43.3 | |
| | | | PCB-32 | 315 | | PCB-73 | 10.2 | | PCB-61/70/74/76 | 1,670 | C |
| **Di** | **Conc.** | **Qualifiers** | PCB-34 | 6.82 | | PCB-43 | 53.8 | | PCB-66 | 893 | |
| PCB-4 | 80.8 | | PCB-23 | (0.501) | | PCB-69/49 | 866 | C | PCB-55 | 14.4 | |
| PCB-10 | 4.71 | | PCB-26/29 | 181 | C | PCB-48 | 255 | | PCB-56 | 428 | |
| PCB-9 | 6.28 | | PCB-25 | 120 | | PCB-44/47/65 | 1,400 | C | PCB-60 | 150 | |
| PCB-7 | 3.45 | | PCB-31 | 831 | | PCB-59/62/75 | 133 | C | PCB-80 | (0.559) | |
| PCB-6 | 33.6 | | PCB-28/20 | 709 | C | PCB-42 | 342 | | PCB-79 | 9.1 | |
| PCB-5 | 0.996 | | PCB-21/33 | 304 | C | PCB-41 | 85.5 | | PCB-78 | (0.688) | |
| PCB-8 | 97.5 | | PCB-22 | 292 | | PCB-71/40 | 591 | C | PCB-81 | 3.32 | |
| PCB-14 | (0.37) | | PCB-36 | 1.13 | | PCB-64 | 563 | | PCB-77 | 77.8 | |
| PCB-11 | 74.9 | | PCB-39 | 7.58 | | | | | | | |
| PCB-13/12 | 20.5 | C | PCB-38 | (0.533) | | | | | | | |
| PCB-15 | 124 | | PCB-35 | 18.7 | | | | | | | |
| | | | PCB-37 | 250 | | | | | | | |
| **Conc.** | 447 | | **Conc.** | 4,690 | | | | | **Conc.** | 9,850 | |
| **EMPC** | 447 | | **EMPC** | 4,690 | | | | | **EMPC** | 9,860 | |

| Totals | Conc. | EMPC |
|---|---|---|
| Mono-Tri | 5,140 | 5,140 |
| Tetra-Hexa | 19,700 | 19,700 |
| Hepta-Deca | 1,920 | 1,920 |
| Mono-Deca | 26,700 | 26,700 |

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# Sample ID: LPR6-ECST-Comp02 Method 1668B

| Penta | Conc. | Qualifiers | Penta | Conc. | Qualifiers | Hexa | Conc. | Qualifiers | Hexa | Conc. | Qualifiers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PCB-104 | 5.22 | | PCB-109/119/86… | 581 | C | PCB-155 | 8.05 | | PCB-165 | 0.495 | J |
| PCB-96 | 17.8 | | PCB-117 | 24.5 | | PCB-152 | 3.1 | | PCB-146 | 123 | |
| PCB-103 | 19.3 | | PCB-116/85 | 129 | C | PCB-150 | 2.87 | | PCB-161 | (0.158) | |
| PCB-94 | 16.7 | | PCB-110 | 976 | | PCB-136 | 138 | | PCB-153/168 | 633 | C |
| PCB-95 | 804 | | PCB-115 | 14 | | PCB-145 | (0.16) | | PCB-141 | 165 | |
| PCB-100/93 | 40.1 | C | PCB-82 | 107 | | PCB-148 | 2.57 | | PCB-130 | 49.9 | |
| PCB-102 | 46.1 | | PCB-111 | (0.196) | | PCB-151/135 | 317 | C | PCB-137 | 34.3 | |
| PCB-98 | (0.281) | | PCB-120 | (0.201) | | PCB-154 | 13.7 | | PCB-164 | 61.6 | |
| PCB-88 | (0.3) | | PCB-108/124 | 30.2 | C | PCB-144 | 35.7 | | PCB-163/138/129 | 920 | C |
| PCB-91 | 146 | | PCB-107 | 46.5 | | PCB-147/149 | 709 | C | PCB-160 | (0.152) | |
| PCB-84 | 265 | | PCB-123 | 13.7 | | PCB-134 | 57.4 | | PCB-158 | 70.7 | |
| PCB-89 | 16.7 | | PCB-106 | (0.221) | | PCB-143 | (0.193) | | PCB-128/166 | 108 | C |
| PCB-121 | (0.19) | | PCB-118 | 701 | | PCB-139/140 | 15 | C | PCB-159 | 7.21 | |
| PCB-92 | 197 | | PCB-122 | 11.5 | | PCB-131 | 11.5 | | PCB-162 | [2.66] | EMPC |
| PCB-113/90/101 | 935 | C | PCB-114 | 16.3 | | PCB-142 | (0.226) | | PCB-167 | 25.1 | |
| PCB-83 | 51.4 | | PCB-105 | 267 | | PCB-132 | 301 | | PCB-156/157 | 63.5 | C |
| PCB-99 | 438 | | PCB-127 | (0.227) | | PCB-133 | 17 | | PCB-169 | [0.709] | J EMPC |
| PCB-112 | (0.196) | | PCB-126 | 2.09 | | | | | | | |
| | | | **Conc.** | 5,920 | | | | | **Conc.** | 3,890 | |
| | | | **EMPC** | 5,920 | | | | | **EMPC** | 3,900 | |

| Hepta | Conc. | Qualifiers | Hepta | Conc. | Qualifiers | Octa | Conc. | Qualifiers | Nona | Conc. | Qualifiers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PCB-188 | 0.597 | J | PCB-174 | 221 | | PCB-202 | 28.1 | | PCB-208 | 23.3 | |
| PCB-179 | 100 | | PCB-177 | 114 | | PCB-201 | 9.66 | | PCB-207 | 3.27 | |
| PCB-184 | 1.15 | | PCB-181 | 1.7 | | PCB-204 | (0.178) | | PCB-206 | 50.1 | |
| PCB-176 | 25 | | PCB-171/173 | 46.5 | C | PCB-197 | 1.89 | | | | |
| PCB-186 | (0.168) | | PCB-172 | 33.4 | | PCB-200 | 11.7 | | **Conc.** | 76.7 | |
| PCB-178 | 44.6 | | PCB-192 | (0.368) | | PCB-198/199 | 91.8 | C | **EMPC** | 76.7 | |
| PCB-175 | 7.64 | | PCB-180/193 | 320 | C | PCB-196 | 20.1 | | | | |
| PCB-187 | 278 | | PCB-191 | 5.16 | | PCB-203 | 50.1 | | **Deca** | **Conc.** | **Qualifiers** |
| PCB-182 | 1.54 | | PCB-170 | 111 | | PCB-195 | 53.5 | | PCB-209 | 43.1 | |
| PCB-183 | 108 | | PCB-190 | 24.8 | | PCB-194 | 67.5 | | | | |
| PCB-185 | 19.4 | | PCB-189 | 4.02 | | PCB-205 | 2.84 | | | | |
| | | | **Conc.** | 1,470 | | **Conc.** | 337 | | | | |
| | | | **EMPC** | 1,470 | | **EMPC** | 337 | | | | |

# Sample ID: LPR6-ECST-Comp02-DUP

# Method 1668B

| Client Data | | Sample Data | | Laboratory Data | | | |
|---|---|---|---|---|---|---|---|
| Name: | Windward Environmental, LLC | Matrix: | Tissue | Project No.: | A3406 | Date Received: | 02-Aug-2011 |
| Project ID: | Passaic RI/FS Caged Bivalve Study | Weight/Volume: | 10.13 g | Sample ID: | A3406_8929_PCB_003DUP | Date Extracted: | 15-Aug-2011 |
| Date Collected: | 08-Jun-2011 | | | QC Batch No.: | 8929 | Date Analyzed: | 22-Aug-2011 |

| Analyte | Conc. | DL | EMPC | Qualifier | Standard | Recovery |
|---|---|---|---|---|---|---|
| | pg/g | pg/g | pg/g | | | % |
| PCB-77 33'44'-TeCB | 87.3 | | | | ES PCB-1 | 75.9 |
| PCB-81 344'5-TeCB | 3.8 | | | | ES PCB-3 | 87.6 |
| PCB-105 233'44'-PeCB | 320 | | | | ES PCB-4 | 88.3 |
| PCB-114 2344'5-PeCB | 18.7 | | | | ES PCB-15 | 101 |
| PCB-118 23'44'5-PeCB | 860 | | | | ES PCB-19 | 91.8 |
| PCB-123 23'44'5'-PeCB | 16.7 | | | | ES PCB-37 | 99.9 |
| PCB-126 33'44'5-PeCB | 2.72 | | | | ES PCB-54 | 78.6 |
| PCB-156/157 233'44'5/233'44'5'-HxCB | 89.5 | | | C | ES PCB-77 | 96.1 |
| PCB-167 23'44'55'-HxCB | 34.7 | | | | ES PCB-81 | 91 |
| PCB-169 33'44'55'-HxCB | 2.07 | | | | ES PCB-104 | 90.1 |
| PCB-189 233'44'55'-HpCB | 6.16 | | | | ES PCB-105 | 96.6 |
| | | | | | ES PCB-114 | 96.2 |
| **TEQs (WHO M/H)** | | | | | ES PCB-118 | 94.9 |
| | | | | | ES PCB-123 | 93.1 |
| ND = 0 | 0.385 | | 0.385 | | ES PCB-126 | 96.9 |
| ND = 0.5 x DL | 0.385 | | 0.385 | | ES PCB-153 | 88.7 |
| | | | | | ES PCB-155 | 87.1 |
| **Totals** | | | | | ES PCB-156/157 | 92.9 |
| | | | | | ES PCB-167 | 90 |
| Mono-CBs | 3.91 | | 4.56 | | ES PCB-169 | 82.8 |
| Di-CBs | 448 | | 449 | | ES PCB-170 | 209 V |
| Tri-CBs | 4,890 | | | | ES PCB-180 | 206 V |
| Tetra-CBs | 11,300 | | 11,300 | | ES PCB-188 | 93.2 |
| Penta-CBs | 7,800 | | | | ES PCB-189 | 147 V |
| Hexa-CBs | 5,600 | | 5,610 | | ES PCB-202 | 91.1 |
| Hepta-CBs | 2,350 | | | | ES PCB-205 | 97.7 |
| Octa-CBs | 537 | | | | ES PCB-206 | 121 |
| Nona-CBs | 114 | | | | ES PCB-208 | 157 V |
| Deca-CB | 67.9 | | | | ES PCB-209 | 126 V |
| | | | | | CS PCB-28 | 68 |
| Mono-Deca | 33,100 | | 33,100 | | CS PCB-111 | 95.8 |
| | | | | | CS PCB-178 | 100 |

Checkcode: 972-166-GBB AP PCB 2011 Rev. A Report Created: 31-Aug-2011 17:26 Analyst: LB

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# Sample ID: LPR6-ECST-Comp02-DUP

# Method 1668B

| Client Data | | Sample Data | | Laboratory Data | | | |
|---|---|---|---|---|---|---|---|
| Name: | Windward Environmental, LLC | Matrix: | Tissue | Project No.: | A3406 | Date Received: | 02-Aug-2011 |
| Project ID: | Passaic RI/FS Caged Bivalve Study | Weight/Volume: | 10.13 g | Sample ID: | A3406_8929_PCB_003DUP | Date Extracted: | 15-Aug-2011 |
| Date Collected: | 08-Jun-2011 | | | QC Batch No.: | 8929 | Date Analyzed: | 22-Aug-2011 |
| | | Units | pg/g | Checkcode: | 972-166-GBB | Time Analyzed: | 16:39:16 |

| Mono | Conc. | Qualifiers | Tri | Conc. | Qualifiers | Tetra | Conc. | Qualifiers | Tetra | Conc. | Qualifiers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PCB-1 | 2.69 | | PCB-19 | 83.8 | | PCB-54 | 18.8 | | PCB-72 | 13.2 | |
| PCB-2 | [0.652] | J EMPC | PCB-30/18 | 796 | C | PCB-50/53 | 221 | C | PCB-68 | 11.5 | |
| PCB-3 | 1.22 | | PCB-17 | 446 | | PCB-45 | 228 | | PCB-57 | 7.87 | |
| | | | PCB-27 | 84 | | PCB-51 | 144 | | PCB-58 | [4.6] | EMPC |
| **Conc.** | 3.91 | | PCB-24 | 11.4 | | PCB-46 | 84 | | PCB-67 | 47.5 | |
| **EMPC** | 4.56 | | PCB-16 | 308 | | PCB-52 | 1,790 | | PCB-63 | 51.6 | |
| | | | PCB-32 | 337 | | PCB-73 | 9.37 | | PCB-61/70/74/76 | 1,920 | C |
| **Di** | **Conc.** | **Qualifiers** | PCB-34 | 7.12 | | PCB-43 | 64.3 | | PCB-66 | 1,040 | |
| PCB-4 | 79.9 | | PCB-23 | (0.559) | | PCB-69/49 | 1,020 | C | PCB-55 | 17.3 | |
| PCB-10 | 4.93 | | PCB-26/29 | 189 | C | PCB-48 | 290 | | PCB-56 | 484 | |
| PCB-9 | 6.15 | | PCB-25 | 124 | | PCB-44/47/65 | 1,600 | C | PCB-60 | 175 | |
| PCB-7 | 3.64 | | PCB-31 | 863 | | PCB-59/62/75 | 149 | C | PCB-80 | (0.663) | |
| PCB-6 | 33.4 | | PCB-28/20 | 723 | C | PCB-42 | 388 | | PCB-79 | 11.7 | |
| PCB-5 | [1.06] | EMPC | PCB-21/33 | 317 | C | PCB-41 | 103 | | PCB-78 | (0.816) | |
| PCB-8 | 98.3 | | PCB-22 | 300 | | PCB-71/40 | 658 | C | PCB-81 | 3.8 | |
| PCB-14 | (0.578) | | PCB-36 | 1.29 | | PCB-64 | 643 | | PCB-77 | 87.3 | |
| PCB-11 | 73 | | PCB-39 | 8.59 | | | | | | | |
| PCB-13/12 | 20.7 | C | PCB-38 | (0.595) | | | | | | | |
| PCB-15 | 128 | | PCB-35 | 19.9 | | | | | | | |
| | | | PCB-37 | 270 | | | | | | | |
| **Conc.** | 448 | | **Conc.** | 4,890 | | | | | **Conc.** | 11,300 | |
| **EMPC** | 449 | | **EMPC** | 4,890 | | | | | **EMPC** | 11,300 | |


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| Totals | Conc. | EMPC |
|---|---|---|
| Mono-Tri | 5,340 | 5,340 |
| Tetra-Hexa | 24,700 | 24,700 |
| Hepta-Deca | 3,070 | 3,070 |
| Mono-Deca | 33,100 | 33,100 |

# Sample ID: LPR6-ECST-Comp02-DUP

# Method 1668B

| Penta | Conc. | Qualifiers | Penta | Conc. | Qualifiers | Hexa | Conc. | Qualifiers | Hexa | Conc. | Qualifiers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PCB-104 | 5.8 | | PCB-109/119/86… | 776 | C | PCB-155 | 10.4 | | PCB-165 | (0.268) | |
| PCB-96 | 19.3 | | PCB-117 | 22.6 | | PCB-152 | 3.42 | | PCB-146 | 182 | |
| PCB-103 | 26.3 | | PCB-116/85 | 185 | C | PCB-150 | 3.16 | | PCB-161 | (0.265) | |
| PCB-94 | 23.1 | | PCB-110 | 1,280 | | PCB-136 | 161 | | PCB-153/168 | 965 | C |
| PCB-95 | 1,060 | | PCB-115 | 34.4 | | PCB-145 | (0.228) | | PCB-141 | 253 | |
| PCB-100/93 | 54 | C | PCB-82 | 138 | | PCB-148 | 4.2 | | PCB-130 | 69.4 | |
| PCB-102 | 64.4 | | PCB-111 | (2.67) | | PCB-151/135 | 504 | C | PCB-137 | 47.3 | |
| PCB-98 | (3.82) | | PCB-120 | (2.73) | | PCB-154 | 21.6 | | PCB-164 | 88.8 | |
| PCB-88 | (4.08) | | PCB-108/124 | 36.2 | C | PCB-144 | 56.7 | | PCB-163/138/129 | 1,320 | C |
| PCB-91 | 194 | | PCB-107 | 56.3 | | PCB-147/149 | 1,010 | C | PCB-160 | (0.256) | |
| PCB-84 | 337 | | PCB-123 | 16.7 | | PCB-134 | 75.2 | | PCB-158 | 103 | |
| PCB-89 | 21.4 | | PCB-106 | (3) | | PCB-143 | (0.325) | | PCB-128/166 | 126 | C |
| PCB-121 | (2.58) | | PCB-118 | 860 | | PCB-139/140 | 19.6 | C | PCB-159 | 11.5 | |
| PCB-92 | 274 | | PCB-122 | 12.2 | | PCB-131 | 14.3 | | PCB-162 | [3.49] | EMPC |
| PCB-113/90/101 | 1,300 | C | PCB-114 | 18.7 | | PCB-142 | (0.381) | | PCB-167 | 34.7 | |
| PCB-83 | 71.2 | | PCB-105 | 320 | | PCB-132 | 404 | | PCB-156/157 | 89.5 | C |
| PCB-99 | 596 | | PCB-127 | (2.96) | | PCB-133 | 22.8 | | PCB-169 | 2.07 | |
| PCB-112 | (2.66) | | PCB-126 | 2.72 | | | | | | | |
| | | | **Conc.** | 7,800 | | | | | **Conc.** | 5,600 | |
| | | | **EMPC** | 7,800 | | | | | **EMPC** | 5,610 | |

| Hepta | Conc. | Qualifiers | Hepta | Conc. | Qualifiers | Octa | Conc. | Qualifiers | Nona | Conc. | Qualifiers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PCB-188 | 0.808 | J | PCB-174 | 336 | | PCB-202 | 42.8 | | PCB-208 | 34.3 | |
| PCB-179 | 140 | | PCB-177 | 177 | | PCB-201 | 15.2 | | PCB-207 | 5.24 | |
| PCB-184 | 1.31 | | PCB-181 | 2.53 | | PCB-204 | (0.252) | | PCB-206 | 74.3 | |
| PCB-176 | 34.7 | | PCB-171/173 | 73.4 | C | PCB-197 | 2.94 | | | | |
| PCB-186 | (0.212) | | PCB-172 | 56 | | PCB-200 | 18.8 | | **Conc.** | 114 | |
| PCB-178 | 65.4 | | PCB-192 | (0.557) | | PCB-198/199 | 139 | C | **EMPC** | 114 | |
| PCB-175 | 12 | | PCB-180/193 | 550 | C | PCB-196 | 32.3 | | | | |
| PCB-187 | 438 | | PCB-191 | 9.37 | | PCB-203 | 77 | | **Deca** | **Conc.** | **Qualifiers** |
| PCB-182 | 1.96 | | PCB-170 | 186 | | PCB-195 | 85.9 | | PCB-209 | 67.9 | |
| PCB-183 | 181 | | PCB-190 | 44 | | PCB-194 | 118 | | | | |
| PCB-185 | 31.4 | | PCB-189 | 6.16 | | PCB-205 | 5.15 | | | | |
| | | | **Conc.** | 2,350 | | **Conc.** | 537 | | | | |
| | | | **EMPC** | 2,350 | | **EMPC** | 537 | | | | |

# Sample ID: LPR7-ECST-Comp03

# Method 1668B

| Client Data | | Sample Data | | Laboratory Data | | | |
|---|---|---|---|---|---|---|---|
| Name: | Windward Environmental, LLC | Matrix: | Tissue | Project No.: | A3406 | Date Received: | 02-Aug-2011 |
| Project ID: | Passaic RI/FS Caged Bivalve Study | Weight/Volume: | 10.13 g | Sample ID: | A3406_8929_PCB_004 | Date Extracted: | 15-Aug-2011 |
| Date Collected: | 08-Jun-2011 | | | QC Batch No.: | 8929 | Date Analyzed: | 22-Aug-2011 |

| Analyte | Conc. | DL | EMPC | Qualifier | Standard | Recovery |
|---|---|---|---|---|---|---|
| | pg/g | pg/g | pg/g | | | % |
| PCB-77 33'44'-TeCB | 91.4 | | | | ES PCB-1 | 76.8 |
| PCB-81 344'5-TeCB | 3.52 | | | | ES PCB-3 | 86.4 |
| PCB-105 233'44'-PeCB | 321 | | | | ES PCB-4 | 88.1 |
| PCB-114 2344'5-PeCB | 19.7 | | | | ES PCB-15 | 101 |
| PCB-118 23'44'5-PeCB | 815 | | | | ES PCB-19 | 93.4 |
| PCB-123 23'44'5'-PeCB | 16 | | | | ES PCB-37 | 99.8 |
| PCB-126 33'44'5-PeCB | 2.02 | | | | ES PCB-54 | 76.2 |
| PCB-156/157 233'44'5/233'44'5'-HxCB | 77.9 | | | C | ES PCB-77 | 96.9 |
| PCB-167 23'44'55'-HxCB | 28.6 | | | | ES PCB-81 | 90.7 |
| PCB-169 33'44'55'-HxCB | ND | 0.656 | | | ES PCB-104 | 83.7 |
| PCB-189 233'44'55'-HpCB | EMPC | | 3.38 | | ES PCB-105 | 92.4 |
| | | | | | ES PCB-114 | 90.3 |
| **TEQs (WHO M/H)** | | | | | ES PCB-118 | 89.5 |
| | | | | | ES PCB-123 | 86.6 |
| ND = 0 | 0.25 | | 0.251 | | ES PCB-126 | 92.4 |
| ND = 0.5 x DL | 0.26 | | 0.26 | | ES PCB-153 | 85 |
| | | | | | ES PCB-155 | 82 |
| **Totals** | | | | | ES PCB-156/157 | 90 |
| | | | | | ES PCB-167 | 87.2 |
| Mono-CBs | 4.64 | | | | ES PCB-169 | 79.3 |
| Di-CBs | 524 | | | | ES PCB-170 | 199 V |
| Tri-CBs | 5,350 | | | | ES PCB-180 | 196 V |
| Tetra-CBs | 11,000 | | | | ES PCB-188 | 86 |
| Penta-CBs | 7,260 | | | | ES PCB-189 | 137 V |
| Hexa-CBs | 4,300 | | 4,310 | | ES PCB-202 | 85.8 |
| Hepta-CBs | 1,460 | | 1,460 | | ES PCB-205 | 87.8 |
| Octa-CBs | 341 | | 345 | | ES PCB-206 | 108 |
| Nona-CBs | 79.4 | | | | ES PCB-208 | 140 V |
| Deca-CB | 45.8 | | | | ES PCB-209 | 110 |
| | | | | | CS PCB-28 | 66.3 |
| Mono-Deca | 30,300 | | 30,300 | | CS PCB-111 | 91.3 |
| | | | | | CS PCB-178 | 96.4 |

Checkcode: 528-849-CXZ AP PCB 2011 Rev. A Report Created: 31-Aug-2011 17:26 Analyst: LB

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# Sample ID: LPR7-ECST-Comp03 — Method 1668B

| Client Data | | Sample Data | | Laboratory Data | | | |
|---|---|---|---|---|---|---|---|
| Name: | Windward Environmental, LLC | Matrix: | Tissue | Project No.: | A3406 | Date Received: | 02-Aug-2011 |
| Project ID: | Passaic RI/FS Caged Bivalve Study | Weight/Volume: | 10.13 g | Sample ID: | A3406_8929_PCB_004 | Date Extracted: | 15-Aug-2011 |
| Date Collected: | 08-Jun-2011 | | | QC Batch No.: | 8929 | Date Analyzed: | 22-Aug-2011 |
| | | Units | pg/g | Checkcode: | 528-849-CXZ | Time Analyzed: | 17:34:21 |

| Mono | Conc. | Qualifiers | Tri | Conc. | Qualifiers | Tetra | Conc. | Qualifiers | Tetra | Conc. | Qualifiers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PCB-1 | 2.94 | | PCB-19 | 89.1 | | PCB-54 | 11.2 | | PCB-72 | 11.6 | |
| PCB-2 | 0.489 | J | PCB-30/18 | 918 | C | PCB-50/53 | 186 | C | PCB-68 | 7.75 | |
| PCB-3 | 1.21 | | PCB-17 | 475 | | PCB-45 | 222 | | PCB-57 | 8.36 | |
| | | | PCB-27 | 83.3 | | PCB-51 | 89.2 | | PCB-58 | 4.32 | |
| **Conc.** | 4.64 | | PCB-24 | 11.3 | | PCB-46 | 81.7 | | PCB-67 | 46.2 | |
| **EMPC** | 4.64 | | PCB-16 | 367 | | PCB-52 | 1,700 | | PCB-63 | 51 | |
| | | | PCB-32 | 349 | | PCB-73 | 7.98 | | PCB-61/70/74/76 | 2,010 | C |
| **Di** | **Conc.** | **Qualifiers** | PCB-34 | 6.24 | | PCB-43 | 60.5 | | PCB-66 | 1,070 | |
| PCB-4 | 91.6 | | PCB-23 | 1.06 | | PCB-69/49 | 933 | C | PCB-55 | 16.4 | |
| PCB-10 | 5.67 | | PCB-26/29 | 193 | C | PCB-48 | 301 | | PCB-56 | 509 | |
| PCB-9 | 8.78 | | PCB-25 | 107 | | PCB-44/47/65 | 1,440 | C | PCB-60 | 213 | |
| PCB-7 | 5.06 | | PCB-31 | 949 | | PCB-59/62/75 | 139 | C | PCB-80 | (0.652) | |
| PCB-6 | 36.8 | | PCB-28/20 | 711 | C | PCB-42 | 370 | | PCB-79 | 9.78 | |
| PCB-5 | 1.68 | | PCB-21/33 | 410 | C | PCB-41 | 115 | | PCB-78 | (0.803) | |
| PCB-8 | 138 | | PCB-22 | 341 | | PCB-71/40 | 639 | C | PCB-81 | 3.52 | |
| PCB-14 | (0.421) | | PCB-36 | 0.978 | J | PCB-64 | 627 | | PCB-77 | 91.4 | |
| PCB-11 | 78 | | PCB-39 | 7.66 | | | | | | | |
| PCB-13/12 | 17.6 | C | PCB-38 | (0.507) | | | | | | | |
| PCB-15 | 141 | | PCB-35 | 20.6 | | | | | | | |
| | | | PCB-37 | 305 | | | | | | | |
| **Conc.** | 524 | | **Conc.** | 5,350 | | | | | **Conc.** | 11,000 | |
| **EMPC** | 524 | | **EMPC** | 5,350 | | | | | **EMPC** | 11,000 | |


ANALYTICAL PERSPECTIVES

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| Totals | Conc. | EMPC |
|---|---|---|
| Mono-Tri | 5,870 | 5,870 |
| Tetra-Hexa | 22,500 | 22,500 |
| Hepta-Deca | 1,930 | 1,930 |
| Mono-Deca | 30,300 | 30,300 |

# Sample ID: LPR7-ECST-Comp03 Method 1668B

| Penta | Conc. | Qualifiers | Penta | Conc. | Qualifiers | Hexa | Conc. | Qualifiers | Hexa | Conc. | Qualifiers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PCB-104 | 2.55 | | PCB-109/119/86… | 761 | C | PCB-155 | 1.89 | | PCB-165 | (0.245) | |
| PCB-96 | 16.4 | | PCB-117 | 25.1 | | PCB-152 | 1.87 | | PCB-146 | 130 | |
| PCB-103 | 15.4 | | PCB-116/85 | 173 | C | PCB-150 | [1.54] | EMPC | PCB-161 | (0.242) | |
| PCB-94 | 15.1 | | PCB-110 | 1,220 | | PCB-136 | 134 | | PCB-153/168 | 680 | C |
| PCB-95 | 978 | | PCB-115 | 27.8 | | PCB-145 | (0.19) | | PCB-141 | 186 | |
| PCB-100/93 | 31.3 | C | PCB-82 | 139 | | PCB-148 | [1.76] | EMPC | PCB-130 | 56.9 | |
| PCB-102 | 49.4 | | PCB-111 | (1.94) | | PCB-151/135 | 372 | C | PCB-137 | 37.7 | |
| PCB-98 | (2.78) | | PCB-120 | (1.99) | | PCB-154 | 11.2 | | PCB-164 | 73.6 | |
| PCB-88 | 19.1 | | PCB-108/124 | 37.6 | C | PCB-144 | 45.9 | | PCB-163/138/129 | 1,040 | C |
| PCB-91 | 160 | | PCB-107 | 53.3 | | PCB-147/149 | 755 | C | PCB-160 | (0.234) | |
| PCB-84 | 328 | | PCB-123 | 16 | | PCB-134 | 58.6 | | PCB-158 | 84 | |
| PCB-89 | 21.6 | | PCB-106 | (2.19) | | PCB-143 | 3.45 | | PCB-128/166 | 124 | C |
| PCB-121 | (1.88) | | PCB-118 | 815 | | PCB-139/140 | 16 | C | PCB-159 | 7.3 | |
| PCB-92 | 240 | | PCB-122 | 10.9 | | PCB-131 | 13.5 | | PCB-162 | [2.95] | EMPC |
| PCB-113/90/101 | 1,160 | C | PCB-114 | 19.7 | | PCB-142 | (0.348) | | PCB-167 | 28.6 | |
| PCB-83 | 76.1 | | PCB-105 | 321 | | PCB-132 | 343 | | PCB-156/157 | 77.9 | C |
| PCB-99 | 512 | | PCB-127 | (1.97) | | PCB-133 | 17.4 | | PCB-169 | (0.656) | |
| PCB-112 | 9.93 | | PCB-126 | 2.02 | | | | | | | |
| | | | **Conc.** | 7,260 | | | | | **Conc.** | 4,300 | |
| | | | **EMPC** | 7,260 | | | | | **EMPC** | 4,310 | |

| Hepta | Conc. | Qualifiers | Hepta | Conc. | Qualifiers | Octa | Conc. | Qualifiers | Nona | Conc. | Qualifiers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PCB-188 | 0.461 | J | PCB-174 | 218 | | PCB-202 | 29.1 | | PCB-208 | 25 | |
| PCB-179 | 94 | | PCB-177 | 113 | | PCB-201 | 9.99 | | PCB-207 | 3.37 | |
| PCB-184 | 1.03 | | PCB-181 | (0.516) | | PCB-204 | (0.184) | | PCB-206 | 51 | |
| PCB-176 | 24.2 | | PCB-171/173 | 50.2 | C | PCB-197 | [1.6] | EMPC | | | |
| PCB-186 | (0.186) | | PCB-172 | 34 | | PCB-200 | 12.4 | | **Conc.** | 79.4 | |
| PCB-178 | 42.4 | | PCB-192 | (0.44) | | PCB-198/199 | 93.1 | C | **EMPC** | 79.4 | |
| PCB-175 | 7.57 | | PCB-180/193 | 324 | C | PCB-196 | 19.7 | | | | |
| PCB-187 | 273 | | PCB-191 | 5.8 | | PCB-203 | 49 | | **Deca** | **Conc.** | **Qualifiers** |
| PCB-182 | 1.2 | | PCB-170 | 116 | | PCB-195 | 55.2 | | PCB-209 | 45.8 | |
| PCB-183 | 110 | | PCB-190 | 26.3 | | PCB-194 | 72.5 | | | | |
| PCB-185 | 19.5 | | PCB-189 | [3.38] | EMPC | PCB-205 | [2.67] | EMPC | | | |
| | | | **Conc.** | 1,460 | | **Conc.** | 341 | | | | |
| | | | **EMPC** | 1,460 | | **EMPC** | 345 | | | | |

# Sample ID: LPR7-ECST-Comp04

# Method 1668B

| Client Data | | Sample Data | | Laboratory Data | | | |
|---|---|---|---|---|---|---|---|
| Name: | Windward Environmental, LLC | Matrix: | Tissue | Project No.: | A3406 | Date Received: | 02-Aug-2011 |
| Project ID: | Passaic RI/FS Caged Bivalve Study | Weight/Volume: | 10.05 g | Sample ID: | A3406_8929_PCB_005 | Date Extracted: | 15-Aug-2011 |
| Date Collected: | 08-Jun-2011 | | | QC Batch No.: | 8929 | Date Analyzed: | 22-Aug-2011 |

| Analyte | Conc. | DL | EMPC | Qualifier | Standard | Recovery |
|---|---|---|---|---|---|---|
| | pg/g | pg/g | pg/g | | | % |
| PCB-77 33'44'-TeCB | 53.5 | | | | ES PCB-1 | 79.7 |
| PCB-81 344'5-TeCB | 2.02 | | | | ES PCB-3 | 87 |
| PCB-105 233'44'-PeCB | 201 | | | | ES PCB-4 | 86.1 |
| PCB-114 2344'5-PeCB | 11.7 | | | | ES PCB-15 | 95.4 |
| PCB-118 23'44'5-PeCB | 534 | | | | ES PCB-19 | 88.5 |
| PCB-123 23'44'5'-PeCB | 10.6 | | | | ES PCB-37 | 98.1 |
| PCB-126 33'44'5-PeCB | EMPC | | 1.37 | | ES PCB-54 | 78.5 |
| PCB-156/157 233'44'5/233'44'5'-HxCB | 52.4 | | | C | ES PCB-77 | 103 |
| PCB-167 23'44'55'-HxCB | 20.1 | | | | ES PCB-81 | 96.4 |
| PCB-169 33'44'55'-HxCB | EMPC | | 0.9 | J | ES PCB-104 | 82.1 |
| PCB-189 233'44'55'-HpCB | 2.56 | | | | ES PCB-105 | 97.7 |
| | | | | | ES PCB-114 | 95.1 |
| **TEQs (WHO M/H)** | | | | | ES PCB-118 | 94.1 |
| | | | | | ES PCB-123 | 91.5 |
| ND = 0 | 0.0309 | | 0.195 | | ES PCB-126 | 99.8 |
| ND = 0.5 x DL | 0.0642 | | 0.195 | | ES PCB-153 | 89.3 |
| | | | | | ES PCB-155 | 87.5 |
| **Totals** | | | | | ES PCB-156/157 | 97.2 |
| | | | | | ES PCB-167 | 95.4 |
| Mono-CBs | 4.36 | | | | ES PCB-169 | 87.1 |
| Di-CBs | 347 | | 348 | | ES PCB-170 | 203 V |
| Tri-CBs | 3,230 | | 3,230 | | ES PCB-180 | 203 V |
| Tetra-CBs | 6,230 | | | | ES PCB-188 | 90.3 |
| Penta-CBs | 4,920 | | 4,930 | | ES PCB-189 | 156 V |
| Hexa-CBs | 3,160 | | 3,160 | | ES PCB-202 | 90.8 |
| Hepta-CBs | 1,050 | | 1,060 | | ES PCB-205 | 99.6 |
| Octa-CBs | 266 | | 267 | | ES PCB-206 | 118 |
| Nona-CBs | 80.2 | | | | ES PCB-208 | 155 V |
| Deca-CB | 51.5 | | | | ES PCB-209 | 116 V |
| | | | | | CS PCB-28 | 77.7 |
| Mono-Deca | 19,300 | | 19,400 | | CS PCB-111 | 97.6 |
| | | | | | CS PCB-178 | 102 |

Checkcode: 298-713-LYT AP PCB 2011 Rev. A Report Created: 31-Aug-2011 17:26 Analyst: LB

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# Sample ID: LPR7-ECST-Comp04 — Method 1668B

| Client Data | | Sample Data | | Laboratory Data | | | |
|---|---|---|---|---|---|---|---|
| Name: | Windward Environmental, LLC | Matrix: | Tissue | Project No.: | A3406 | Date Received: | 02-Aug-2011 |
| Project ID: | Passaic RI/FS Caged Bivalve Study | Weight/Volume: | 10.05 g | Sample ID: | A3406_8929_PCB_005 | Date Extracted: | 15-Aug-2011 |
| Date Collected: | 08-Jun-2011 | | | QC Batch No.: | 8929 | Date Analyzed: | 22-Aug-2011 |
| | | Units | pg/g | Checkcode: | 298-713-LYT | Time Analyzed: | 18:29:26 |

| Mono | Conc. | Qualifiers | Tri | Conc. | Qualifiers | Tetra | Conc. | Qualifiers | Tetra | Conc. | Qualifiers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PCB-1 | 2.88 | | PCB-19 | 68.7 | | PCB-54 | 9.59 | | PCB-72 | 6.76 | |
| PCB-2 | 0.415 | J | PCB-30/18 | 479 | C | PCB-50/53 | 136 | C | PCB-68 | 6.52 | |
| PCB-3 | 1.07 | | PCB-17 | 278 | | PCB-45 | 142 | | PCB-57 | 5 | |
| | | | PCB-27 | 58.6 | | PCB-51 | 78.6 | | PCB-58 | 2.29 | |
| **Conc.** | 4.36 | | PCB-24 | 9.23 | | PCB-46 | 50.1 | | PCB-67 | 29.8 | |
| **EMPC** | 4.36 | | PCB-16 | 184 | | PCB-52 | 1,040 | | PCB-63 | 28.8 | |
| | | | PCB-32 | 221 | | PCB-73 | 6.66 | | PCB-61/70/74/76 | 1,010 | C |
| **Di** | **Conc.** | **Qualifiers** | PCB-34 | 5.08 | | PCB-43 | 33.9 | | PCB-66 | 580 | |
| PCB-4 | 73.2 | | PCB-23 | (0.799) | | PCB-69/49 | 525 | C | PCB-55 | 8.94 | |
| PCB-10 | 4.59 | | PCB-26/29 | 142 | C | PCB-48 | 151 | | PCB-56 | 263 | |
| PCB-9 | 5.38 | | PCB-25 | 91.2 | | PCB-44/47/65 | 869 | C | PCB-60 | 93.6 | |
| PCB-7 | 3.19 | | PCB-31 | 552 | | PCB-59/62/75 | 88 | C | PCB-80 | (0.479) | |
| PCB-6 | 28.4 | | PCB-28/20 | 556 | C | PCB-42 | 222 | | PCB-79 | 7.27 | |
| PCB-5 | [0.76] | J EMPC | PCB-21/33 | 193 | C | PCB-41 | 54.2 | | PCB-78 | (0.59) | |
| PCB-8 | 73.3 | | PCB-22 | 195 | | PCB-71/40 | 365 | C | PCB-81 | 2.02 | |
| PCB-14 | (0.48) | | PCB-36 | 1.16 | | PCB-64 | 359 | | PCB-77 | 53.5 | |
| PCB-11 | 42 | | PCB-39 | 5.59 | | | | | | | |
| PCB-13/12 | 15.2 | C | PCB-38 | [1.03] | EMPC | | | | | | |
| PCB-15 | 102 | | PCB-35 | 12.1 | | | | | | | |
| | | | PCB-37 | 175 | | | | | | | |
| **Conc.** | 347 | | **Conc.** | 3,230 | | | | | **Conc.** | 6,230 | |
| **EMPC** | 348 | | **EMPC** | 3,230 | | | | | **EMPC** | 6,230 | |

| Totals | Conc. | EMPC |
|---|---|---|
| Mono-Tri | 3,580 | 3,580 |
| Tetra-Hexa | 14,300 | 14,300 |
| Hepta-Deca | 1,450 | 1,460 |
| Mono-Deca | 19,300 | 19,400 |

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# Sample ID: LPR7-ECST-Comp04 Method 1668B

| Penta | Conc. | Qualifiers | Penta | Conc. | Qualifiers | Hexa | Conc. | Qualifiers | Hexa | Conc. | Qualifiers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PCB-104 | 2.37 | | PCB-109/119/86… | 504 | C | PCB-155 | [1.26] | EMPC | PCB-165 | (0.256) | |
| PCB-96 | 11.8 | | PCB-117 | 18.6 | | PCB-152 | 1.52 | | PCB-146 | 100 | |
| PCB-103 | 12.1 | | PCB-116/85 | 116 | C | PCB-150 | 1.57 | | PCB-161 | (0.254) | |
| PCB-94 | 11.4 | | PCB-110 | 854 | | PCB-136 | 93.1 | | PCB-153/168 | 499 | C |
| PCB-95 | 660 | | PCB-115 | 34.5 | | PCB-145 | (0.198) | | PCB-141 | 131 | |
| PCB-100/93 | 25.9 | C | PCB-82 | 88 | | PCB-148 | 1.99 | | PCB-130 | 43.2 | |
| PCB-102 | 31.8 | | PCB-111 | (1.65) | | PCB-151/135 | 279 | C | PCB-137 | 28.3 | |
| PCB-98 | 2.92 | | PCB-120 | (1.69) | | PCB-154 | 9.11 | | PCB-164 | 54.5 | |
| PCB-88 | [6.61] | EMPC | PCB-108/124 | 25.6 | C | PCB-144 | 30.6 | | PCB-163/138/129 | 775 | C |
| PCB-91 | 118 | | PCB-107 | 36.7 | | PCB-147/149 | 553 | C | PCB-160 | (0.245) | |
| PCB-84 | 215 | | PCB-123 | 10.6 | | PCB-134 | 43.2 | | PCB-158 | 58.7 | |
| PCB-89 | 12.4 | | PCB-106 | (1.86) | | PCB-143 | 2.49 | | PCB-128/166 | 93.4 | C |
| PCB-121 | (1.6) | | PCB-118 | 534 | | PCB-139/140 | 11.9 | C | PCB-159 | 5.48 | |
| PCB-92 | 172 | | PCB-122 | 7.92 | | PCB-131 | 8.46 | | PCB-162 | 2.12 | |
| PCB-113/90/101 | 791 | C | PCB-114 | 11.7 | | PCB-142 | (0.364) | | PCB-167 | 20.1 | |
| PCB-83 | 38.4 | | PCB-105 | 201 | | PCB-132 | 249 | | PCB-156/157 | 52.4 | C |
| PCB-99 | 373 | | PCB-127 | (1.75) | | PCB-133 | 13.1 | | PCB-169 | [0.9] | J EMPC |
| PCB-112 | (1.65) | | PCB-126 | 1.37 | EMPC | | | | | | |
| | | | **Conc.** | 4,920 | | | | | **Conc.** | 3,160 | |
| | | | **EMPC** | 4,930 | | | | | **EMPC** | 3,160 | |

| Hepta | Conc. | Qualifiers | Hepta | Conc. | Qualifiers | Octa | Conc. | Qualifiers | Nona | Conc. | Qualifiers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PCB-188 | (0.199) | | PCB-174 | 158 | | PCB-202 | 27.4 | | PCB-208 | 25.7 | |
| PCB-179 | 69.1 | | PCB-177 | 81.1 | | PCB-201 | 7.05 | | PCB-207 | 2.98 | |
| PCB-184 | 1.16 | | PCB-181 | 1.29 | | PCB-204 | (0.221) | | PCB-206 | 51.5 | |
| PCB-176 | 16.5 | | PCB-171/173 | 30.8 | C | PCB-197 | [1.12] | EMPC | | | |
| PCB-186 | (0.227) | | PCB-172 | 25.6 | | PCB-200 | 8.89 | | **Conc.** | 80.2 | |
| PCB-178 | 33.2 | | PCB-192 | (0.442) | | PCB-198/199 | 77.7 | C | **EMPC** | 80.2 | |
| PCB-175 | 4.71 | | PCB-180/193 | 230 | C | PCB-196 | 12.4 | | | | |
| PCB-187 | 211 | | PCB-191 | [3.38] | EMPC | PCB-203 | 41 | | **Deca** | **Conc.** | **Qualifiers** |
| PCB-182 | (0.484) | | PCB-170 | 81.5 | | PCB-195 | 38.5 | | PCB-209 | 51.5 | |
| PCB-183 | 73.3 | | PCB-190 | 18.9 | | PCB-194 | 51 | | | | |
| PCB-185 | 14.4 | | PCB-189 | 2.56 | | PCB-205 | 1.89 | | | | |
| | | | **Conc.** | 1,050 | | **Conc.** | 266 | | | | |
| | | | **EMPC** | 1,060 | | **EMPC** | 267 | | | | |

# Sample ID: LPR8-ECST-Comp05

# Method 1668B

| Client Data | | Sample Data | | Laboratory Data | | | |
|---|---|---|---|---|---|---|---|
| Name: | Windward Environmental, LLC | Matrix: | Tissue | Project No.: | A3406 | Date Received: | 02-Aug-2011 |
| Project ID: | Passaic RI/FS Caged Bivalve Study | Weight/Volume: | 10.19 g | Sample ID: | A3406_8929_PCB_006 | Date Extracted: | 15-Aug-2011 |
| Date Collected: | 08-Jun-2011 | | | QC Batch No.: | 8929 | Date Analyzed: | 22-Aug-2011 |

| Analyte | Conc. | DL | EMPC | Qualifier | Standard | Recovery |
|---|---|---|---|---|---|---|
| | pg/g | pg/g | pg/g | | | % |
| PCB-77 33'44'-TeCB | 46.5 | | | | ES PCB-1 | 80.6 |
| PCB-81 344'5-TeCB | ND | 0.541 | | | ES PCB-3 | 88.8 |
| PCB-105 233'44'-PeCB | 163 | | | | ES PCB-4 | 96 |
| PCB-114 2344'5-PeCB | 10.3 | | | | ES PCB-15 | 102 |
| PCB-118 23'44'5-PeCB | 415 | | | | ES PCB-19 | 97.1 |
| PCB-123 23'44'5'-PeCB | 9.57 | | | | ES PCB-37 | 100 |
| PCB-126 33'44'5-PeCB | 1.61 | | | | ES PCB-54 | 88.7 |
| PCB-156/157 233'44'5/233'44'5'-HxCB | 41.2 | | | C | ES PCB-77 | 95.2 |
| PCB-167 23'44'55'-HxCB | 15.6 | | | | ES PCB-81 | 92.9 |
| PCB-169 33'44'55'-HxCB | ND | 0.585 | | | ES PCB-104 | 96.2 |
| PCB-189 233'44'55'-HpCB | 1.96 | | | | ES PCB-105 | 94.8 |
| | | | | | ES PCB-114 | 89.9 |
| **TEQs (WHO M/H)** | | | | | ES PCB-118 | 96 |
| | | | | | ES PCB-123 | 92.2 |
| ND = 0 | 0.186 | | 0.186 | | ES PCB-126 | 92.8 |
| ND = 0.5 x DL | 0.195 | | 0.195 | | ES PCB-153 | 96.6 |
| | | | | | ES PCB-155 | 97.7 |
| **Totals** | | | | | ES PCB-156/157 | 91.2 |
| | | | | | ES PCB-167 | 92.1 |
| Mono-CBs | 5.36 | | | | ES PCB-169 | 82.5 |
| Di-CBs | 340 | | | | ES PCB-170 | 197 V |
| Tri-CBs | 2,890 | | 2,900 | | ES PCB-180 | 208 V |
| Tetra-CBs | 5,730 | | | | ES PCB-188 | 93 |
| Penta-CBs | 3,980 | | | | ES PCB-189 | 151 V |
| Hexa-CBs | 2,430 | | | | ES PCB-202 | 91.2 |
| Hepta-CBs | 768 | | 772 | | ES PCB-205 | 103 |
| Octa-CBs | 197 | | 197 | | ES PCB-206 | 132 V |
| Nona-CBs | 61.3 | | | | ES PCB-208 | 147 V |
| Deca-CB | 40 | | | | ES PCB-209 | 139 V |
| | | | | | CS PCB-28 | 73.9 |
| Mono-Deca | 16,400 | | 16,500 | | CS PCB-111 | 95.7 |
| | | | | | CS PCB-178 | 98.6 |

Checkcode: 693-411-CPH AP PCB 2011 Rev. A Report Created: 31-Aug-2011 17:28 Analyst: LB

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# Sample ID: LPR8-ECST-Comp05 — Method 1668B

| Client Data | | Sample Data | | Laboratory Data | | | |
|---|---|---|---|---|---|---|---|
| Name: | Windward Environmental, LLC | Matrix: | Tissue | Project No.: | A3406 | Date Received: | 02-Aug-2011 |
| Project ID: | Passaic RI/FS Caged Bivalve Study | Weight/Volume: | 10.19 g | Sample ID: | A3406_8929_PCB_006 | Date Extracted: | 15-Aug-2011 |
| Date Collected: | 08-Jun-2011 | | | QC Batch No.: | 8929 | Date Analyzed: | 22-Aug-2011 |
| | | Units | pg/g | Checkcode: | 693-411-CPH | Time Analyzed: | 23:15:19 |

| Mono | Conc. | Qualifiers | Tri | Conc. | Qualifiers | Tetra | Conc. | Qualifiers | Tetra | Conc. | Qualifiers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PCB-1 | 3.31 | | PCB-19 | 63.1 | | PCB-54 | 9.37 | | PCB-72 | 7.28 | |
| PCB-2 | 0.828 | J | PCB-30/18 | 458 | C | PCB-50/53 | 134 | C | PCB-68 | 6.21 | |
| PCB-3 | 1.22 | | PCB-17 | 254 | | PCB-45 | 116 | | PCB-57 | 4.76 | |
| | | | PCB-27 | 56.3 | | PCB-51 | 87.1 | | PCB-58 | 2.56 | |
| **Conc.** | 5.36 | | PCB-24 | [8.04] | EMPC | PCB-46 | 51.7 | | PCB-67 | 24.4 | |
| **EMPC** | 5.36 | | PCB-16 | 174 | | PCB-52 | 973 | | PCB-63 | 26 | |
| | | | PCB-32 | 209 | | PCB-73 | 7.19 | | PCB-61/70/74/76 | 863 | C |
| **Di** | **Conc.** | **Qualifiers** | PCB-34 | 4.1 | | PCB-43 | 32.2 | | PCB-66 | 485 | |
| PCB-4 | 68.2 | | PCB-23 | (0.618) | | PCB-69/49 | 528 | C | PCB-55 | 7.34 | |
| PCB-10 | 4.3 | | PCB-26/29 | 125 | C | PCB-48 | 142 | | PCB-56 | 224 | |
| PCB-9 | 5.25 | | PCB-25 | 77.6 | | PCB-44/47/65 | 837 | C | PCB-60 | 80.4 | |
| PCB-7 | 2.76 | | PCB-31 | 489 | | PCB-59/62/75 | 84.5 | C | PCB-80 | (0.444) | |
| PCB-6 | 27.6 | | PCB-28/20 | 452 | C | PCB-42 | 208 | | PCB-79 | 5.79 | |
| PCB-5 | 0.918 | J | PCB-21/33 | 171 | C | PCB-41 | 48.1 | | PCB-78 | (0.543) | |
| PCB-8 | 74 | | PCB-22 | 181 | | PCB-71/40 | 352 | C | PCB-81 | (0.541) | |
| PCB-14 | (0.458) | | PCB-36 | (0.619) | | PCB-64 | 341 | | PCB-77 | 46.5 | |
| PCB-11 | 41.5 | | PCB-39 | [3.7] | EMPC | | | | | | |
| PCB-13/12 | 14.9 | C | PCB-38 | (0.635) | | | | | | | |
| PCB-15 | 100 | | PCB-35 | 10.2 | | | | | | | |
| | | | PCB-37 | 162 | | | | | | | |
| **Conc.** | 340 | | **Conc.** | 2,890 | | | | | **Conc.** | 5,730 | |
| **EMPC** | 340 | | **EMPC** | 2,900 | | | | | **EMPC** | 5,730 | |

| Totals | Conc. | EMPC |
|---|---|---|
| Mono-Tri | 3,230 | 3,240 |
| Tetra-Hexa | 12,100 | 12,100 |
| Hepta-Deca | 1,070 | 1,070 |
| Mono-Deca | 16,400 | 16,500 |

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# Sample ID: LPR8-ECST-Comp05 Method 1668B

| Penta | Conc. | Qualifiers | Penta | Conc. | Qualifiers | Hexa | Conc. | Qualifiers | Hexa | Conc. | Qualifiers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PCB-104 | 2.16 | | PCB-109/119/86… | 419 | C | PCB-155 | 1.11 | | PCB-165 | (0.224) | |
| PCB-96 | 9.88 | | PCB-117 | 15.2 | | PCB-152 | 1.3 | | PCB-146 | 78.6 | |
| PCB-103 | 11 | | PCB-116/85 | 99.2 | C | PCB-150 | 1.18 | | PCB-161 | (0.221) | |
| PCB-94 | 10.1 | | PCB-110 | 628 | | PCB-136 | 75.7 | | PCB-153/168 | 368 | C |
| PCB-95 | 590 | | PCB-115 | 12 | | PCB-145 | (0.167) | | PCB-141 | 91.8 | |
| PCB-100/93 | 21.6 | C | PCB-82 | 69.2 | | PCB-148 | 1.54 | | PCB-130 | 35 | |
| PCB-102 | 27.9 | | PCB-111 | (1.69) | | PCB-151/135 | 223 | C | PCB-137 | 24.8 | |
| PCB-98 | (2.92) | | PCB-120 | (1.73) | | PCB-154 | 7.52 | | PCB-164 | 38.2 | |
| PCB-88 | (2.97) | | PCB-108/124 | 20.4 | C | PCB-144 | 24.5 | | PCB-163/138/129 | 593 | C |
| PCB-91 | 98 | | PCB-107 | 30.1 | | PCB-147/149 | 440 | C | PCB-160 | (0.227) | |
| PCB-84 | 192 | | PCB-123 | 9.57 | | PCB-134 | 34.5 | | PCB-158 | 44.7 | |
| PCB-89 | 10.1 | | PCB-106 | (1.92) | | PCB-143 | (0.3) | | PCB-128/166 | 71 | C |
| PCB-121 | (1.67) | | PCB-118 | 415 | | PCB-139/140 | 8.73 | C | PCB-159 | 4.02 | |
| PCB-92 | 141 | | PCB-122 | 6.83 | | PCB-131 | 7.09 | | PCB-162 | 1.72 | |
| PCB-113/90/101 | 649 | C | PCB-114 | 10.3 | | PCB-142 | (0.33) | | PCB-167 | 15.6 | |
| PCB-83 | 36.5 | | PCB-105 | 163 | | PCB-132 | 187 | | PCB-156/157 | 41.2 | C |
| PCB-99 | 284 | | PCB-127 | (1.97) | | PCB-133 | 9.72 | | PCB-169 | (0.585) | |
| PCB-112 | (1.73) | | PCB-126 | 1.61 | | | | | | | |
| | | | **Conc.** | 3,980 | | | | | **Conc.** | 2,430 | |
| | | | **EMPC** | 3,980 | | | | | **EMPC** | 2,430 | |

| Hepta | Conc. | Qualifiers | Hepta | Conc. | Qualifiers | Octa | Conc. | Qualifiers | Nona | Conc. | Qualifiers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PCB-188 | (0.159) | | PCB-174 | 112 | | PCB-202 | 20.9 | | PCB-208 | 19.6 | |
| PCB-179 | 48.2 | | PCB-177 | 62 | | PCB-201 | 5.42 | | PCB-207 | 2.25 | |
| PCB-184 | 0.854 | J | PCB-181 | 0.934 | J | PCB-204 | (0.153) | | PCB-206 | 39.5 | |
| PCB-176 | 10.8 | | PCB-171/173 | 22.1 | C | PCB-197 | [0.724] | J EMPC | | | |
| PCB-186 | (0.175) | | PCB-172 | 18 | | PCB-200 | 7.42 | | **Conc.** | 61.3 | |
| PCB-178 | 25.7 | | PCB-192 | (0.454) | | PCB-198/199 | 58.7 | C | **EMPC** | 61.3 | |
| PCB-175 | [3.42] | EMPC | PCB-180/193 | 165 | C | PCB-196 | 9.14 | | | | |
| PCB-187 | 159 | | PCB-191 | 2.18 | | PCB-203 | 31 | | **Deca** | **Conc.** | **Qualifiers** |
| PCB-182 | (0.525) | | PCB-170 | 64.6 | | PCB-195 | 25.3 | | PCB-209 | 40 | |
| PCB-183 | 49.1 | | PCB-190 | 14.6 | | PCB-194 | 37.1 | | | | |
| PCB-185 | 11.6 | | PCB-189 | 1.96 | | PCB-205 | 1.5 | | | | |
| | | | **Conc.** | 768 | | **Conc.** | 197 | | | | |
| | | | **EMPC** | 772 | | **EMPC** | 197 | | | | |

# Sample ID: LPR1-GDST-Comp01

# Method 1668B

| Client Data | | Sample Data | | Laboratory Data | | | |
|---|---|---|---|---|---|---|---|
| Name: | Windward Environmental, LLC | Matrix: | Tissue | Project No.: | A3406 | Date Received: | 02-Aug-2011 |
| Project ID: | Passaic RI/FS Caged Bivalve Study | Weight/Volume: | 10.03 g | Sample ID: | A3406_8929_PCB_007 | Date Extracted: | 15-Aug-2011 |
| Date Collected: | 09-May-2011 | | | QC Batch No.: | 8929 | Date Analyzed: | 23-Aug-2011 |

| Analyte | Conc. | DL | EMPC | Qualifier | Standard | Recovery |
|---|---|---|---|---|---|---|
| | pg/g | pg/g | pg/g | | | % |
| PCB-77 33'44'-TeCB | 46.2 | | | | ES PCB-1 | 67.7 |
| PCB-81 344'5-TeCB | 1.68 | | | | ES PCB-3 | 81.6 |
| PCB-105 233'44'-PeCB | 175 | | | | ES PCB-4 | 87.2 |
| PCB-114 2344'5-PeCB | 8.29 | | | | ES PCB-15 | 103 |
| PCB-118 23'44'5-PeCB | 434 | | | | ES PCB-19 | 89.6 |
| PCB-123 23'44'5'-PeCB | 10.2 | | | | ES PCB-37 | 98 |
| PCB-126 33'44'5-PeCB | EMPC | | 0.837 | J | ES PCB-54 | 87.2 |
| PCB-156/157 233'44'5/233'44'5'-HxCB | 21.1 | | | C | ES PCB-77 | 93.4 |
| PCB-167 23'44'55'-HxCB | 15 | | | | ES PCB-81 | 89.4 |
| PCB-169 33'44'55'-HxCB | ND | 0.48 | | | ES PCB-104 | 94 |
| PCB-189 233'44'55'-HpCB | 1.18 | | | | ES PCB-105 | 90.6 |
| | | | | | ES PCB-114 | 89.2 |
| **TEQs (WHO M/H)** | | | | | ES PCB-118 | 95.4 |
| | | | | | ES PCB-123 | 92.4 |
| ND = 0 | 0.025 | | 0.109 | | ES PCB-126 | 91.1 |
| ND = 0.5 x DL | 0.0485 | | 0.116 | | ES PCB-153 | 96.4 |
| | | | | | ES PCB-155 | 97.3 |
| **Totals** | | | | | ES PCB-156/157 | 91 |
| | | | | | ES PCB-167 | 91.4 |
| Mono-CBs | 7.96 | | 10.4 | | ES PCB-169 | 85.1 |
| Di-CBs | 369 | | | | ES PCB-170 | 149 |
| Tri-CBs | 3,200 | | | | ES PCB-180 | 151 V |
| Tetra-CBs | 7,490 | | | | ES PCB-188 | 93.8 |
| Penta-CBs | 4,400 | | 4,400 | | ES PCB-189 | 122 V |
| Hexa-CBs | 2,430 | | 2,440 | | ES PCB-202 | 93.1 |
| Hepta-CBs | 557 | | | | ES PCB-205 | 101 |
| Octa-CBs | 45.6 | | 46 | | ES PCB-206 | 114 |
| Nona-CBs | | | 1.94 | | ES PCB-208 | 120 |
| Deca-CB | 1.54 | | | | ES PCB-209 | 115 |
| | | | | | CS PCB-28 | 78.3 |
| Mono-Deca | 18,500 | | 18,500 | | CS PCB-111 | 95.1 |
| | | | | | CS PCB-178 | 98.9 |

Checkcode: 973-021-HTN AP PCB 2011 Rev. A Report Created: 31-Aug-2011 17:28 Analyst: LB

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# Sample ID: LPR1-GDST-Comp01 — Method 1668B

| Client Data | | Sample Data | | Laboratory Data | | | |
|---|---|---|---|---|---|---|---|
| Name: | Windward Environmental, LLC | Matrix: | Tissue | Project No.: | A3406 | Date Received: | 02-Aug-2011 |
| Project ID: | Passaic RI/FS Caged Bivalve Study | Weight/Volume: | 10.03 g | Sample ID: | A3406_8929_PCB_007 | Date Extracted: | 15-Aug-2011 |
| Date Collected: | 09-May-2011 | | | QC Batch No.: | 8929 | Date Analyzed: | 23-Aug-2011 |
| | | Units | pg/g | Checkcode: | 973-021-HTN | Time Analyzed: | 00:09:59 |

| Mono | Conc. | Qualifiers | Tri | Conc. | Qualifiers | Tetra | Conc. | Qualifiers | Tetra | Conc. | Qualifiers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PCB-1 | 6.62 | | PCB-19 | 58.1 | | PCB-54 | 18.9 | | PCB-72 | 12.3 | |
| PCB-2 | [2.42] | EMPC | PCB-30/18 | 464 | C | PCB-50/53 | 189 | C | PCB-68 | 8.15 | |
| PCB-3 | 1.34 | | PCB-17 | 293 | | PCB-45 | 90.9 | | PCB-57 | 5.5 | |
| | | | PCB-27 | 79.4 | | PCB-51 | 200 | | PCB-58 | (0.501) | |
| **Conc.** | 7.96 | | PCB-24 | 7.3 | | PCB-46 | 67.7 | | PCB-67 | 33.3 | |
| **EMPC** | 10.4 | | PCB-16 | 183 | | PCB-52 | 1,220 | | PCB-63 | 31.5 | |
| | | | PCB-32 | 236 | | PCB-73 | 7.45 | | PCB-61/70/74/76 | 1,190 | C |
| **Di** | **Conc.** | **Qualifiers** | PCB-34 | 7.24 | | PCB-43 | 41.4 | | PCB-66 | 627 | |
| PCB-4 | 73.1 | | PCB-23 | 0.672 | J | PCB-69/49 | 728 | C | PCB-55 | 8.53 | |
| PCB-10 | 9.83 | | PCB-26/29 | 163 | C | PCB-48 | 172 | | PCB-56 | 280 | |
| PCB-9 | 7.01 | | PCB-25 | 96.4 | | PCB-44/47/65 | 1,120 | C | PCB-60 | 100 | |
| PCB-7 | 2.98 | | PCB-31 | 590 | | PCB-59/62/75 | 100 | C | PCB-80 | (0.44) | |
| PCB-6 | 43.7 | | PCB-28/20 | 509 | C | PCB-42 | 283 | | PCB-79 | 6.34 | |
| PCB-5 | 1.77 | | PCB-21/33 | 186 | C | PCB-41 | 44.4 | | PCB-78 | (0.539) | |
| PCB-8 | 65.9 | | PCB-22 | 178 | | PCB-71/40 | 456 | C | PCB-81 | 1.68 | |
| PCB-14 | (0.381) | | PCB-36 | 1.73 | | PCB-64 | 404 | | PCB-77 | 46.2 | |
| PCB-11 | 83.6 | | PCB-39 | 4.99 | | | | | | | |
| PCB-13/12 | 17 | C | PCB-38 | (0.505) | | | | | | | |
| PCB-15 | 64.4 | | PCB-35 | 11.9 | | | | | | | |
| | | | PCB-37 | 126 | | | | | | | |
| **Conc.** | 369 | | **Conc.** | 3,200 | | | | | **Conc.** | 7,490 | |
| **EMPC** | 369 | | **EMPC** | 3,200 | | | | | **EMPC** | 7,490 | |

| Totals | Conc. | EMPC |
|---|---|---|
| Mono-Tri | 3,570 | 3,580 |
| Tetra-Hexa | 14,300 | 14,300 |
| Hepta-Deca | 604 | 606 |
| Mono-Deca | 18,500 | 18,500 |

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# Sample ID: LPR1-GDST-Comp01 Method 1668B

| Penta | Conc. | Qualifiers | Penta | Conc. | Qualifiers | Hexa | Conc. | Qualifiers | Hexa | Conc. | Qualifiers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PCB-104 | 6.37 | | PCB-109/119/86… | 433 | C | PCB-155 | 5.78 | | PCB-165 | (0.168) | |
| PCB-96 | 13 | | PCB-117 | 16.6 | | PCB-152 | 2.61 | | PCB-146 | 101 | |
| PCB-103 | 24.7 | | PCB-116/85 | 105 | C | PCB-150 | 3.54 | | PCB-161 | (0.166) | |
| PCB-94 | 17.9 | | PCB-110 | 611 | | PCB-136 | 91.9 | | PCB-153/168 | 436 | C |
| PCB-95 | 620 | | PCB-115 | 26.3 | | PCB-145 | (0.132) | | PCB-141 | 13.1 | |
| PCB-100/93 | 53.9 | C | PCB-82 | 73.1 | | PCB-148 | 2.87 | | PCB-130 | 31 | |
| PCB-102 | 49.2 | | PCB-111 | (1.02) | | PCB-151/135 | 264 | C | PCB-137 | [8.98] | EMPC |
| PCB-98 | (1.76) | | PCB-120 | 2.93 | | PCB-154 | 19.1 | | PCB-164 | 29.8 | |
| PCB-88 | (1.79) | | PCB-108/124 | 19 | C | PCB-144 | 5.3 | | PCB-163/138/129 | 537 | C |
| PCB-91 | 126 | | PCB-107 | 33.3 | | PCB-147/149 | 542 | C | PCB-160 | (0.17) | |
| PCB-84 | 211 | | PCB-123 | 10.2 | | PCB-134 | 34.6 | | PCB-158 | 14.3 | |
| PCB-89 | 11.6 | | PCB-106 | (1.16) | | PCB-143 | (0.225) | | PCB-128/166 | 61.8 | C |
| PCB-121 | (1.01) | | PCB-118 | 434 | | PCB-139/140 | 6.63 | C | PCB-159 | (0.389) | |
| PCB-92 | 161 | | PCB-122 | 7.05 | | PCB-131 | 3.22 | | PCB-162 | [1.98] | EMPC |
| PCB-113/90/101 | 739 | C | PCB-114 | 8.29 | | PCB-142 | (0.247) | | PCB-167 | 15 | |
| PCB-83 | 52.3 | | PCB-105 | 175 | | PCB-132 | 175 | | PCB-156/157 | 21.1 | C |
| PCB-99 | 356 | | PCB-127 | (1.17) | | PCB-133 | 13 | | PCB-169 | (0.48) | |
| PCB-112 | 1.66 | | PCB-126 | 0.837 | J EMPC | | | | | | |
| | | | **Conc.** | 4,400 | | | | | **Conc.** | 2,430 | |
| | | | **EMPC** | 4,400 | | | | | **EMPC** | 2,440 | |

| Hepta | Conc. | Qualifiers | Hepta | Conc. | Qualifiers | Octa | Conc. | Qualifiers | Nona | Conc. | Qualifiers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PCB-188 | 1.07 | | PCB-174 | 16.5 | | PCB-202 | 17.6 | | PCB-208 | [0.444] | J EMPC |
| PCB-179 | 59.7 | | PCB-177 | 75.7 | | PCB-201 | 1.26 | | PCB-207 | (0.337) | |
| PCB-184 | (0.131) | | PCB-181 | (0.311) | | PCB-204 | (0.112) | | PCB-206 | [1.49] | EMPC |
| PCB-176 | 4.31 | | PCB-171/173 | 9.91 | C | PCB-197 | [0.363] | J EMPC | | | |
| PCB-186 | (0.141) | | PCB-172 | 8.5 | | PCB-200 | 0.252 | J | **Conc.** | 0 | |
| PCB-178 | 32.6 | | PCB-192 | (0.258) | | PCB-198/199 | 8.33 | C | **EMPC** | 1.94 | |
| PCB-175 | (0.321) | | PCB-180/193 | 93.6 | C | PCB-196 | 1.23 | | | | |
| PCB-187 | 205 | | PCB-191 | (0.266) | | PCB-203 | 3.48 | | **Deca** | **Conc.** | **Qualifiers** |
| PCB-182 | (0.298) | | PCB-170 | 31.1 | | PCB-195 | 2.25 | | PCB-209 | 1.54 | |
| PCB-183 | 13.4 | | PCB-190 | 3.2 | | PCB-194 | 11.3 | | | | |
| PCB-185 | 0.955 | J | PCB-189 | 1.18 | | PCB-205 | (0.277) | | | | |
| | | | **Conc.** | 557 | | **Conc.** | 45.6 | | | | |
| | | | **EMPC** | 557 | | **EMPC** | 46 | | | | |

# Sample ID: LPRBG-GDST-Comp01 — Method 1668B

| Client Data | | Sample Data | | Laboratory Data | | | |
|---|---|---|---|---|---|---|---|
| Name: | Windward Environmental, LLC | Matrix: | Tissue | Project No.: | A3406 | Date Received: | 02-Aug-2011 |
| Project ID: | Passaic RI/FS Caged Bivalve Study | Weight/Volume: | 10.20 g | Sample ID: | A3406_8929_PCB_008 | Date Extracted: | 15-Aug-2011 |
| Date Collected: | 08-Mar-2011 | | | QC Batch No.: | 8929 | Date Analyzed: | 23-Aug-2011 |

| Analyte | Conc. | DL | EMPC | Qualifier | Standard | Recovery |
|---|---|---|---|---|---|---|
| | pg/g | pg/g | pg/g | | | % |
| PCB-77 33'44'-TeCB | 1.38 | | | | ES PCB-1 | 89.4 |
| PCB-81 344'5-TeCB | ND | 0.23 | | | ES PCB-3 | 95 |
| PCB-105 233'44'-PeCB | 7.55 | | | | ES PCB-4 | 109 V |
| PCB-114 2344'5-PeCB | ND | 0.267 | | | ES PCB-15 | 112 V |
| PCB-118 23'44'5-PeCB | 36.8 | | | | ES PCB-19 | 107 |
| PCB-123 23'44'5'-PeCB | EMPC | | 0.588 | J | ES PCB-37 | 99 |
| PCB-126 33'44'5-PeCB | ND | 0.277 | | | ES PCB-54 | 76.7 |
| PCB-156/157 233'44'5/233'44'5'-HxCB | 0.973 | | | J C | ES PCB-77 | 87.3 |
| PCB-167 23'44'55'-HxCB | 2.68 | | | | ES PCB-81 | 83.3 |
| PCB-169 33'44'55'-HxCB | ND | 0.324 | | | ES PCB-104 | 97.1 |
| PCB-189 233'44'55'-HpCB | ND | 0.391 | | | ES PCB-105 | 102 |
| | | | | | ES PCB-114 | 101 |
| **TEQs (WHO M/H)** | | | | | ES PCB-118 | 104 |
| | | | | | ES PCB-123 | 85.2 |
| ND = 0 | 0.00158 | | 0.00159 | | ES PCB-126 | 100 |
| ND = 0.5 x DL | 0.0203 | | 0.0203 | | ES PCB-153 | 96.5 |
| | | | | | ES PCB-155 | 91.5 |
| **Totals** | | | | | ES PCB-156/157 | 94 |
| | | | | | ES PCB-167 | 93.9 |
| Mono-CBs | 2.68 | | | | ES PCB-169 | 80.9 |
| Di-CBs | 30.5 | | | | ES PCB-170 | 280 V |
| Tri-CBs | 37 | | 44.3 | | ES PCB-180 | 291 V |
| Tetra-CBs | 130 | | 132 | | ES PCB-188 | 104 |
| Penta-CBs | 209 | | 213 | | ES PCB-189 | 154 V |
| Hexa-CBs | 248 | | 258 | | ES PCB-202 | 94.9 |
| Hepta-CBs | 91 | | | | ES PCB-205 | 104 |
| Octa-CBs | 10.9 | | | | ES PCB-206 | 123 V |
| Nona-CBs | ND | 0.655 | | | ES PCB-208 | 169 V |
| Deca-CB | ND | 0.425 | | | ES PCB-209 | 122 V |
| | | | | | CS PCB-28 | 51.5 |
| Mono-Deca | 759 | | 782 | | CS PCB-111 | 87.4 |
| | | | | | CS PCB-178 | 109 |

Checkcode: 604-952-MFT AP PCB 2011 Rev. A Report Created: 31-Aug-2011 17:28 Analyst: LB

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# Sample ID: LPRBG-GDST-Comp01 — Method 1668B

| Client Data | | Sample Data | | Laboratory Data | | | |
|---|---|---|---|---|---|---|---|
| Name: | Windward Environmental, LLC | Matrix: | Tissue | Project No.: | A3406 | Date Received: | 02-Aug-2011 |
| Project ID: | Passaic RI/FS Caged Bivalve Study | Weight/Volume: | 10.20 g | Sample ID: | A3406_8929_PCB_008 | Date Extracted: | 15-Aug-2011 |
| Date Collected: | 08-Mar-2011 | | | QC Batch No.: | 8929 | Date Analyzed: | 23-Aug-2011 |
| | | Units | pg/g | Checkcode: | 604-952-MFT | Time Analyzed: | 01:05:02 |

| Mono | Conc. | Qualifiers | Tri | Conc. | Qualifiers | Tetra | Conc. | Qualifiers | Tetra | Conc. | Qualifiers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PCB-1 | 0.925 | J | PCB-19 | 0.491 | J | PCB-54 | (0.148) | | PCB-72 | 0.561 | J |
| PCB-2 | 1.13 | | PCB-30/18 | 5.75 | C | PCB-50/53 | 1.71 | J C | PCB-68 | [0.415] | J EMPC |
| PCB-3 | 0.626 | J | PCB-17 | 4.61 | | PCB-45 | 0.936 | J | PCB-57 | (0.229) | |
| | | | PCB-27 | [0.736] | J EMPC | PCB-51 | [0.839] | J EMPC | PCB-58 | (0.215) | |
| **Conc.** | 2.68 | | PCB-24 | (0.151) | | PCB-46 | 0.448 | J | PCB-67 | 1.31 | |
| **EMPC** | 2.68 | | PCB-16 | 2.53 | | PCB-52 | 27.5 | | PCB-63 | 0.96 | J |
| | | | PCB-32 | 2.6 | | PCB-73 | 0.184 | J | PCB-61/70/74/76 | 30.1 | C |
| **Di** | **Conc.** | **Qualifiers** | PCB-34 | (0.189) | | PCB-43 | 0.596 | J | PCB-66 | 14 | |
| PCB-4 | 1.54 | | PCB-23 | (0.18) | | PCB-69/49 | 13.7 | C | PCB-55 | (0.218) | |
| PCB-10 | (0.273) | | PCB-26/29 | 2 | C | PCB-48 | 3.06 | | PCB-56 | 4.46 | |
| PCB-9 | 0.378 | J | PCB-25 | 1.11 | | PCB-44/47/65 | 12.3 | C | PCB-60 | 1.74 | |
| PCB-7 | 0.252 | J | PCB-31 | 9.96 | | PCB-59/62/75 | [0.943] | J EMPC C | PCB-80 | (0.189) | |
| PCB-6 | 1.65 | | PCB-28/20 | [4.02] | EMPC C | PCB-42 | 2.37 | | PCB-79 | 0.332 | J |
| PCB-5 | 0.267 | J | PCB-21/33 | 4.7 | C | PCB-41 | 0.754 | J | PCB-78 | (0.231) | |
| PCB-8 | 4.97 | | PCB-22 | 2.65 | | PCB-71/40 | 6.42 | C | PCB-81 | (0.23) | |
| PCB-14 | (0.413) | | PCB-36 | [0.499] | J EMPC | PCB-64 | 4.77 | | PCB-77 | 1.38 | |
| PCB-11 | 19.5 | | PCB-39 | (0.166) | | | | | | | |
| PCB-13/12 | 0.686 | J C | PCB-38 | (0.185) | | | | | | | |
| PCB-15 | 1.31 | | PCB-35 | 0.606 | J | | | | | | |
| | | | PCB-37 | [2.03] | EMPC | | | | | | |
| **Conc.** | 30.5 | | **Conc.** | 37 | | | | | **Conc.** | 130 | |
| **EMPC** | 30.5 | | **EMPC** | 44.3 | | | | | **EMPC** | 132 | |


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| Totals | Conc. | EMPC |
|---|---|---|
| Mono-Tri | 70.2 | 77.5 |
| Tetra-Hexa | 587 | 602 |
| Hepta-Deca | 102 | 102 |
| Mono-Deca | 759 | 782 |

# Sample ID: LPRBG-GDST-Comp01 Method 1668B

| Penta | Conc. | Qualifiers | Penta | Conc. | Qualifiers | Hexa | Conc. | Qualifiers | Hexa | Conc. | Qualifiers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PCB-104 | (0.119) | | PCB-109/119/86… | 15.9 | C | PCB-155 | 0.33 | J | PCB-165 | (0.153) | |
| PCB-96 | 0.189 | J | PCB-117 | 0.546 | J | PCB-152 | (0.129) | | PCB-146 | 24.6 | |
| PCB-103 | 0.785 | J | PCB-116/85 | 3.83 | C | PCB-150 | 0.586 | J | PCB-161 | (0.151) | |
| PCB-94 | (0.406) | | PCB-110 | 24.1 | | PCB-136 | 3.82 | | PCB-153/168 | 80.1 | C |
| PCB-95 | 21.8 | | PCB-115 | (0.307) | | PCB-145 | (0.127) | | PCB-141 | (0.179) | |
| PCB-100/93 | 0.824 | J C | PCB-82 | 1.11 | | PCB-148 | [0.638] | J EMPC | PCB-130 | [2.63] | EMPC |
| PCB-102 | 1.63 | | PCB-111 | (0.277) | | PCB-151/135 | 17.4 | C | PCB-137 | (0.208) | |
| PCB-98 | (0.48) | | PCB-120 | [0.855] | J EMPC | PCB-154 | 4.47 | | PCB-164 | [1.38] | EMPC |
| PCB-88 | (0.488) | | PCB-108/124 | 1.17 | J C | PCB-144 | (0.192) | | PCB-163/138/129 | 62.4 | C |
| PCB-91 | 3.2 | | PCB-107 | 4.08 | | PCB-147/149 | 37.8 | C | PCB-160 | (0.155) | |
| PCB-84 | 4.01 | | PCB-123 | [0.588] | J EMPC | PCB-134 | [1.48] | EMPC | PCB-158 | (0.137) | |
| PCB-89 | (0.425) | | PCB-106 | (0.316) | | PCB-143 | (0.205) | | PCB-128/166 | 5.09 | C |
| PCB-121 | (0.274) | | PCB-118 | 36.8 | | PCB-139/140 | [0.288] | J EMPC C | PCB-159 | (0.228) | |
| PCB-92 | 8.69 | | PCB-122 | (0.293) | | PCB-131 | (0.213) | | PCB-162 | 0.487 | J |
| PCB-113/90/101 | 46.2 | C | PCB-114 | (0.267) | | PCB-142 | (0.225) | | PCB-167 | 2.68 | |
| PCB-83 | [1.8] | EMPC | PCB-105 | 7.55 | | PCB-132 | 7.01 | | PCB-156/157 | 0.973 | J C |
| PCB-99 | 27 | | PCB-127 | (0.268) | | PCB-133 | [3.77] | EMPC | PCB-169 | (0.324) | |
| PCB-112 | (0.284) | | PCB-126 | (0.277) | | | | | | | |
| | | | **Conc.** | 209 | | | | | **Conc.** | 248 | |
| | | | **EMPC** | 213 | | | | | **EMPC** | 258 | |

| Hepta | Conc. | Qualifiers | Hepta | Conc. | Qualifiers | Octa | Conc. | Qualifiers | Nona | Conc. | Qualifiers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PCB-188 | 1.34 | | PCB-174 | (0.292) | | PCB-202 | 10.9 | | PCB-208 | (0.446) | |
| PCB-179 | 6.19 | | PCB-177 | 10.7 | | PCB-201 | (0.126) | | PCB-207 | (0.473) | |
| PCB-184 | (0.092) | | PCB-181 | (0.299) | | PCB-204 | (0.123) | | PCB-206 | (0.865) | |
| PCB-176 | (0.1) | | PCB-171/173 | (0.337) | C | PCB-197 | (0.111) | | | | |
| PCB-186 | (0.0994) | | PCB-172 | (0.342) | | PCB-200 | (0.139) | | **Conc.** | 0 | |
| PCB-178 | 10.3 | | PCB-192 | (0.247) | | PCB-198/199 | (0.166) | C | **EMPC** | 0 | |
| PCB-175 | (0.309) | | PCB-180/193 | 4.82 | C | PCB-196 | (0.168) | | | | |
| PCB-187 | 57.6 | | PCB-191 | (0.255) | | PCB-203 | (0.151) | | **Deca** | **Conc.** | **Qualifiers** |
| PCB-182 | (0.286) | | PCB-170 | (0.294) | | PCB-195 | (1.21) | | PCB-209 | (0.425) | |
| PCB-183 | (0.289) | | PCB-190 | (0.227) | | PCB-194 | (1.16) | | | | |
| PCB-185 | (0.319) | | PCB-189 | (0.391) | | PCB-205 | (0.717) | | | | |
| | | | **Conc.** | 91 | | **Conc.** | 10.9 | | | | |
| | | | **EMPC** | 91 | | **EMPC** | 10.9 | | | | |

# Sample ID: LPR2-GDST-Comp02 — Method 1668B

| Client Data | | Sample Data | | Laboratory Data | | | |
|---|---|---|---|---|---|---|---|
| Name: | Windward Environmental, LLC | Matrix: | Tissue | Project No.: | A3406 | Date Received: | 02-Aug-2011 |
| Project ID: | Passaic RI/FS Caged Bivalve Study | Weight/Volume: | 10.13 g | Sample ID: | A3406_8929_PCB_009 | Date Extracted: | 15-Aug-2011 |
| Date Collected: | 09-May-2011 | | | QC Batch No.: | 8929 | Date Analyzed: | 23-Aug-2011 |

| Analyte | Conc. | DL | EMPC | Qualifier | Standard | Recovery |
|---|---|---|---|---|---|---|
| | pg/g | pg/g | pg/g | | | % |
| PCB-77 33'44'-TeCB | 18.4 | | | | ES PCB-1 | 81.6 |
| PCB-81 344'5-TeCB | 0.743 | | | J | ES PCB-3 | 93.1 |
| PCB-105 233'44'-PeCB | 58.9 | | | | ES PCB-4 | 103 |
| PCB-114 2344'5-PeCB | 3.06 | | | | ES PCB-15 | 113 V |
| PCB-118 23'44'5-PeCB | 154 | | | | ES PCB-19 | 103 |
| PCB-123 23'44'5'-PeCB | 3.06 | | | | ES PCB-37 | 101 |
| PCB-126 33'44'5-PeCB | 0.387 | | | J | ES PCB-54 | 86.8 |
| PCB-156/157 233'44'5/233'44'5'-HxCB | 6.78 | | | C | ES PCB-77 | 94.7 |
| PCB-167 23'44'55'-HxCB | 4.93 | | | | ES PCB-81 | 90 |
| PCB-169 33'44'55'-HxCB | ND | 0.245 | | | ES PCB-104 | 97.2 |
| PCB-189 233'44'55'-HpCB | 0.411 | | | J | ES PCB-105 | 94.1 |
| | | | | | ES PCB-114 | 91.6 |
| **TEQs (WHO M/H)** | | | | | ES PCB-118 | 95.6 |
| | | | | | ES PCB-123 | 90.5 |
| ND = 0 | 0.0477 | | 0.0477 | | ES PCB-126 | 92.7 |
| ND = 0.5 x DL | 0.0513 | | 0.0513 | | ES PCB-153 | 98.5 |
| | | | | | ES PCB-155 | 97.2 |
| **Totals** | | | | | ES PCB-156/157 | 93.8 |
| | | | | | ES PCB-167 | 95.2 |
| Mono-CBs | 12.5 | | | | ES PCB-169 | 84.2 |
| Di-CBs | 267 | | | | ES PCB-170 | 205 V |
| Tri-CBs | 1,580 | | 1,580 | | ES PCB-180 | 215 V |
| Tetra-CBs | 3,220 | | 3,230 | | ES PCB-188 | 103 |
| Penta-CBs | 1,580 | | 1,590 | | ES PCB-189 | 151 V |
| Hexa-CBs | 812 | | 813 | | ES PCB-202 | 96.1 |
| Hepta-CBs | 204 | | | | ES PCB-205 | 103 |
| Octa-CBs | 17.6 | | 20.6 | | ES PCB-206 | 122 |
| Nona-CBs | | | 1.43 | | ES PCB-208 | 162 V |
| Deca-CB | 1.18 | | | | ES PCB-209 | 130 V |
| | | | | | CS PCB-28 | 71.3 |
| Mono-Deca | 7,700 | | 7,710 | | CS PCB-111 | 90 |
| | | | | | CS PCB-178 | 106 |

Checkcode: 621-662-ZHN AP PCB 2011 Rev. A Report Created: 31-Aug-2011 17:29 Analyst: LB

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# Sample ID: LPR2-GDST-Comp02 — Method 1668B

| Client Data | | Sample Data | | Laboratory Data | | | |
|---|---|---|---|---|---|---|---|
| Name: | Windward Environmental, LLC | Matrix: | Tissue | Project No.: | A3406 | Date Received: | 02-Aug-2011 |
| Project ID: | Passaic RI/FS Caged Bivalve Study | Weight/Volume: | 10.13 g | Sample ID: | A3406_8929_PCB_009 | Date Extracted: | 15-Aug-2011 |
| Date Collected: | 09-May-2011 | | | QC Batch No.: | 8929 | Date Analyzed: | 23-Aug-2011 |
| | | Units | pg/g | Checkcode: | 621-662-ZHN | Time Analyzed: | 02:00:04 |

| Mono | Conc. | Qualifiers | Tri | Conc. | Qualifiers | Tetra | Conc. | Qualifiers | Tetra | Conc. | Qualifiers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PCB-1 | 8.41 | | PCB-19 | 38.4 | | PCB-54 | 10.7 | | PCB-72 | 4.83 | |
| PCB-2 | 2.08 | | PCB-30/18 | 255 | C | PCB-50/53 | 86.9 | C | PCB-68 | [3.25] | EMPC |
| PCB-3 | 1.97 | | PCB-17 | 156 | | PCB-45 | 44.5 | | PCB-57 | 2.09 | |
| | | | PCB-27 | 39.3 | | PCB-51 | 98.7 | | PCB-58 | 1.22 | |
| **Conc.** | 12.5 | | PCB-24 | 3.77 | | PCB-46 | 32.3 | | PCB-67 | 12.2 | |
| **EMPC** | 12.5 | | PCB-16 | 106 | | PCB-52 | 520 | | PCB-63 | 13.3 | |
| | | | PCB-32 | 121 | | PCB-73 | 3.59 | | PCB-61/70/74/76 | 468 | C |
| **Di** | **Conc.** | **Qualifiers** | PCB-34 | 2.6 | | PCB-43 | 16.4 | | PCB-66 | 262 | |
| PCB-4 | 63.7 | | PCB-23 | [0.262] | J EMPC | PCB-69/49 | 323 | C | PCB-55 | [3.57] | EMPC |
| PCB-10 | 5.87 | | PCB-26/29 | 64.2 | C | PCB-48 | 77 | | PCB-56 | 121 | |
| PCB-9 | 4.36 | | PCB-25 | 42.1 | | PCB-44/47/65 | 490 | C | PCB-60 | 45 | |
| PCB-7 | 2.38 | | PCB-31 | 269 | | PCB-59/62/75 | 41.6 | C | PCB-80 | (0.241) | |
| PCB-6 | 27 | | PCB-28/20 | 222 | C | PCB-42 | 126 | | PCB-79 | 2.65 | |
| PCB-5 | 1.16 | | PCB-21/33 | 92.5 | C | PCB-41 | 21.9 | | PCB-78 | (0.295) | |
| PCB-8 | 52.8 | | PCB-22 | 93.8 | | PCB-71/40 | 204 | C | PCB-81 | 0.743 | J |
| PCB-14 | (0.347) | | PCB-36 | 0.634 | J | PCB-64 | 174 | | PCB-77 | 18.4 | |
| PCB-11 | 54.6 | | PCB-39 | 2.42 | | | | | | | |
| PCB-13/12 | 11.2 | C | PCB-38 | (0.17) | | | | | | | |
| PCB-15 | 44.2 | | PCB-35 | 5.38 | | | | | | | |
| | | | PCB-37 | 62.7 | | | | | | | |
| **Conc.** | 267 | | **Conc.** | 1,580 | | | | | **Conc.** | 3,220 | |
| **EMPC** | 267 | | **EMPC** | 1,580 | | | | | **EMPC** | 3,230 | |

| Totals | Conc. | EMPC |
|---|---|---|
| Mono-Tri | 1,860 | 1,860 |
| Tetra-Hexa | 5,620 | 5,630 |
| Hepta-Deca | 222 | 227 |
| Mono-Deca | 7,700 | 7,710 |

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# Sample ID: LPR2-GDST-Comp02 Method 1668B

| Penta | Conc. | Qualifiers | Penta | Conc. | Qualifiers | Hexa | Conc. | Qualifiers | Hexa | Conc. | Qualifiers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PCB-104 | 2.37 | | PCB-109/119/86… | 154 | C | PCB-155 | 2 | | PCB-165 | (0.11) | |
| PCB-96 | 5.1 | | PCB-117 | 6.83 | | PCB-152 | 0.872 | J | PCB-146 | 37.3 | |
| PCB-103 | 9.4 | | PCB-116/85 | 37.4 | C | PCB-150 | 1.25 | | PCB-161 | (0.108) | |
| PCB-94 | 7.06 | | PCB-110 | 217 | | PCB-136 | 29.7 | | PCB-153/168 | 151 | C |
| PCB-95 | 235 | | PCB-115 | 1.66 | | PCB-145 | (0.0904) | | PCB-141 | 6.96 | |
| PCB-100/93 | 19.8 | C | PCB-82 | 27.9 | | PCB-148 | 1.3 | | PCB-130 | 10.3 | |
| PCB-102 | 18.5 | | PCB-111 | (0.494) | | PCB-151/135 | 83.7 | C | PCB-137 | 4.31 | |
| PCB-98 | (0.856) | | PCB-120 | 1.24 | | PCB-154 | 7 | | PCB-164 | 9.1 | |
| PCB-88 | (0.871) | | PCB-108/124 | 6.64 | C | PCB-144 | 2.08 | | PCB-163/138/129 | 179 | C |
| PCB-91 | 45.6 | | PCB-107 | 12.8 | | PCB-147/149 | 175 | C | PCB-160 | (0.111) | |
| PCB-84 | 81.8 | | PCB-123 | 3.06 | | PCB-134 | 11.7 | | PCB-158 | 4.95 | |
| PCB-89 | 4.17 | | PCB-106 | (0.564) | | PCB-143 | (0.147) | | PCB-128/166 | 20.2 | C |
| PCB-121 | (0.489) | | PCB-118 | 154 | | PCB-139/140 | 1.93 | J C | PCB-159 | (0.176) | |
| PCB-92 | 56.2 | | PCB-122 | [2.34] | EMPC | PCB-131 | [0.723] | J EMPC | PCB-162 | [0.69] | J EMPC |
| PCB-113/90/101 | 271 | C | PCB-114 | 3.06 | | PCB-142 | (0.161) | | PCB-167 | 4.93 | |
| PCB-83 | 16.7 | | PCB-105 | 58.9 | | PCB-132 | 54.5 | | PCB-156/157 | 6.78 | C |
| PCB-99 | 127 | | PCB-127 | (0.531) | | PCB-133 | 5.61 | | PCB-169 | (0.245) | |
| PCB-112 | [1.92] | EMPC | PCB-126 | 0.387 | J | | | | | | |
| | | | **Conc.** | 1,580 | | | | | **Conc.** | 812 | |
| | | | **EMPC** | 1,590 | | | | | **EMPC** | 813 | |

| Hepta | Conc. | Qualifiers | Hepta | Conc. | Qualifiers | Octa | Conc. | Qualifiers | Nona | Conc. | Qualifiers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PCB-188 | 0.689 | J | PCB-174 | 8.99 | | PCB-202 | 7.73 | | PCB-208 | (0.415) | |
| PCB-179 | 17.1 | | PCB-177 | 24.5 | | PCB-201 | [0.449] | J EMPC | PCB-207 | (0.44) | |
| PCB-184 | (0.106) | | PCB-181 | (0.265) | | PCB-204 | (0.0833) | | PCB-206 | [1.43] | EMPC |
| PCB-176 | 1.46 | | PCB-171/173 | 3.84 | C | PCB-197 | [0.157] | J EMPC | | | |
| PCB-186 | (0.114) | | PCB-172 | 3.24 | | PCB-200 | 0.237 | J | **Conc.** | 0 | |
| PCB-178 | 12.2 | | PCB-192 | (0.219) | | PCB-198/199 | 3.52 | C | **EMPC** | 1.43 | |
| PCB-175 | (0.273) | | PCB-180/193 | 32.9 | C | PCB-196 | [0.789] | J EMPC | | | |
| PCB-187 | 79.2 | | PCB-191 | (0.226) | | PCB-203 | 1.59 | | **Deca** | **Conc.** | **Qualifiers** |
| PCB-182 | (0.253) | | PCB-170 | 11.3 | | PCB-195 | [1.63] | EMPC | PCB-209 | 1.18 | |
| PCB-183 | 6.43 | | PCB-190 | 1.39 | | PCB-194 | 4.47 | | | | |
| PCB-185 | (0.282) | | PCB-189 | 0.411 | J | PCB-205 | (0.331) | | | | |
| | | | **Conc.** | 204 | | **Conc.** | 17.6 | | | | |
| | | | **EMPC** | 204 | | **EMPC** | 20.6 | | | | |

# Sample ID: LPR3-GDST-Comp03 — Method 1668B

| Client Data | | Sample Data | | Laboratory Data | | | |
|---|---|---|---|---|---|---|---|
| Name: | Windward Environmental, LLC | Matrix: | Tissue | Project No.: | A3406 | Date Received: | 02-Aug-2011 |
| Project ID: | Passaic RI/FS Caged Bivalve Study | Weight/Volume: | 10.09 g | Sample ID: | A3406_8929_PCB_010 | Date Extracted: | 15-Aug-2011 |
| Date Collected: | 09-May-2011 | | | QC Batch No.: | 8929 | Date Analyzed: | 23-Aug-2011 |

| Analyte | Conc. | DL | EMPC | Qualifier | Standard | Recovery |
|---|---|---|---|---|---|---|
| | pg/g | pg/g | pg/g | | | % |
| PCB-77 33'44'-TeCB | 5.72 | | | | ES PCB-1 | 81.8 |
| PCB-81 344'5-TeCB | ND | 0.383 | | | ES PCB-3 | 89.9 |
| PCB-105 233'44'-PeCB | 19.3 | | | | ES PCB-4 | 96.3 |
| PCB-114 2344'5-PeCB | EMPC | | 0.99 | J | ES PCB-15 | 103 |
| PCB-118 23'44'5-PeCB | 56.3 | | | | ES PCB-19 | 94 |
| PCB-123 23'44'5'-PeCB | 1.02 | | | | ES PCB-37 | 94.4 |
| PCB-126 33'44'5-PeCB | ND | 0.469 | | | ES PCB-54 | 81.3 |
| PCB-156/157 233'44'5/233'44'5'-HxCB | 3.47 | | | C | ES PCB-77 | 90.3 |
| PCB-167 23'44'55'-HxCB | 2.43 | | | | ES PCB-81 | 87.3 |
| PCB-169 33'44'55'-HxCB | ND | 0.453 | | | ES PCB-104 | 92.5 |
| PCB-189 233'44'55'-HpCB | ND | 0.399 | | | ES PCB-105 | 96.3 |
| | | | | | ES PCB-114 | 94.1 |
| **TEQs (WHO M/H)** | | | | | ES PCB-118 | 101 |
| | | | | | ES PCB-123 | 98.3 |
| ND = 0 | 0.00305 | | 0.00308 | | ES PCB-126 | 91.9 |
| ND = 0.5 x DL | 0.0334 | | 0.0334 | | ES PCB-153 | 97.2 |
| | | | | | ES PCB-155 | 98.2 |
| **Totals** | | | | | ES PCB-156/157 | 93.7 |
| | | | | | ES PCB-167 | 95.8 |
| Mono-CBs | 5.32 | | 6.84 | | ES PCB-169 | 85.9 |
| Di-CBs | 121 | | | | ES PCB-170 | 189 V |
| Tri-CBs | 624 | | 627 | | ES PCB-180 | 192 V |
| Tetra-CBs | 975 | | 977 | | ES PCB-188 | 103 |
| Penta-CBs | 464 | | 472 | | ES PCB-189 | 151 V |
| Hexa-CBs | 361 | | 368 | | ES PCB-202 | 93.2 |
| Hepta-CBs | 114 | | 118 | | ES PCB-205 | 106 |
| Octa-CBs | 12.3 | | 19.1 | | ES PCB-206 | 129 V |
| Nona-CBs | 1.71 | | | | ES PCB-208 | 153 V |
| Deca-CB | 1.28 | | | | ES PCB-209 | 135 V |
| | | | | | CS PCB-28 | 75.5 |
| Mono-Deca | 2,680 | | 2,710 | | CS PCB-111 | 92.5 |
| | | | | | CS PCB-178 | 104 |

Checkcode: 098-234-LDB  AP PCB 2011 Rev. A  Report Created: 29-Aug-2011 14:31  Analyst: LB

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# Sample ID: LPR3-GDST-Comp03 — Method 1668B

| Client Data | | Sample Data | | Laboratory Data | | | |
|---|---|---|---|---|---|---|---|
| Name: | Windward Environmental, LLC | Matrix: | Tissue | Project No.: | A3406 | Date Received: | 02-Aug-2011 |
| Project ID: | Passaic RI/FS Caged Bivalve Study | Weight/Volume: | 10.09 g | Sample ID: | A3406_8929_PCB_010 | Date Extracted: | 15-Aug-2011 |
| Date Collected: | 09-May-2011 | | | QC Batch No.: | 8929 | Date Analyzed: | 23-Aug-2011 |
| | | Units | pg/g | Checkcode: | 098-234-LDB | Time Analyzed: | 02:55:07 |

| Mono | Conc. | Qualifiers | Tri | Conc. | Qualifiers | Tetra | Conc. | Qualifiers | Tetra | Conc. | Qualifiers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PCB-1 | 4 | | PCB-19 | 16.4 | | PCB-54 | 4.91 | | PCB-72 | [1.12] | EMPC |
| PCB-2 | [1.53] | EMPC | PCB-30/18 | 98.6 | C | PCB-50/53 | 33 | C | PCB-68 | 1.19 | |
| PCB-3 | 1.32 | | PCB-17 | 64.6 | | PCB-45 | 14.8 | | PCB-57 | (0.382) | |
| | | | PCB-27 | 14.3 | | PCB-51 | 39 | | PCB-58 | (0.358) | |
| **Conc.** | 5.32 | | PCB-24 | 1.79 | | PCB-46 | 9.81 | | PCB-67 | 3.53 | |
| **EMPC** | 6.84 | | PCB-16 | 44.1 | | PCB-52 | 159 | | PCB-63 | 3.75 | |
| | | | PCB-32 | 47.2 | | PCB-73 | 1.42 | | PCB-61/70/74/76 | 136 | C |
| **Di** | **Conc.** | **Qualifiers** | PCB-34 | [0.876] | J EMPC | PCB-43 | 4.71 | | PCB-66 | 76.1 | |
| PCB-4 | 27.6 | | PCB-23 | (0.217) | | PCB-69/49 | 101 | C | PCB-55 | 1.26 | |
| PCB-10 | 2.33 | | PCB-26/29 | 23.3 | C | PCB-48 | 24 | | PCB-56 | 32.7 | |
| PCB-9 | 2.02 | | PCB-25 | 16 | | PCB-44/47/65 | 147 | C | PCB-60 | 12.5 | |
| PCB-7 | 1.11 | | PCB-31 | 104 | | PCB-59/62/75 | 12.4 | C | PCB-80 | (0.315) | |
| PCB-6 | 10.5 | | PCB-28/20 | 94.8 | C | PCB-42 | 33.4 | | PCB-79 | [0.639] | J EMPC |
| PCB-5 | (0.602) | | PCB-21/33 | 37.8 | C | PCB-41 | 7.37 | | PCB-78 | (0.385) | |
| PCB-8 | 26.7 | | PCB-22 | 35 | | PCB-71/40 | 59.9 | C | PCB-81 | (0.383) | |
| PCB-14 | (0.602) | | PCB-36 | (0.217) | | PCB-64 | 50.5 | | PCB-77 | 5.72 | |
| PCB-11 | 25.5 | B | PCB-39 | 0.976 | J | | | | | | |
| PCB-13/12 | 4.72 | C | PCB-38 | (0.223) | | | | | | | |
| PCB-15 | 20.5 | | PCB-35 | [2.08] | EMPC | | | | | | |
| | | | PCB-37 | 24.9 | | | | | | | |
| **Conc.** | 121 | | **Conc.** | 624 | | | | | **Conc.** | 975 | |
| **EMPC** | 121 | | **EMPC** | 627 | | | | | **EMPC** | 977 | |


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| Totals | Conc. | EMPC |
|---|---|---|
| Mono-Tri | 750 | 755 |
| Tetra-Hexa | 1,800 | 1,820 |
| Hepta-Deca | 129 | 140 |
| Mono-Deca | 2,680 | 2,710 |

# Sample ID: LPR3-GDST-Comp03 Method 1668B

| Penta | Conc. | Qualifiers | Penta | Conc. | Qualifiers | Hexa | Conc. | Qualifiers | Hexa | Conc. | Qualifiers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PCB-104 | [0.887] | J EMPC | PCB-109/119/86… | 43.3 | C | PCB-155 | 0.696 | J | PCB-165 | (0.297) | |
| PCB-96 | [1.61] | EMPC | PCB-117 | 1.8 | | PCB-152 | (0.224) | | PCB-146 | 23.4 | |
| PCB-103 | 3.26 | | PCB-116/85 | 10.5 | C | PCB-150 | (0.214) | | PCB-161 | (0.293) | |
| PCB-94 | 1.98 | | PCB-110 | 61.4 | | PCB-136 | 9.35 | | PCB-153/168 | 82.6 | C |
| PCB-95 | 68.3 | | PCB-115 | 1.25 | | PCB-145 | (0.222) | | PCB-141 | 5.22 | |
| PCB-100/93 | 5.37 | C | PCB-82 | 7.41 | | PCB-148 | (0.371) | | PCB-130 | [3.63] | EMPC |
| PCB-102 | 5.64 | | PCB-111 | (0.4) | | PCB-151/135 | 34.7 | C | PCB-137 | 1.81 | |
| PCB-98 | (0.694) | | PCB-120 | (0.412) | | PCB-154 | 5.04 | | PCB-164 | 3.18 | |
| PCB-88 | (0.706) | | PCB-108/124 | 2.35 | C | PCB-144 | 1.59 | | PCB-163/138/129 | 78.8 | C |
| PCB-91 | 11.8 | | PCB-107 | 5.11 | | PCB-147/149 | 72.7 | C | PCB-160 | (0.301) | |
| PCB-84 | 19.8 | | PCB-123 | 1.02 | | PCB-134 | 4.03 | | PCB-158 | [2.89] | EMPC |
| PCB-89 | (0.615) | | PCB-106 | (0.457) | | PCB-143 | (0.397) | | PCB-128/166 | 8.83 | C |
| PCB-121 | (0.397) | | PCB-118 | 56.3 | | PCB-139/140 | (0.353) | C | PCB-159 | (0.354) | |
| PCB-92 | 15.7 | | PCB-122 | [0.667] | J EMPC | PCB-131 | (0.413) | | PCB-162 | (0.327) | |
| PCB-113/90/101 | 80.3 | C | PCB-114 | [0.99] | J EMPC | PCB-142 | (0.436) | | PCB-167 | 2.43 | |
| PCB-83 | [3.91] | EMPC | PCB-105 | 19.3 | | PCB-132 | 19.7 | | PCB-156/157 | 3.47 | C |
| PCB-99 | 42.2 | | PCB-127 | (0.465) | | PCB-133 | 3.45 | | PCB-169 | (0.453) | |
| PCB-112 | (0.411) | | PCB-126 | (0.469) | | | | | | | |
| | | | **Conc.** | 464 | | | | | **Conc.** | 361 | |
| | | | **EMPC** | 472 | | | | | **EMPC** | 368 | |

| Hepta | Conc. | Qualifiers | Hepta | Conc. | Qualifiers | Octa | Conc. | Qualifiers | Nona | Conc. | Qualifiers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PCB-188 | 0.738 | J | PCB-174 | 7.1 | | PCB-202 | 8.03 | | PCB-208 | (0.9) | |
| PCB-179 | 7.76 | | PCB-177 | 11.2 | | PCB-201 | (0.302) | | PCB-207 | (0.955) | |
| PCB-184 | (0.215) | | PCB-181 | (0.45) | | PCB-204 | (0.296) | | PCB-206 | 1.71 | |
| PCB-176 | [0.698] | J EMPC | PCB-171/173 | [2.02] | EMPC C | PCB-197 | (0.267) | | | | |
| PCB-186 | (0.233) | | PCB-172 | [1.64] | EMPC | PCB-200 | (0.334) | | **Conc.** | 1.71 | |
| PCB-178 | 7.69 | | PCB-192 | (0.372) | | PCB-198/199 | 3.15 | C | **EMPC** | 1.71 | |
| PCB-175 | (0.464) | | PCB-180/193 | 16.3 | C | PCB-196 | 1.12 | | | | |
| PCB-187 | 52.3 | | PCB-191 | (0.384) | | PCB-203 | [1.33] | EMPC | **Deca** | **Conc.** | **Qualifiers** |
| PCB-182 | (0.43) | | PCB-170 | 5.85 | | PCB-195 | [2.48] | EMPC | PCB-209 | 1.28 | |
| PCB-183 | 4.85 | | PCB-190 | (0.377) | | PCB-194 | [3] | EMPC | | | |
| PCB-185 | (0.479) | | PCB-189 | (0.399) | | PCB-205 | (0.644) | | | | |
| | | | **Conc.** | 114 | | **Conc.** | 12.3 | | | | |
| | | | **EMPC** | 118 | | **EMPC** | 19.1 | | | | |

# Sample ID: CARP2 SRM

# Method 1668B

| Client Data | | Sample Data | | Laboratory Data | | | |
|---|---|---|---|---|---|---|---|
| Name: | Windward Environmental, LLC | Matrix: | Tissue | Project No.: | A3406 | Date Received: | n/a |
| Project ID: | Passaic RI/FS Caged Bivalve Study | Weight/Volume: | 10.78 g | Sample ID: | A3406_8929_PCB_011-sp10 | Date Extracted: | 15-Aug-2011 |
| Date Collected: | n/a | | | QC Batch No.: | 8929 | Date Analyzed: | 23-Aug-2011 |

| Analyte | Conc. | DL | EMPC | Qualifier | Standard | Recovery |
|---|---|---|---|---|---|---|
| | pg/g | pg/g | pg/g | | | % |
| PCB-77 33'44'-TeCB | 1,470 | | | | ES PCB-1 | 74.2 |
| PCB-81 344'5-TeCB | 194 | | | | ES PCB-3 | 78.3 |
| PCB-105 233'44'-PeCB | 61,100 | | | E | ES PCB-4 | 84.1 |
| PCB-114 2344'5-PeCB | 5,620 | | | E | ES PCB-15 | 97 |
| PCB-118 23'44'5-PeCB | 142,000 | | | E | ES PCB-19 | 51.8 |
| PCB-123 23'44'5'-PeCB | 4,460 | | | E | ES PCB-37 | 93.3 |
| PCB-126 33'44'5-PeCB | 453 | | | | ES PCB-54 | 68.8 |
| PCB-156/157 233'44'5/233'44'5'-HxCB | 11,500 | | | E C | ES PCB-77 | 101 |
| PCB-167 23'44'55'-HxCB | 5,080 | | | E | ES PCB-81 | 96.9 |
| PCB-169 33'44'55'-HxCB | 178 | | | | ES PCB-104 | 72.1 |
| PCB-189 233'44'55'-HpCB | 1,050 | | | | ES PCB-105 | 89.1 |
| | | | | | ES PCB-114 | 87.5 |
| **TEQs (WHO M/H)** | | | | | ES PCB-118 | 91.5 |
| | | | | | ES PCB-123 | 84.5 |
| ND = 0 | 57.8 | | 57.8 | | ES PCB-126 | 84.3 |
| ND = 0.5 x DL | 57.8 | | 57.8 | | ES PCB-153 | 87.1 |
| | | | | | ES PCB-155 | 80.3 |
| **Totals** | | | | | ES PCB-156/157 | 89.5 |
| | | | | | ES PCB-167 | 88.8 |
| Mono-CBs | 451 | | | | ES PCB-169 | 86 |
| Di-CBs | 17,600 | | | | ES PCB-170 | 139 |
| Tri-CBs | 203,000 | | | | ES PCB-180 | 144 |
| Tetra-CBs | 921,000 | | | | ES PCB-188 | 71.4 |
| Penta-CBs | 1,010,000 | | | | ES PCB-189 | 126 V |
| Hexa-CBs | 483,000 | | | | ES PCB-202 | 76 |
| Hepta-CBs | 207,000 | | | | ES PCB-205 | 90.5 |
| Octa-CBs | 57,200 | | | | ES PCB-206 | 226 V |
| Nona-CBs | 5,210 | | | | ES PCB-208 | 124 |
| Deca-CB | 5,590 | | | E | ES PCB-209 | 119 V |
| | | | | | CS PCB-28 | 80.5 |
| Mono-Deca | 2,910,000 | | 2,910,000 | | CS PCB-111 | 97.8 |
| | | | | | CS PCB-178 | 95.2 |

Checkcode: 291-723-TTP AP PCB 2011 Rev. A Report Created: 25-Aug-2011 14:09 Analyst: LB

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# Sample ID: CARP2 SRM — Method 1668B

| Client Data | | Sample Data | | Laboratory Data | | | |
|---|---|---|---|---|---|---|---|
| Name: | Windward Environmental, LLC | Matrix: | Tissue | Project No.: | A3406 | Date Received: | n/a |
| Project ID: | Passaic RI/FS Caged Bivalve Study | Weight/Volume: | 10.78 g | Sample ID: | A3406_8929_PCB_011-sp10 | Date Extracted: | 15-Aug-2011 |
| Date Collected: | n/a | | | QC Batch No.: | 8929 | Date Analyzed: | 23-Aug-2011 |
| | | Units | pg/g | Checkcode: | 291-723-TTP | Time Analyzed: | 12:22:56 |

| Mono | Conc. | Qualifiers | Tri | Conc. | Qualifiers | Tetra | Conc. | Qualifiers | Tetra | Conc. | Qualifiers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PCB-1 | 394 | | PCB-19 | 2,840 | | PCB-54 | 109 | | PCB-72 | 1,860 | |
| PCB-2 | 14 | | PCB-30/18 | 51,900 | E C | PCB-50/53 | 7,150 | C | PCB-68 | 1,760 | |
| PCB-3 | 43.1 | | PCB-17 | 20,800 | E | PCB-45 | 9,090 | E | PCB-57 | 712 | |
| | | | PCB-27 | 6,110 | E | PCB-51 | 2,390 | | PCB-58 | 672 | |
| **Conc.** | 451 | | PCB-24 | 322 | | PCB-46 | 2,270 | | PCB-67 | 768 | |
| **EMPC** | 451 | | PCB-16 | 7,100 | E | PCB-52 | 151,000 | E | PCB-63 | 10,100 | E |
| | | | PCB-32 | 21,900 | E | PCB-73 | 512 | | PCB-61/70/74/76 | 124,000 | E C |
| **Di** | **Conc.** | **Qualifiers** | PCB-34 | 565 | | PCB-43 | 4,650 | E | PCB-66 | 147,000 | E |
| PCB-4 | 7,190 | E | PCB-23 | (5.54) | | PCB-69/49 | 117,000 | E C | PCB-55 | 410 | |
| PCB-10 | 240 | | PCB-26/29 | 19,600 | E C | PCB-48 | 12,300 | E | PCB-56 | 19,800 | E |
| PCB-9 | 341 | | PCB-25 | 6,180 | E | PCB-44/47/65 | 128,000 | E C | PCB-60 | 24,900 | E |
| PCB-7 | 147 | | PCB-31 | 27,300 | E | PCB-59/62/75 | 11,800 | E C | PCB-80 | (12) | |
| PCB-6 | 4,030 | E | PCB-28/20 | 28,800 | E C | PCB-42 | 38,000 | E | PCB-79 | 1,210 | |
| PCB-5 | 20 | | PCB-21/33 | 2,710 | C | PCB-41 | 1,520 | | PCB-78 | (14.6) | |
| PCB-8 | 4,890 | E | PCB-22 | 5,580 | E | PCB-71/40 | 47,600 | E C | PCB-81 | 194 | |
| PCB-14 | (5.63) | | PCB-36 | (5.66) | | PCB-64 | 53,000 | E | PCB-77 | 1,470 | |
| PCB-11 | 65.3 | | PCB-39 | 226 | | | | | | | |
| PCB-13/12 | 168 | C | PCB-38 | 110 | | | | | | | |
| PCB-15 | 528 | | PCB-35 | (5.96) | | | | | | | |
| | | | PCB-37 | 839 | | | | | | | |
| **Conc.** | 17,600 | | **Conc.** | 203,000 | | | | | **Conc.** | 921,000 | |
| **EMPC** | 17,600 | | **EMPC** | 203,000 | | | | | **EMPC** | 921,000 | |


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| Totals | Conc. | EMPC |
|---|---|---|
| Mono-Tri | 221,000 | 221,000 |
| Tetra-Hexa | 2,410,000 | 2,410,000 |
| Hepta-Deca | 275,000 | 275,000 |
| Mono-Deca | 2,910,000 | 2,910,000 |

# Sample ID: CARP2 SRM — Method 1668B

| Penta | Conc. | Qualifiers | Penta | Conc. | Qualifiers | Hexa | Conc. | Qualifiers | Hexa | Conc. | Qualifiers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PCB-104 | 19.9 | | PCB-109/119/86… | 115,000 | E C | PCB-155 | 40.5 | | PCB-165 | 313 | |
| PCB-96 | 917 | | PCB-117 | (3.56) | | PCB-152 | 82.7 | | PCB-146 | 23,100 | E |
| PCB-103 | 1,440 | | PCB-116/85 | 52,800 | E C | PCB-150 | 150 | | PCB-161 | (2.9) | |
| PCB-94 | 749 | | PCB-110 | 150,000 | E | PCB-136 | 6,520 | E | PCB-153/168 | 92,700 | E C |
| PCB-95 | 66,300 | E | PCB-115 | (3.34) | | PCB-145 | 33.7 | | PCB-141 | 16,600 | E |
| PCB-100/93 | 2,220 | C | PCB-82 | 25,200 | E | PCB-148 | 260 | | PCB-130 | 10,800 | E |
| PCB-102 | 5,010 | E | PCB-111 | (3.21) | | PCB-151/135 | 27,900 | E C | PCB-137 | 6,510 | E |
| PCB-98 | 276 | | PCB-120 | 905 | | PCB-154 | 1,680 | | PCB-164 | 4,770 | E |
| PCB-88 | (5.08) | | PCB-108/124 | 3,200 | C | PCB-144 | 3,880 | E | PCB-163/138/129 | 138,000 | E C |
| PCB-91 | 25,900 | E | PCB-107 | 14,200 | E | PCB-147/149 | 63,600 | E C | PCB-160 | (2.73) | |
| PCB-84 | 27,700 | E | PCB-123 | 4,460 | E | PCB-134 | 5,320 | E | PCB-158 | 10,400 | E |
| PCB-89 | 2,000 | | PCB-106 | (3.39) | | PCB-143 | 215 | | PCB-128/166 | 20,000 | E C |
| PCB-121 | (3.22) | | PCB-118 | 142,000 | E | PCB-139/140 | 2,400 | C | PCB-159 | 644 | |
| PCB-92 | 30,800 | E | PCB-122 | 1,120 | | PCB-131 | 1,260 | | PCB-162 | 723 | |
| PCB-113/90/101 | 146,000 | E C | PCB-114 | 5,620 | E | PCB-142 | 67 | | PCB-167 | 5,080 | E |
| PCB-83 | 10,800 | E | PCB-105 | 61,100 | E | PCB-132 | 25,400 | E | PCB-156/157 | 11,500 | E C |
| PCB-99 | 113,000 | E | PCB-127 | (3.82) | | PCB-133 | 2,890 | | PCB-169 | 178 | |
| PCB-112 | 697 | | PCB-126 | 453 | | | | | | | |
| | | | **Conc.** | 1,010,000 | | | | | **Conc.** | 483,000 | |
| | | | **EMPC** | 1,010,000 | | | | | **EMPC** | 483,000 | |

| Hepta | Conc. | Qualifiers | Hepta | Conc. | Qualifiers | Octa | Conc. | Qualifiers | Nona | Conc. | Qualifiers |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PCB-188 | 88.2 | | PCB-174 | 16,200 | E | PCB-202 | 2,430 | | PCB-208 | 1,740 | |
| PCB-179 | 7,370 | E | PCB-177 | 16,700 | E | PCB-201 | 1,390 | | PCB-207 | 1,080 | |
| PCB-184 | 64.6 | | PCB-181 | 275 | | PCB-204 | 42.6 | | PCB-206 | 2,390 | |
| PCB-176 | 2,260 | | PCB-171/173 | 7,710 | E C | PCB-197 | 478 | | | | |
| PCB-186 | (2.46) | | PCB-172 | 6,660 | E | PCB-200 | 1,210 | | **Conc.** | 5,210 | |
| PCB-178 | 6,930 | E | PCB-192 | 79.8 | | PCB-198/199 | 15,000 | E C | **EMPC** | 5,210 | |
| PCB-175 | 1,160 | | PCB-180/193 | 52,900 | E C | PCB-196 | 5,900 | E | | | |
| PCB-187 | 41,000 | E | PCB-191 | 1,030 | | PCB-203 | 8,020 | E | **Deca** | **Conc.** | **Qualifiers** |
| PCB-182 | 320 | | PCB-170 | 20,700 | E | PCB-195 | 7,780 | E | PCB-209 | 5,590 | E |
| PCB-183 | 17,600 | E | PCB-190 | 4,860 | E | PCB-194 | 14,200 | E | | | |
| PCB-185 | 2,040 | | PCB-189 | 1,050 | | PCB-205 | 726 | | | | |
| | | | **Conc.** | 207,000 | | **Conc.** | 57,200 | | | | |
| | | | **EMPC** | 207,000 | | **EMPC** | 57,200 | | | | |

Brooks Rand Labs

# Sample Information

| Sample | Lab ID | Report Matrix | Type | Sampled | Received |
|---|---|---|---|---|---|
| *LPR6-ECST-Comp01* | 1132006-01 | Biota | Sample | 06/08/2011 | 08/02/2011 |
| *LPRBG-ECST-Comp01* | 1132006-02 | Biota | Sample | 03/09/2011 | 08/02/2011 |
| *LPR6-ECST-Comp02* | 1132006-03 | Biota | Sample | 06/08/2011 | 08/02/2011 |
| *LPR7-ECST-Comp03* | 1132006-04 | Biota | Sample | 06/08/2011 | 08/02/2011 |
| *LPR7-ECST-Comp04* | 1132006-05 | Biota | Sample | 06/08/2011 | 08/02/2011 |
| *LPR8-ECST-Comp05* | 1132006-06 | Biota | Sample | 06/08/2011 | 08/02/2011 |
| *LPR1-GDST-Comp01* | 1132006-07 | Biota | Sample | 05/09/2011 | 08/02/2011 |
| *LPRBG-GDST-Comp01* | 1132006-08 | Biota | Sample | 03/08/2011 | 08/02/2011 |
| *LPR2-GDST-Comp02* | 1132006-09 | Biota | QC Sample | 05/09/2011 | 08/02/2011 |
| *LPR3-GDST-Comp03* | 1132006-10 | Biota | Sample | 05/09/2011 | 08/02/2011 |
| *LPR-071811-RB* | 1132006-11 | DIW | Equip. Blank | 07/18/2011 | 07/21/2011 |

# Batch Summary

| Analyte | Lab Matrix | Method | Prepared | Analyzed | Batch | Sequence |
|---|---|---|---|---|---|---|
| Hg | Biota | EPA 1631 Appendix | 09/06/2011 | 09/07/2011 | B111364 | 1100615 |
| MeHg | Biota | EPA 1630 | 08/16/2011 | 08/25/2011 | B111090 | 1100579 |
| Hg | Water | EPA 1631 | 08/09/2011 | 08/11/2011 | B111199 | 1100547 |
| MeHg | Water | EPA 1630 | 08/10/2011 | 08/11/2011 | B111209 | 1100545 |

# Sample Results

| Sample | Analyte | Report Matrix | Fraction | Result | Qualifier | MDL | MRL | Unit | Batch | Sequence |
|---|---|---|---|---|---|---|---|---|---|---|
| ***LPR-071811-RB*** | | | | | | | | | | |
| 1132006-11 | Hg | DIW | T | 0.41 | U | 0.15 | 0.41 | ng/L | B111199 | 1100547 |
| 1132006-11 | MeHg | DIW | T | 0.049 | U | 0.019 | 0.049 | ng/L | B111209 | 1100545 |
| ***LPR1-GDST-Comp01*** | | | | | | | | | | |
| 1132006-07 | Hg | Biota | N/A | 10.7 | | 0.36 | 0.90 | ng/g | B111364 | 1100615 |
| 1132006-07 | MeHg | Biota | N/A | 4.7 | | 1.0 | 2.9 | ng/g | B111090 | 1100579 |
| ***LPR2-GDST-Comp02*** | | | | | | | | | | |
| 1132006-09 | Hg | Biota | N/A | 8.67 | | 0.34 | 0.86 | ng/g | B111364 | 1100615 |
| 1132006-09 | MeHg | Biota | N/A | 3.3 | | 0.9 | 2.7 | ng/g | B111090 | 1100579 |
| ***LPR3-GDST-Comp03*** | | | | | | | | | | |
| 1132006-10 | Hg | Biota | N/A | 18.7 | | 0.40 | 1.01 | ng/g | B111364 | 1100615 |
| 1132006-10 | MeHg | Biota | N/A | 4.5 | | 0.9 | 2.6 | ng/g | B111090 | 1100579 |
| ***LPR6-ECST-Comp01*** | | | | | | | | | | |
| 1132006-01 | Hg | Biota | N/A | 27.9 | | 0.38 | 0.94 | ng/g | B111364 | 1100615 |
| 1132006-01 | MeHg | Biota | N/A | 12.4 | | 0.8 | 2.5 | ng/g | B111090 | 1100579 |
| ***LPR6-ECST-Comp02*** | | | | | | | | | | |
| 1132006-03 | Hg | Biota | N/A | 24.0 | | 0.39 | 0.98 | ng/g | B111364 | 1100615 |
| 1132006-03 | MeHg | Biota | N/A | 16.9 | | 0.9 | 2.6 | ng/g | B111090 | 1100579 |
| ***LPR7-ECST-Comp03*** | | | | | | | | | | |
| 1132006-04 | Hg | Biota | N/A | 33.4 | | 0.38 | 0.96 | ng/g | B111364 | 1100615 |
| 1132006-04 | MeHg | Biota | N/A | 15.4 | | 1.0 | 2.9 | ng/g | B111090 | 1100579 |
| ***LPR7-ECST-Comp04*** | | | | | | | | | | |
| 1132006-05 | Hg | Biota | N/A | 26.8 | | 0.39 | 0.98 | ng/g | B111364 | 1100615 |
| 1132006-05 | MeHg | Biota | N/A | 24.6 | | 0.9 | 2.7 | ng/g | B111090 | 1100579 |
| ***LPR8-ECST-Comp05*** | | | | | | | | | | |
| 1132006-06 | Hg | Biota | N/A | 34.8 | | 0.40 | 1.00 | ng/g | B111364 | 1100615 |
| 1132006-06 | MeHg | Biota | N/A | 21.3 | | 0.9 | 2.8 | ng/g | B111090 | 1100579 |

# Sample Results

| Sample | Analyte | Report Matrix | Fraction | Result | Qualifier | MDL | MRL | Unit | Batch | Sequence |
|---|---|---|---|---|---|---|---|---|---|---|
| ***LPRBG-ECST-Comp01*** | | | | | | | | | | |
| 1132006-02 | Hg | Biota | N/A | 27.8 | | 0.36 | 0.91 | ng/g | B111364 | 1100615 |
| 1132006-02 | MeHg | Biota | N/A | 18.4 | | 0.9 | 2.8 | ng/g | B111090 | 1100579 |
| ***LPRBG-GDST-Comp01*** | | | | | | | | | | |
| 1132006-08 | Hg | Biota | N/A | 11.3 | | 0.40 | 0.99 | ng/g | B111364 | 1100615 |
| 1132006-08 | MeHg | Biota | N/A | 3.5 | | 0.9 | 2.7 | ng/g | B111090 | 1100579 |

**Project ID:** WIN-SE0901
**PM:** Jen Hartmann

**Client PM:** Jennifer Parker
**Client PO:** Task 23.2.1

# Accuracy & Precision Summary

**Batch:** B111090
**Lab Matrix:** Biota
**Method:** EPA 1630

| Sample | Analyte | Native | Spike | Result | Units | REC & Limits | | RPD & Limits | |
|---|---|---|---|---|---|---|---|---|---|
| **B111090-SRM1** | **Certified Reference Material (1106028, NIST 1946 SRM)** | | | | | | | | |
| | MeHg | | 394.0 | 417.7 | ng/g | 106% | 65-135 | | |
| **B111090-DUP1** | **Duplicate (1132006-09)** | | | | | | | | |
| | MeHg | 3.3 | | 4.1 | ng/g | | | 20% | 35 |
| **B111090-MS1** | **Matrix Spike (1132006-09)** | | | | | | | | |
| | MeHg | 3.3 | 246.1 | 322.6 | ng/g | 130% | 65-135 | | |
| **B111090-MSD1** | **Matrix Spike Duplicate (1132006-09)** | | | | | | | | |
| | MeHg | 3.3 | 224.2 | 273.5 | ng/g | 120% | 65-135 | 16% | 35 |

**Project ID:** WIN-SE0901
**PM:** Jen Hartmann

**Client PM:** Jennifer Parker
**Client PO:** Task 23.2.1

# Accuracy & Precision Summary

**Batch:** B111199
**Lab Matrix:** Water
**Method:** EPA 1631

| Sample | Analyte | Native | Spike | Result | Units | REC & Limits | | RPD & Limits | |
|---|---|---|---|---|---|---|---|---|---|
| **B111199-SRM1** | **Certified Reference Material (1133002, NIST 1641d 1000x dilution)** | | | | | | | | |
| | Hg | | 15.68 | 16.58 | ng/L | 106% | 85-115 | | |
| **B111199-MS2** | **Matrix Spike (1132024-02)** | | | | | | | | |
| | Hg | 0.21 | 2.025 | 2.53 | ng/L | 114% | 71-125 | | |
| **B111199-MSD2** | **Matrix Spike Duplicate (1132024-02)** | | | | | | | | |
| | Hg | 0.21 | 2.022 | 2.60 | ng/L | 118% | 71-125 | 3% | 24 |

**Project ID:** WIN-SE0901
**PM:** Jen Hartmann

**Client PM:** Jennifer Parker
**Client PO:** Task 23.2.1

# Accuracy & Precision Summary

**Batch:** B111209
**Lab Matrix:** Water
**Method:** EPA 1630

| Sample | Analyte | Native | Spike | Result | Units | REC & Limits | | RPD & Limits | |
|---|---|---|---|---|---|---|---|---|---|
| **B111209-BS1** | **Laboratory Fortified Blank (1130012)** | | | | | | | | |
| | MeHg | | 1.005 | 1.008 | ng/L | 100% | 67-133 | | |
| **B111209-MS1** | **Matrix Spike (1128011-02)** | | | | | | | | |
| | MeHg | 3.868 | 5.005 | 9.525 | ng/L | 113% | 65-135 | | |
| **B111209-MSD1** | **Matrix Spike Duplicate (1128011-02)** | | | | | | | | |
| | MeHg | 3.868 | 5.005 | 9.685 | ng/L | 116% | 65-135 | 2% | 35 |

**Project ID:** WIN-SE0901
**PM:** Jen Hartmann

**Client PM:** Jennifer Parker
**Client PO:** Task 23.2.1

# Accuracy & Precision Summary

**Batch:** B111364
**Lab Matrix:** Biota
**Method:** EPA 1631 Appendix

| Sample | Analyte | Native | Spike | Result | Units | REC & Limits | | RPD & Limits | |
|---|---|---|---|---|---|---|---|---|---|
| **B111364-SRM1** | **Certified Reference Material (0910049, IAEA 407)** | | | | | | | | |
| | Hg | | 222.0 | 209.4 | ng/g | 94% | 75-125 | | |
| **B111364-DUP1** | **Duplicate (1132006-09)** | | | | | | | | |
| | Hg | 8.67 | | 11.60 | ng/g | | | 29% | 30 |
| **B111364-MS1** | **Matrix Spike (1132006-09)** | | | | | | | | |
| | Hg | 8.67 | 64.16 | 81.27 | ng/g | 113% | 70-130 | | |
| **B111364-MSD1** | **Matrix Spike Duplicate (1132006-09)** | | | | | | | | |
| | Hg | 8.67 | 66.16 | 77.55 | ng/g | 104% | 70-130 | 5% | 30 |

Columbia Analytical Services

# Butyltins

# Organic Analysis:
# Butyltins (as cation)

## Summary Package

### Sample and QC Results

**COLUMBIA ANALYTICAL SERVICES, INC.**

**Client:** Windward Environmental, LLC
**Project:** Passaic RI/FS Caged Bivalve Study/Task 23.2.1

**Service Request:** K1106643

**Cover Page - Organic Analysis Data Package**
**Butyltins (as cation)**

| Sample Name | Lab Code | Date Collected | Date Received |
|---|---|---|---|
| LPR-071811-RB | K1106643-001 | 07/18/2011 | 07/21/2011 |

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the case narrative. Release of the data contained in this hardcopy data package and in the computer-readable data submitted on floppy diskette has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature.

Signature:_____ Name:_____

Date:_____ Title:_____

# COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

| | | | |
|---|---|---|---|
| **Client:** | Windward Environmental, LLC | **Service Request:** | K1106643 |
| **Project:** | Passaic RI/FS Caged Bivalve Study/Task 23.2.1 | **Date Collected:** | 07/18/2011 |
| **Sample Matrix:** | Water | **Date Received:** | 07/21/2011 |
| | | **Date Extracted:** | 07/25/2011 |
| | | **Date Analyzed:** | 08/08/2011 |

## Butyltins (as cation)

| | | | |
|---|---|---|---|
| **Sample Name:** | LPR-071811-RB | **Units:** | ug/L |
| **Lab Code:** | K1106643-001 | **Basis:** | NA |
| **File ID:** | J:\GC26\DATA\080811\0808F016.D | **Level:** | Low |
| **Instrument ID:** | GC26 | | |
| **Extraction Method:** | EPA 3520C | **Extraction Lot:** | KWG1107461 |
| **Analysis Method:** | Krone | **Calibration ID:** | CAL10641 |
| | | **Column1:** | RTX-1 |
| **Sample Amount:** | 500 mL | **Column2:** | RTX-35 |
| **% Solids:** | NA | | |
| **Dilution Factor:** | 1 | | |

| CAS No. | Analyte Name | Result | Q | MRL | MDL | Note |
|---|---|---|---|---|---|---|
| 1461-25-2 | Tetra-n-butyltin | 0.050 | U | 0.050 | 0.038 | * |
| 36643-28-4 | Tri-n-butyltin Cation | 0.050 | U | 0.050 | 0.012 | |
| 14488-53-0 | Di-n-butyltin Cation | 0.050 | U | 0.050 | 0.0073 | |
| 78763-54-9 | n-Butyltin Cation | 0.050 | U | 0.050 | 0.029 | |

* See Case Narrative

| Surrogate Name | %Rec | Control Limits | Date Analyzed | Note |
|---|---|---|---|---|
| Tri-n-propyltin | 95 | 27-134 | 08/08/11 | Acceptable |

**Comments:**

# COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

| | | | |
|---|---|---|---|
| **Client:** | Windward Environmental, LLC | **Service Request:** | K1106643 |
| **Project:** | Passaic RI/FS Caged Bivalve Study/Task 23.2.1 | **Date Collected:** | NA |
| **Sample Matrix:** | Water | **Date Received:** | NA |
| | | **Date Extracted:** | 07/25/2011 |
| | | **Date Analyzed:** | 08/08/2011 |

## Butyltins (as cation)

| | | | |
|---|---|---|---|
| **Sample Name:** | Method Blank | **Units:** | ug/L |
| **Lab Code:** | KWG1107461-3 | **Basis:** | NA |
| **File ID:** | J:\GC26\DATA\080811\0808F015.D | **Level:** | Low |
| **Instrument ID:** | GC26 | | |
| **Extraction Method:** | EPA 3520C | **Extraction Lot:** | KWG1107461 |
| **Analysis Method:** | Krone | **Calibration ID:** | CAL10641 |
| | | **Column1:** | RTX-1 |
| **Sample Amount:** | 500 mL | **Column2:** | RTX-35 |
| **% Solids:** | NA | | |
| **Dilution Factor:** | 1 | | |

| CAS No. | Analyte Name | Result | Q | MRL | MDL | Note |
|---|---|---|---|---|---|---|
| 1461-25-2 | Tetra-n-butyltin | 0.050 | U | 0.050 | 0.038 | * |
| 36643-28-4 | Tri-n-butyltin Cation | 0.050 | U | 0.050 | 0.012 | |
| 14488-53-0 | Di-n-butyltin Cation | 0.050 | U | 0.050 | 0.0073 | |
| 78763-54-9 | n-Butyltin Cation | 0.050 | U | 0.050 | 0.029 | * |

* See Case Narrative

| Surrogate Name | %Rec | Control Limits | Date Analyzed | Note |
|---|---|---|---|---|
| Tri-n-propyltin | 89 | 27-134 | 08/08/11 | Acceptable |

**Comments:**

# Metals

REVISED
3:52 pm, Sep 02, 2011

# Columbia Analytical Services

## - Cover Page -
## INORGANIC ANALYSIS DATA PACKAGE

**Client:** Windward Environmental, LLC
**Project Name:** Passaic RI/FS Caged Bivalve Study
**Project No.:** Task 23.2.1

**Service Request:** K1106643

| Sample Name: | Lab Code: |
|---|---|
| **Batch QCD1** | **K1106207-001D** |
| **Batch QCS1** | **K1106207-001S** |
| **Batch QCD2** | **K1106547-006D** |
| **Batch QCS2** | **K1106547-006S** |
| **LPR-071811-RB** | **K1106643-001** |
| **Method Blank** | **K1106643-MB** |
| **Batch QCD3** | **K1106671-001D** |
| **Batch QCS3** | **K1106671-001S** |
| **Batch QCD4** | **K1106682-001D** |
| **Batch QCS4** | **K1106682-001S** |

**Comments:**

**Approved By:** _____ **Date:** 9/2/11

# METALS

- 1 -

## INORGANIC ANALYSIS DATA PACKAGE

| | | | |
|---|---|---|---|
| Client: | Windward Environmental, LLC | Service Request: | K1106643 |
| Project No.: | Task 23.2.1 | Date Collected: | 07/18/11 |
| Project Name: | Passaic RI/FS Caged Bivalve Stud | Date Received: | 07/21/11 |
| Matrix: | WATER | Units: | ug/L |
| | | Basis: | NA |

Sample Name: LPR-071811-RB  Lab Code: K1106643-001

| Analyte | Analysis Method | MRL | MDL | Dil. Factor | Date Extracted | Date Analyzed | Result | C | Q |
|---|---|---|---|---|---|---|---|---|---|
| Aluminum | 6020 | 2.0 | 0.3 | 1.0 | 08/02/11 | 08/06/11 | 1.4 | J | |
| Antimony | 6020 | 0.050 | 0.005 | 1.0 | 08/02/11 | 08/06/11 | 0.005 | U | |
| Arsenic | 6020 | 0.5 | 0.1 | 1.0 | 08/02/11 | 08/06/11 | 0.1 | U | |
| Barium | 6020 | 0.050 | 0.020 | 1.0 | 08/02/11 | 08/09/11 | 0.107 | | N |
| Beryllium | 6020 | 0.020 | 0.006 | 1.0 | 08/02/11 | 08/09/11 | 0.007 | J | |
| Cadmium | 6020 | 0.020 | 0.005 | 1.0 | 08/02/11 | 08/06/11 | 0.005 | U | |
| Calcium | 6010B | 50.0 | 6.0 | 1.0 | 08/02/11 | 08/05/11 | 43.1 | J | |
| Chromium | 6010B | 5.0 | 2.0 | 1.0 | 08/02/11 | 08/10/11 | 9.5 | | |
| Cobalt | 6020 | 0.020 | 0.006 | 1.0 | 08/02/11 | 08/06/11 | 0.015 | J | |
| Copper | 6020 | 0.10 | 0.02 | 1.0 | 08/02/11 | 08/06/11 | 1.07 | | |
| Iron | 6010B | 20.0 | 0.8 | 1.0 | 08/02/11 | 08/05/11 | 44.9 | | |
| Lead | 6020 | 0.020 | 0.005 | 1.0 | 08/02/11 | 08/06/11 | 0.010 | J | |
| Magnesium | 6010B | 20.0 | 0.3 | 1.0 | 08/02/11 | 08/05/11 | 2.3 | J | |
| Manganese | 6020 | 0.050 | 0.006 | 1.0 | 08/02/11 | 08/09/11 | 1.670 | | |
| Nickel | 6020 | 0.20 | 0.02 | 1.0 | 08/02/11 | 08/09/11 | 1.38 | | |
| Potassium | 6010B | 400 | 40 | 1.0 | 08/02/11 | 08/05/11 | 40 | U | |
| Selenium | 7742 | 1.0 | 0.2 | 2.0 | 08/02/11 | 08/08/11 | 0.2 | U | |
| Silver | 6020 | 0.020 | 0.004 | 1.0 | 08/02/11 | 08/06/11 | 0.004 | U | |
| Sodium | 6010B | 100 | 20 | 1.0 | 08/02/11 | 08/05/11 | 72 | J | |
| Thallium | 6020 | 0.020 | 0.005 | 1.0 | 08/02/11 | 08/09/11 | 0.005 | U | |
| Titanium | 6010B | 10.0 | 2.0 | 1.0 | 08/02/11 | 08/05/11 | 3.8 | J | |
| Vanadium | 6010B | 10.0 | 5.0 | 1.0 | 08/02/11 | 08/10/11 | 5.0 | U | |
| Zinc | 6020 | 0.5 | 0.2 | 1.0 | 08/02/11 | 08/09/11 | 1.8 | | |

% Solids: 0.0

Comments:

# METALS

- 1 -

## INORGANIC ANALYSIS DATA PACKAGE

| | | | |
|---|---|---|---|
| Client: | Windward Environmental, LLC | Service Request: | K1106643 |
| Project No.: | Task 23.2.1 | Date Collected: | |
| Project Name: | Passaic RI/FS Caged Bivalve Stud | Date Received: | |
| Matrix: | WATER | Units: | ug/L |
| | | Basis: | NA |

Sample Name: Method Blank  Lab Code: K1106643-MB

| Analyte | Analysis Method | MRL | MDL | Dil. Factor | Date Extracted | Date Analyzed | Result | C | Q |
|---|---|---|---|---|---|---|---|---|---|
| Aluminum | 6020 | 2.0 | 0.3 | 1.0 | 08/02/11 | 08/06/11 | 0.3 | U | |
| Antimony | 6020 | 0.050 | 0.005 | 1.0 | 08/02/11 | 08/06/11 | 0.020 | J | |
| Arsenic | 6020 | 0.5 | 0.1 | 1.0 | 08/02/11 | 08/06/11 | 0.1 | U | |
| Barium | 6020 | 0.050 | 0.020 | 1.0 | 08/02/11 | 08/09/11 | 0.020 | U | N |
| Beryllium | 6020 | 0.020 | 0.006 | 1.0 | 08/02/11 | 08/09/11 | 0.006 | U | |
| Cadmium | 6020 | 0.020 | 0.005 | 1.0 | 08/02/11 | 08/06/11 | 0.005 | J | |
| Calcium | 6010B | 50.0 | 6.0 | 1.0 | 08/02/11 | 08/05/11 | 6.0 | U | |
| Chromium | 6010B | 5.0 | 2.0 | 1.0 | 08/02/11 | 08/10/11 | 2.0 | U | |
| Cobalt | 6020 | 0.020 | 0.006 | 1.0 | 08/02/11 | 08/06/11 | 0.006 | U | |
| Copper | 6020 | 0.10 | 0.02 | 1.0 | 08/02/11 | 08/06/11 | 0.02 | U | |
| Iron | 6010B | 20.0 | 0.8 | 1.0 | 08/02/11 | 08/05/11 | 0.8 | U | |
| Lead | 6020 | 0.020 | 0.005 | 1.0 | 08/02/11 | 08/06/11 | 0.005 | U | |
| Magnesium | 6010B | 20.0 | 0.3 | 1.0 | 08/02/11 | 08/05/11 | 0.3 | U | |
| Manganese | 6020 | 0.050 | 0.006 | 1.0 | 08/02/11 | 08/09/11 | 0.006 | U | |
| Nickel | 6020 | 0.20 | 0.02 | 1.0 | 08/02/11 | 08/09/11 | 0.02 | U | |
| Potassium | 6010B | 400 | 40 | 1.0 | 08/02/11 | 08/05/11 | 40 | U | |
| Selenium | 7742 | 1.0 | 0.2 | 2.0 | 08/02/11 | 08/08/11 | 0.2 | U | |
| Silver | 6020 | 0.020 | 0.004 | 1.0 | 08/02/11 | 08/06/11 | 0.008 | J | |
| Sodium | 6010B | 100 | 20 | 1.0 | 08/02/11 | 08/05/11 | 20 | U | |
| Thallium | 6020 | 0.020 | 0.005 | 1.0 | 08/02/11 | 08/09/11 | 0.005 | U | |
| Titanium | 6010B | 10.0 | 2.0 | 1.0 | 08/02/11 | 08/05/11 | 2.0 | U | |
| Vanadium | 6010B | 10.0 | 5.0 | 1.0 | 08/02/11 | 08/10/11 | 5.0 | U | |
| Zinc | 6020 | 0.5 | 0.2 | 1.0 | 08/02/11 | 08/09/11 | 0.2 | U | |

% Solids: 0.0

Comments:

# Metals

# Columbia Analytical Services

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## INORGANIC ANALYSIS DATA PACKAGE

**Client:** Windward Environmental, LLC
**Project Name:** Passaic RI/FS Caged Bivalve Study
**Project No.:** Task 23.2.1

**Service Request:** K1107026

| Sample Name: | Lab Code: |
|---|---|
| LPR6-ECST-Comp01 | K1107026-001 |
| LPRBG-ECST-Comp01 | K1107026-002 |
| LPR6-ECST-Comp02 | K1107026-003 |
| LPR6-ECST-Comp02D | K1107026-003D |
| LPR6-ECST-Comp02S | K1107026-003S |
| LPR7-ECST-Comp03 | K1107026-004 |
| LPR7-ECST-Comp04 | K1107026-005 |
| LPR8-ECST-Comp05 | K1107026-006 |
| LPR1-GDST-Comp01 | K1107026-007 |
| LPRBG-GDST-Comp01 | K1107026-008 |
| LPR2-GDST-Comp02 | K1107026-009 |
| LPR3-GDST-Comp03 | K1107026-010 |
| Method Blank | K1107026-MB |

**Comments:**

**Approved By:** 3C **Date:** 9/8/11

# Metals

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## INORGANIC ANALYSIS DATA PACKAGE

| | | | |
|---|---|---|---|
| **Client:** | Windward Environmental, LLC | **Service Request:** | K1107026 |
| **Project No.:** | Task 23.2.1 | **Date Collected:** | 06/08/11 |
| **Project Name:** | Passaic RI/FS Caged Bivalve Stud | **Date Received:** | 08/02/11 |
| **Matrix:** | TISSUE | **Units:** | mg/Kg |
| | | **Basis:** | WET |

**Sample Name:** LPR6-ECST-Comp01 **Lab Code:** K1107026-001

| Analyte | Analysis Method | MRL | MDL | Dilution Factor | Date Extracted | Date Analyzed | Result | C | Q |
|---|---|---|---|---|---|---|---|---|---|
| Aluminum | 6010B | 0.40 | 0.02 | 1.0 | 08/20/11 | 09/03/11 | 13.9 | | |
| Antimony | 6020 | 0.004 | 0.002 | 5.0 | 08/20/11 | 09/01/11 | 0.016 | | |
| Arsenic | 6020 | 0.040 | 0.003 | 5.0 | 08/20/11 | 09/01/11 | 0.278 | | |
| Barium | 6010B | 0.02 | 0.00 | 1.0 | 08/20/11 | 09/03/11 | 296 | | |
| Beryllium | 6020 | 0.0016 | 0.0003 | 5.0 | 08/20/11 | 09/01/11 | 0.0063 | | |
| Cadmium | 6020 | 0.0016 | 0.0004 | 5.0 | 08/20/11 | 09/01/11 | 0.0573 | | |
| Calcium | 6010B | 0.4 | 0.2 | 1.0 | 08/20/11 | 09/03/11 | 2980 | | |
| Chromium | 6010B | 0.02 | 0.01 | 1.0 | 08/20/11 | 09/03/11 | 0.35 | | |
| Cobalt | 6020 | 0.0016 | 0.0002 | 5.0 | 08/20/11 | 09/01/11 | 0.0766 | | |
| Copper | 6020 | 0.008 | 0.002 | 5.0 | 08/20/11 | 09/01/11 | 0.501 | | N* |
| Iron | 6010B | 0.08 | 0.03 | 1.0 | 08/20/11 | 09/03/11 | 1080 | | |
| Lead | 6020 | 0.0016 | 0.0004 | 5.0 | 08/20/11 | 09/01/11 | 0.188 | | |
| Magnesium | 6010B | 0.16 | 0.03 | 1.0 | 08/20/11 | 09/03/11 | 88 | | |
| Manganese | 6010B | 0.040 | 0.002 | 1.0 | 08/20/11 | 09/03/11 | 1210 | | |
| Nickel | 6020 | 0.016 | 0.002 | 5.0 | 08/20/11 | 09/01/11 | 0.152 | | |
| Potassium | 6010B | 3.2 | 0.5 | 1.0 | 08/20/11 | 09/03/11 | 143 | | |
| Selenium | 7742 | 0.008 | 0.004 | 5.0 | 08/20/11 | 09/03/11 | 0.151 | | |
| Silver | 6020 | 0.002 | 0.002 | 5.0 | 08/20/11 | 09/01/11 | 0.005 | | |
| Sodium | 6010B | 1.6 | 0.3 | 1.0 | 08/20/11 | 09/03/11 | 210 | | |
| Thallium | 6020 | 0.0016 | 0.0002 | 5.0 | 08/20/11 | 09/01/11 | 0.0060 | | |
| Titanium | 6010B | 0.02 | 0.01 | 1.0 | 08/20/11 | 09/03/11 | 0.42 | | |
| Vanadium | 6010B | 0.02 | 0.01 | 1.0 | 08/20/11 | 09/03/11 | 5.05 | | |
| Zinc | 6010B | 0.016 | 0.005 | 1.0 | 08/20/11 | 09/03/11 | 14.1 | | |

Comments:

## Metals

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### INORGANIC ANALYSIS DATA PACKAGE

| | | | |
|---|---|---|---|
| **Client:** | Windward Environmental, LLC | **Service Request:** | K1107026 |
| **Project No.:** | Task 23.2.1 | **Date Collected:** | 03/09/11 |
| **Project Name:** | Passaic RI/FS Caged Bivalve Stud | **Date Received:** | 08/02/11 |
| **Matrix:** | TISSUE | **Units:** | mg/Kg |
| | | **Basis:** | WET |

**Sample Name:** LPRBG-ECST-Comp01 **Lab Code:** K1107026-002

| Analyte | Analysis Method | MRL | MDL | Dilution Factor | Date Extracted | Date Analyzed | Result | C | Q |
|---|---|---|---|---|---|---|---|---|---|
| Aluminum | 6010B | 0.53 | 0.03 | 1.0 | 08/20/11 | 09/03/11 | 11.1 | | |
| Antimony | 6020 | 0.005 | 0.002 | 5.0 | 08/20/11 | 09/01/11 | 0.002 | U | |
| Arsenic | 6020 | 0.053 | 0.004 | 5.0 | 08/20/11 | 09/01/11 | 0.375 | | |
| Barium | 6010B | 0.03 | 0.00 | 1.0 | 08/20/11 | 09/03/11 | 359 | | |
| Beryllium | 6020 | 0.0021 | 0.0004 | 5.0 | 08/20/11 | 09/01/11 | 0.0064 | | |
| Cadmium | 6020 | 0.0021 | 0.0005 | 5.0 | 08/20/11 | 09/01/11 | 0.0589 | | |
| Calcium | 6010B | 0.5 | 0.3 | 1.0 | 08/20/11 | 09/03/11 | 3670 | | |
| Chromium | 6010B | 0.02 | 0.01 | 1.0 | 08/20/11 | 09/03/11 | 0.33 | | |
| Cobalt | 6020 | 0.0021 | 0.0002 | 5.0 | 08/20/11 | 09/01/11 | 0.0796 | | |
| Copper | 6020 | 0.011 | 0.003 | 5.0 | 08/20/11 | 09/01/11 | 0.835 | | N* |
| Iron | 6010B | 0.11 | 0.04 | 1.0 | 08/20/11 | 09/03/11 | 1270 | | |
| Lead | 6020 | 0.0021 | 0.0005 | 5.0 | 08/20/11 | 09/01/11 | 0.128 | | |
| Magnesium | 6010B | 0.21 | 0.04 | 1.0 | 08/20/11 | 09/03/11 | 89 | | |
| Manganese | 6010B | 0.053 | 0.003 | 1.0 | 08/20/11 | 09/03/11 | 1510 | | |
| Nickel | 6020 | 0.021 | 0.002 | 5.0 | 08/20/11 | 09/01/11 | 0.197 | | |
| Potassium | 6010B | 4.2 | 0.6 | 1.0 | 08/20/11 | 09/03/11 | 209 | | |
| Selenium | 7742 | 0.011 | 0.005 | 5.0 | 08/20/11 | 09/03/11 | 0.129 | | |
| Silver | 6020 | 0.002 | 0.002 | 5.0 | 08/20/11 | 09/01/11 | 0.004 | | |
| Sodium | 6010B | 2.1 | 0.4 | 1.0 | 08/20/11 | 09/03/11 | 211 | | |
| Thallium | 6020 | 0.0021 | 0.0002 | 5.0 | 08/20/11 | 09/01/11 | 0.0010 | J | |
| Titanium | 6010B | 0.02 | 0.01 | 1.0 | 08/20/11 | 09/03/11 | 0.31 | | |
| Vanadium | 6010B | 0.02 | 0.01 | 1.0 | 08/20/11 | 09/03/11 | 6.30 | | |
| Zinc | 6010B | 0.021 | 0.006 | 1.0 | 08/20/11 | 09/03/11 | 16.7 | | |

Comments:

# Metals

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## INORGANIC ANALYSIS DATA PACKAGE

| | | | |
|---|---|---|---|
| **Client:** | Windward Environmental, LLC | **Service Request:** | K1107026 |
| **Project No.:** | Task 23.2.1 | **Date Collected:** | 06/08/11 |
| **Project Name:** | Passaic RI/FS Caged Bivalve Stud | **Date Received:** | 08/02/11 |
| **Matrix:** | TISSUE | **Units:** | mg/Kg |
| | | **Basis:** | WET |

**Sample Name:** LPR6-ECST-Comp02 **Lab Code:** K1107026-003

| Analyte | Analysis Method | MRL | MDL | Dilution Factor | Date Extracted | Date Analyzed | Result | C | Q |
|---|---|---|---|---|---|---|---|---|---|
| Aluminum | 6010B | 0.46 | 0.03 | 1.0 | 08/20/11 | 09/03/11 | 27.4 | | |
| Antimony | 6020 | 0.005 | 0.002 | 5.0 | 08/20/11 | 09/01/11 | 0.004 | J | |
| Arsenic | 6020 | 0.046 | 0.004 | 5.0 | 08/20/11 | 09/01/11 | 0.337 | | |
| Barium | 6010B | 0.03 | 0.00 | 1.0 | 08/20/11 | 09/03/11 | 300 | | |
| Beryllium | 6020 | 0.0018 | 0.0004 | 5.0 | 08/20/11 | 09/01/11 | 0.0059 | | |
| Cadmium | 6020 | 0.0018 | 0.0005 | 5.0 | 08/20/11 | 09/01/11 | 0.0655 | | |
| Calcium | 6010B | 0.5 | 0.3 | 1.0 | 08/20/11 | 09/03/11 | 3130 | | |
| Chromium | 6010B | 0.02 | 0.01 | 1.0 | 08/20/11 | 09/03/11 | 0.90 | | |
| Cobalt | 6020 | 0.0018 | 0.0002 | 5.0 | 08/20/11 | 09/01/11 | 0.0755 | | |
| Copper | 6020 | 0.009 | 0.003 | 5.0 | 08/20/11 | 09/01/11 | 1.240 | | N* |
| Iron | 6010B | 0.09 | 0.04 | 1.0 | 08/20/11 | 09/03/11 | 1140 | | |
| Lead | 6020 | 0.0018 | 0.0005 | 5.0 | 08/20/11 | 09/01/11 | 0.279 | | |
| Magnesium | 6010B | 0.18 | 0.04 | 1.0 | 08/20/11 | 09/03/11 | 114 | | |
| Manganese | 6010B | 0.046 | 0.003 | 1.0 | 08/20/11 | 09/03/11 | 1250 | | |
| Nickel | 6020 | 0.018 | 0.002 | 5.0 | 08/20/11 | 09/01/11 | 0.403 | | |
| Potassium | 6010B | 3.7 | 0.6 | 1.0 | 08/20/11 | 09/03/11 | 190 | | |
| Selenium | 7742 | 0.009 | 0.005 | 5.0 | 08/20/11 | 09/03/11 | 0.216 | | |
| Silver | 6020 | 0.002 | 0.002 | 5.0 | 08/20/11 | 09/01/11 | 0.006 | | |
| Sodium | 6010B | 1.8 | 0.4 | 1.0 | 08/20/11 | 09/03/11 | 277 | | |
| Thallium | 6020 | 0.0018 | 0.0002 | 5.0 | 08/20/11 | 09/01/11 | 0.0013 | J | |
| Titanium | 6010B | 0.02 | 0.01 | 1.0 | 08/20/11 | 09/03/11 | 0.85 | | |
| Vanadium | 6010B | 0.02 | 0.01 | 1.0 | 08/20/11 | 09/03/11 | 5.22 | | |
| Zinc | 6010B | 0.018 | 0.006 | 1.0 | 08/20/11 | 09/03/11 | 16.1 | | |

Comments:

# Metals

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## INORGANIC ANALYSIS DATA PACKAGE

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|---|---|---|---|
| **Client:** | Windward Environmental, LLC | **Service Request:** | K1107026 |
| **Project No.:** | Task 23.2.1 | **Date Collected:** | 06/08/11 |
| **Project Name:** | Passaic RI/FS Caged Bivalve Stud | **Date Received:** | 08/02/11 |
| **Matrix:** | TISSUE | **Units:** | mg/Kg |
| | | **Basis:** | WET |

**Sample Name:** LPR7-ECST-Comp03 **Lab Code:** K1107026-004

| Analyte | Analysis Method | MRL | MDL | Dilution Factor | Date Extracted | Date Analyzed | Result | C | Q |
|---|---|---|---|---|---|---|---|---|---|
| Aluminum | 6010B | 0.46 | 0.03 | 1.0 | 08/20/11 | 09/03/11 | 18.7 | | |
| Antimony | 6020 | 0.005 | 0.002 | 5.0 | 08/20/11 | 09/01/11 | 0.003 | J | |
| Arsenic | 6020 | 0.046 | 0.004 | 5.0 | 08/20/11 | 09/01/11 | 0.357 | | |
| Barium | 6010B | 0.03 | 0.00 | 1.0 | 08/20/11 | 09/03/11 | 355 | | |
| Beryllium | 6020 | 0.0019 | 0.0004 | 5.0 | 08/20/11 | 09/01/11 | 0.0066 | | |
| Cadmium | 6020 | 0.0019 | 0.0005 | 5.0 | 08/20/11 | 09/01/11 | 0.0682 | | |
| Calcium | 6010B | 0.5 | 0.3 | 1.0 | 08/20/11 | 09/03/11 | 3510 | | |
| Chromium | 6010B | 0.02 | 0.01 | 1.0 | 08/20/11 | 09/03/11 | 0.57 | | |
| Cobalt | 6020 | 0.0019 | 0.0002 | 5.0 | 08/20/11 | 09/01/11 | 0.0857 | | |
| Copper | 6020 | 0.009 | 0.003 | 5.0 | 08/20/11 | 09/01/11 | 0.630 | | N* |
| Iron | 6010B | 0.09 | 0.04 | 1.0 | 08/20/11 | 09/03/11 | 1310 | | |
| Lead | 6020 | 0.0019 | 0.0005 | 5.0 | 08/20/11 | 09/01/11 | 0.253 | | |
| Magnesium | 6010B | 0.19 | 0.04 | 1.0 | 08/20/11 | 09/03/11 | 113 | | |
| Manganese | 6010B | 0.046 | 0.003 | 1.0 | 08/20/11 | 09/03/11 | 1410 | | |
| Nickel | 6020 | 0.019 | 0.002 | 5.0 | 08/20/11 | 09/01/11 | 0.243 | | |
| Potassium | 6010B | 3.7 | 0.6 | 1.0 | 08/20/11 | 09/03/11 | 177 | | |
| Selenium | 7742 | 0.009 | 0.005 | 5.0 | 08/20/11 | 09/03/11 | 0.148 | | |
| Silver | 6020 | 0.002 | 0.002 | 5.0 | 08/20/11 | 09/01/11 | 0.005 | | |
| Sodium | 6010B | 1.9 | 0.4 | 1.0 | 08/20/11 | 09/03/11 | 260 | | |
| Thallium | 6020 | 0.0019 | 0.0002 | 5.0 | 08/20/11 | 09/01/11 | 0.0008 | J | |
| Titanium | 6010B | 0.02 | 0.01 | 1.0 | 08/20/11 | 09/03/11 | 0.57 | | |
| Vanadium | 6010B | 0.02 | 0.01 | 1.0 | 08/20/11 | 09/03/11 | 5.82 | | |
| Zinc | 6010B | 0.019 | 0.006 | 1.0 | 08/20/11 | 09/03/11 | 17.3 | | |

Comments:

# Metals

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## INORGANIC ANALYSIS DATA PACKAGE

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|---|---|---|---|
| **Client:** | Windward Environmental, LLC | **Service Request:** | K1107026 |
| **Project No.:** | Task 23.2.1 | **Date Collected:** | 06/08/11 |
| **Project Name:** | Passaic RI/FS Caged Bivalve Stud | **Date Received:** | 08/02/11 |
| **Matrix:** | TISSUE | **Units:** | mg/Kg |
| | | **Basis:** | WET |

**Sample Name:** LPR7-ECST-Comp04 **Lab Code:** K1107026-005

| Analyte | Analysis Method | MRL | MDL | Dilution Factor | Date Extracted | Date Analyzed | Result | C | Q |
|---|---|---|---|---|---|---|---|---|---|
| Aluminum | 6010B | 0.49 | 0.03 | 1.0 | 08/20/11 | 09/03/11 | 17.5 | | |
| Antimony | 6020 | 0.005 | 0.002 | 5.0 | 08/20/11 | 09/01/11 | 0.002 | J | |
| Arsenic | 6020 | 0.049 | 0.004 | 5.0 | 08/20/11 | 09/01/11 | 0.374 | | |
| Barium | 6010B | 0.03 | 0.00 | 1.0 | 08/20/11 | 09/03/11 | 309 | | |
| Beryllium | 6020 | 0.0020 | 0.0004 | 5.0 | 08/20/11 | 09/01/11 | 0.0063 | | |
| Cadmium | 6020 | 0.0020 | 0.0005 | 5.0 | 08/20/11 | 09/01/11 | 0.0674 | | |
| Calcium | 6010B | 0.5 | 0.3 | 1.0 | 08/20/11 | 09/03/11 | 3240 | | |
| Chromium | 6010B | 0.02 | 0.01 | 1.0 | 08/20/11 | 09/03/11 | 0.40 | | |
| Cobalt | 6020 | 0.0020 | 0.0002 | 5.0 | 08/20/11 | 09/01/11 | 0.0802 | | |
| Copper | 6020 | 0.010 | 0.003 | 5.0 | 08/20/11 | 09/01/11 | 0.719 | | N* |
| Iron | 6010B | 0.10 | 0.04 | 1.0 | 08/20/11 | 09/03/11 | 1150 | | |
| Lead | 6020 | 0.0020 | 0.0005 | 5.0 | 08/20/11 | 09/01/11 | 0.227 | | |
| Magnesium | 6010B | 0.20 | 0.04 | 1.0 | 08/20/11 | 09/03/11 | 115 | | |
| Manganese | 6010B | 0.049 | 0.003 | 1.0 | 08/20/11 | 09/03/11 | 1260 | | |
| Nickel | 6020 | 0.020 | 0.002 | 5.0 | 08/20/11 | 09/01/11 | 0.452 | | |
| Potassium | 6010B | 4.0 | 0.6 | 1.0 | 08/20/11 | 09/03/11 | 193 | | |
| Selenium | 7742 | 0.010 | 0.005 | 5.0 | 08/20/11 | 09/03/11 | 0.189 | | |
| Silver | 6020 | 0.002 | 0.002 | 5.0 | 08/20/11 | 09/01/11 | 0.006 | | |
| Sodium | 6010B | 2.0 | 0.4 | 1.0 | 08/20/11 | 09/03/11 | 260 | | |
| Thallium | 6020 | 0.0020 | 0.0002 | 5.0 | 08/20/11 | 09/01/11 | 0.0009 | J | |
| Titanium | 6010B | 0.02 | 0.01 | 1.0 | 08/20/11 | 09/03/11 | 0.51 | | |
| Vanadium | 6010B | 0.02 | 0.01 | 1.0 | 08/20/11 | 09/03/11 | 5.35 | | |
| Zinc | 6010B | 0.020 | 0.006 | 1.0 | 08/20/11 | 09/03/11 | 17.1 | | |

Comments:

## Metals

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### INORGANIC ANALYSIS DATA PACKAGE

| | | | |
|---|---|---|---|
| **Client:** | Windward Environmental, LLC | **Service Request:** | K1107026 |
| **Project No.:** | Task 23.2.1 | **Date Collected:** | 06/08/11 |
| **Project Name:** | Passaic RI/FS Caged Bivalve Stud | **Date Received:** | 08/02/11 |
| **Matrix:** | TISSUE | **Units:** | mg/Kg |
| | | **Basis:** | WET |

**Sample Name:** LPR8-ECST-Comp05 **Lab Code:** K1107026-006

| Analyte | Analysis Method | MRL | MDL | Dilution Factor | Date Extracted | Date Analyzed | Result | C | Q |
|---|---|---|---|---|---|---|---|---|---|
| Aluminum | 6010B | 0.43 | 0.03 | 1.0 | 08/20/11 | 09/03/11 | 11.0 | | |
| Antimony | 6020 | 0.004 | 0.002 | 5.0 | 08/20/11 | 09/01/11 | 0.004 | J | |
| Arsenic | 6020 | 0.043 | 0.003 | 5.0 | 08/20/11 | 09/01/11 | 0.342 | | |
| Barium | 6010B | 0.03 | 0.00 | 1.0 | 08/20/11 | 09/03/11 | 283 | | |
| Beryllium | 6020 | 0.0017 | 0.0003 | 5.0 | 08/20/11 | 09/01/11 | 0.0054 | | |
| Cadmium | 6020 | 0.0017 | 0.0004 | 5.0 | 08/20/11 | 09/01/11 | 0.0658 | | |
| Calcium | 6010B | 0.4 | 0.3 | 1.0 | 08/20/11 | 09/03/11 | 3040 | | |
| Chromium | 6010B | 0.02 | 0.01 | 1.0 | 08/20/11 | 09/03/11 | 10.80 | | |
| Cobalt | 6020 | 0.0017 | 0.0002 | 5.0 | 08/20/11 | 09/01/11 | 0.159 | | |
| Copper | 6020 | 0.009 | 0.003 | 5.0 | 08/20/11 | 09/01/11 | 0.924 | | N* |
| Iron | 6010B | 0.09 | 0.04 | 1.0 | 08/20/11 | 09/03/11 | 1070 | | |
| Lead | 6020 | 0.0017 | 0.0004 | 5.0 | 08/20/11 | 09/01/11 | 0.136 | | |
| Magnesium | 6010B | 0.17 | 0.04 | 1.0 | 08/20/11 | 09/03/11 | 91 | | |
| Manganese | 6010B | 0.043 | 0.003 | 1.0 | 08/20/11 | 09/03/11 | 1170 | | |
| Nickel | 6020 | 0.017 | 0.002 | 5.0 | 08/20/11 | 09/01/11 | 7.790 | | |
| Potassium | 6010B | 3.5 | 0.5 | 1.0 | 08/20/11 | 09/03/11 | 147 | | |
| Selenium | 7742 | 0.009 | 0.004 | 5.0 | 08/20/11 | 09/03/11 | 0.120 | | |
| Silver | 6020 | 0.002 | 0.002 | 5.0 | 08/20/11 | 09/01/11 | 0.005 | | |
| Sodium | 6010B | 1.7 | 0.3 | 1.0 | 08/20/11 | 09/03/11 | 241 | | |
| Thallium | 6020 | 0.0017 | 0.0002 | 5.0 | 08/20/11 | 09/01/11 | 0.0008 | J | |
| Titanium | 6010B | 0.02 | 0.01 | 1.0 | 08/20/11 | 09/03/11 | 0.33 | | |
| Vanadium | 6010B | 0.02 | 0.01 | 1.0 | 08/20/11 | 09/03/11 | 4.93 | | |
| Zinc | 6010B | 0.017 | 0.005 | 1.0 | 08/20/11 | 09/03/11 | 13.5 | | |

Comments:

# Metals

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## INORGANIC ANALYSIS DATA PACKAGE

| | | | |
|---|---|---|---|
| **Client:** | Windward Environmental, LLC | **Service Request:** | K1107026 |
| **Project No.:** | Task 23.2.1 | **Date Collected:** | 05/09/11 |
| **Project Name:** | Passaic RI/FS Caged Bivalve Stud | **Date Received:** | 08/02/11 |
| **Matrix:** | TISSUE | **Units:** | mg/Kg |
| | | **Basis:** | WET |

**Sample Name:** LPR1-GDST-Comp01 **Lab Code:** K1107026-007

| Analyte | Analysis Method | MRL | MDL | Dilution Factor | Date Extracted | Date Analyzed | Result | C | Q |
|---|---|---|---|---|---|---|---|---|---|
| Aluminum | 6010B | 0.26 | 0.02 | 1.0 | 08/20/11 | 09/03/11 | 16.9 | | |
| Antimony | 6020 | 0.003 | 0.001 | 5.0 | 08/20/11 | 09/01/11 | 0.003 | | |
| Arsenic | 6020 | 0.026 | 0.002 | 5.0 | 08/20/11 | 09/01/11 | 1.100 | | |
| Barium | 6010B | 0.02 | 0.00 | 1.0 | 08/20/11 | 09/03/11 | 1.11 | | |
| Beryllium | 6020 | 0.0010 | 0.0002 | 5.0 | 08/20/11 | 09/01/11 | 0.0010 | J | |
| Cadmium | 6020 | 0.0010 | 0.0003 | 5.0 | 08/20/11 | 09/01/11 | 0.0211 | | |
| Calcium | 6010B | 0.3 | 0.2 | 1.0 | 08/20/11 | 09/03/11 | 175 | | |
| Chromium | 6010B | 0.01 | 0.00 | 1.0 | 08/20/11 | 09/03/11 | 0.16 | | |
| Cobalt | 6020 | 0.0010 | 0.0001 | 5.0 | 08/20/11 | 09/01/11 | 0.0223 | | |
| Copper | 6020 | 0.005 | 0.002 | 5.0 | 08/20/11 | 09/01/11 | 0.683 | | N* |
| Iron | 6010B | 0.05 | 0.02 | 1.0 | 08/20/11 | 09/03/11 | 32.4 | | |
| Lead | 6020 | 0.0010 | 0.0003 | 5.0 | 08/20/11 | 09/01/11 | 0.172 | | |
| Magnesium | 6010B | 0.10 | 0.02 | 1.0 | 08/20/11 | 09/03/11 | 251 | | |
| Manganese | 6010B | 0.005 | 0.002 | 1.0 | 08/20/11 | 09/03/11 | 2.10 | | |
| Nickel | 6020 | 0.010 | 0.001 | 5.0 | 08/20/11 | 09/01/11 | 0.112 | | |
| Potassium | 6010B | 2.1 | 0.3 | 1.0 | 08/20/11 | 09/03/11 | 534 | | |
| Selenium | 7742 | 0.005 | 0.003 | 5.0 | 08/20/11 | 09/03/11 | 0.185 | | |
| Silver | 6020 | 0.001 | 0.001 | 5.0 | 08/20/11 | 09/01/11 | 0.025 | | |
| Sodium | 6010B | 1.0 | 0.2 | 1.0 | 08/20/11 | 09/03/11 | 1710 | | |
| Thallium | 6020 | 0.0010 | 0.0001 | 5.0 | 08/20/11 | 09/01/11 | 0.0004 | J | |
| Titanium | 6010B | 0.01 | 0.01 | 1.0 | 08/20/11 | 09/03/11 | 0.45 | | |
| Vanadium | 6010B | 0.01 | 0.00 | 1.0 | 08/20/11 | 09/03/11 | 0.08 | | |
| Zinc | 6010B | 0.010 | 0.003 | 1.0 | 08/20/11 | 09/03/11 | 3.38 | | |

Comments:

## Metals

- 1 -

### INORGANIC ANALYSIS DATA PACKAGE

| | | | |
|---|---|---|---|
| **Client:** | Windward Environmental, LLC | **Service Request:** | K1107026 |
| **Project No.:** | Task 23.2.1 | **Date Collected:** | 03/08/11 |
| **Project Name:** | Passaic RI/FS Caged Bivalve Stud | **Date Received:** | 08/02/11 |
| **Matrix:** | TISSUE | **Units:** | mg/Kg |
| | | **Basis:** | WET |

**Sample Name:** LPRBG-GDST-Comp01 **Lab Code:** K1107026-008

| Analyte | Analysis Method | MRL | MDL | Dilution Factor | Date Extracted | Date Analyzed | Result | C | Q |
|---|---|---|---|---|---|---|---|---|---|
| Aluminum | 6010B | 0.37 | 0.02 | 1.0 | 08/20/11 | 09/03/11 | 5.92 | | |
| Antimony | 6020 | 0.004 | 0.001 | 5.0 | 08/20/11 | 09/01/11 | 0.001 | U | |
| Arsenic | 6020 | 0.037 | 0.003 | 5.0 | 08/20/11 | 09/01/11 | 1.540 | | |
| Barium | 6010B | 0.02 | 0.00 | 1.0 | 08/20/11 | 09/03/11 | 2.20 | | |
| Beryllium | 6020 | 0.0015 | 0.0003 | 5.0 | 08/20/11 | 09/01/11 | 0.0007 | J | |
| Cadmium | 6020 | 0.0015 | 0.0004 | 5.0 | 08/20/11 | 09/01/11 | 0.0261 | | |
| Calcium | 6010B | 0.4 | 0.2 | 1.0 | 08/20/11 | 09/03/11 | 400 | | |
| Chromium | 6010B | 0.02 | 0.01 | 1.0 | 08/20/11 | 09/03/11 | 0.20 | | |
| Cobalt | 6020 | 0.0015 | 0.0001 | 5.0 | 08/20/11 | 09/01/11 | 0.0214 | | |
| Copper | 6020 | 0.007 | 0.002 | 5.0 | 08/20/11 | 09/01/11 | 0.620 | | N* |
| Iron | 6010B | 0.08 | 0.03 | 1.0 | 08/20/11 | 09/03/11 | 15.1 | | |
| Lead | 6020 | 0.0015 | 0.0004 | 5.0 | 08/20/11 | 09/01/11 | 0.0408 | | |
| Magnesium | 6010B | 0.15 | 0.03 | 1.0 | 08/20/11 | 09/03/11 | 554 | | |
| Manganese | 6010B | 0.008 | 0.002 | 1.0 | 09/13/11 | 09/14/11 | 0.891 | | |
| Nickel | 6020 | 0.015 | 0.001 | 5.0 | 08/20/11 | 09/01/11 | 0.165 | | |
| Potassium | 6010B | 3.0 | 0.4 | 1.0 | 08/20/11 | 09/03/11 | 622 | | |
| Selenium | 7742 | 0.007 | 0.004 | 5.0 | 08/20/11 | 09/03/11 | 0.162 | | |
| Silver | 6020 | 0.001 | 0.001 | 5.0 | 08/20/11 | 09/01/11 | 0.025 | | |
| Sodium | 6010B | 1.5 | 0.3 | 1.0 | 08/20/11 | 09/03/11 | 3860 | | |
| Thallium | 6020 | 0.0015 | 0.0001 | 5.0 | 08/20/11 | 09/01/11 | 0.0004 | J | |
| Titanium | 6010B | 0.02 | 0.01 | 1.0 | 08/20/11 | 09/03/11 | 0.17 | | |
| Vanadium | 6010B | 0.02 | 0.01 | 1.0 | 08/20/11 | 09/03/11 | 0.12 | | |
| Zinc | 6010B | 0.015 | 0.004 | 1.0 | 08/20/11 | 09/03/11 | 4.20 | | |

Comments:

# Metals

- 1 -

## INORGANIC ANALYSIS DATA PACKAGE

| | | | |
|---|---|---|---|
| **Client:** | Windward Environmental, LLC | **Service Request:** | K1107026 |
| **Project No.:** | Task 23.2.1 | **Date Collected:** | 05/09/11 |
| **Project Name:** | Passaic RI/FS Caged Bivalve Stud | **Date Received:** | 08/02/11 |
| **Matrix:** | TISSUE | **Units:** | mg/Kg |
| | | **Basis:** | WET |

**Sample Name:** LPR2-GDST-Comp02 **Lab Code:** K1107026-009

| Analyte | Analysis Method | MRL | MDL | Dilution Factor | Date Extracted | Date Analyzed | Result | C | Q |
|---|---|---|---|---|---|---|---|---|---|
| Aluminum | 6010B | 0.24 | 0.02 | 1.0 | 08/20/11 | 09/03/11 | 16.6 | | |
| Antimony | 6020 | 0.002 | 0.001 | 5.0 | 08/20/11 | 09/01/11 | 0.001 | J | |
| Arsenic | 6020 | 0.024 | 0.002 | 5.0 | 08/20/11 | 09/01/11 | 0.876 | | |
| Barium | 6010B | 0.02 | 0.00 | 1.0 | 08/20/11 | 09/03/11 | 0.86 | | |
| Beryllium | 6020 | 0.0010 | 0.0002 | 5.0 | 08/20/11 | 09/01/11 | 0.0009 | J | |
| Cadmium | 6020 | 0.0010 | 0.0002 | 5.0 | 08/20/11 | 09/01/11 | 0.0210 | | |
| Calcium | 6010B | 0.2 | 0.1 | 1.0 | 08/20/11 | 09/03/11 | 157 | | |
| Chromium | 6010B | 0.01 | 0.00 | 1.0 | 08/20/11 | 09/03/11 | 0.20 | | |
| Cobalt | 6020 | 0.0010 | 0.0001 | 5.0 | 08/20/11 | 09/01/11 | 0.0243 | | |
| Copper | 6020 | 0.005 | 0.001 | 5.0 | 08/20/11 | 09/01/11 | 0.631 | | N* |
| Iron | 6010B | 0.05 | 0.02 | 1.0 | 08/20/11 | 09/03/11 | 26.7 | | |
| Lead | 6020 | 0.0010 | 0.0002 | 5.0 | 08/20/11 | 09/01/11 | 0.122 | | |
| Magnesium | 6010B | 0.10 | 0.02 | 1.0 | 08/20/11 | 09/03/11 | 197 | | |
| Manganese | 6010B | 0.005 | 0.001 | 1.0 | 09/13/11 | 09/14/11 | 0.981 | | |
| Nickel | 6020 | 0.010 | 0.001 | 5.0 | 08/20/11 | 09/01/11 | 0.131 | | |
| Potassium | 6010B | 2.0 | 0.3 | 1.0 | 08/20/11 | 09/03/11 | 427 | | |
| Selenium | 7742 | 0.005 | 0.002 | 5.0 | 08/20/11 | 09/03/11 | 0.194 | | |
| Silver | 6020 | 0.001 | 0.001 | 5.0 | 08/20/11 | 09/01/11 | 0.022 | | |
| Sodium | 6010B | 1.0 | 0.2 | 1.0 | 08/20/11 | 09/03/11 | 1230 | | |
| Thallium | 6020 | 0.0010 | 0.0001 | 5.0 | 08/20/11 | 09/01/11 | 0.0004 | J | |
| Titanium | 6010B | 0.01 | 0.00 | 1.0 | 08/20/11 | 09/03/11 | 0.47 | | |
| Vanadium | 6010B | 0.01 | 0.00 | 1.0 | 08/20/11 | 09/03/11 | 0.10 | | |
| Zinc | 6010B | 0.010 | 0.003 | 1.0 | 08/20/11 | 09/03/11 | 3.66 | | |

Comments:

# Metals

- 1 -

## INORGANIC ANALYSIS DATA PACKAGE

| | | | |
|---|---|---|---|
| **Client:** | Windward Environmental, LLC | **Service Request:** | K1107026 |
| **Project No.:** | Task 23.2.1 | **Date Collected:** | 05/09/11 |
| **Project Name:** | Passaic RI/FS Caged Bivalve Stud | **Date Received:** | 08/02/11 |
| **Matrix:** | TISSUE | **Units:** | mg/Kg |
| | | **Basis:** | WET |

**Sample Name:** LPR3-GDST-Comp03 **Lab Code:** K1107026-010

| Analyte | Analysis Method | MRL | MDL | Dilution Factor | Date Extracted | Date Analyzed | Result | C | Q |
|---|---|---|---|---|---|---|---|---|---|
| Aluminum | 6010B | 0.42 | 0.03 | 1.0 | 08/20/11 | 09/03/11 | 31.8 | | |
| Antimony | 6020 | 0.003 | 0.001 | 5.0 | 08/20/11 | 09/01/11 | 0.001 | J | |
| Arsenic | 6020 | 0.028 | 0.002 | 5.0 | 08/20/11 | 09/01/11 | 0.824 | | |
| Barium | 6010B | 0.03 | 0.00 | 1.0 | 08/20/11 | 09/03/11 | 3.02 | | |
| Beryllium | 6020 | 0.0011 | 0.0002 | 5.0 | 08/20/11 | 09/01/11 | 0.0012 | | |
| Cadmium | 6020 | 0.0011 | 0.0003 | 5.0 | 08/20/11 | 09/01/11 | 0.0253 | | |
| Calcium | 6010B | 0.4 | 0.3 | 1.0 | 08/20/11 | 09/03/11 | 271 | | |
| Chromium | 6010B | 0.02 | 0.01 | 1.0 | 08/20/11 | 09/03/11 | 15.90 | | |
| Cobalt | 6020 | 0.0011 | 0.0001 | 5.0 | 08/20/11 | 09/01/11 | 0.0968 | | |
| Copper | 6020 | 0.006 | 0.002 | 5.0 | 08/20/11 | 09/01/11 | 0.975 | | N* |
| Iron | 6010B | 0.08 | 0.03 | 1.0 | 08/20/11 | 09/03/11 | 132 | | |
| Lead | 6020 | 0.0011 | 0.0003 | 5.0 | 08/20/11 | 09/01/11 | 0.147 | | |
| Magnesium | 6010B | 0.17 | 0.03 | 1.0 | 08/20/11 | 09/03/11 | 220 | | |
| Manganese | 6010B | 0.008 | 0.003 | 1.0 | 08/20/11 | 09/03/11 | 3.98 | | |
| Nickel | 6020 | 0.011 | 0.001 | 5.0 | 08/20/11 | 09/01/11 | 6.100 | | |
| Potassium | 6010B | 3.4 | 0.5 | 1.0 | 08/20/11 | 09/03/11 | 613 | | |
| Selenium | 7742 | 0.006 | 0.003 | 5.0 | 08/20/11 | 09/03/11 | 0.137 | | |
| Silver | 6020 | 0.001 | 0.001 | 5.0 | 08/20/11 | 09/01/11 | 0.024 | | |
| Sodium | 6010B | 1.7 | 0.3 | 1.0 | 08/20/11 | 09/03/11 | 1380 | | |
| Thallium | 6020 | 0.0011 | 0.0001 | 5.0 | 08/20/11 | 09/01/11 | 0.0006 | J | |
| Titanium | 6010B | 0.02 | 0.01 | 1.0 | 08/20/11 | 09/03/11 | 1.15 | | |
| Vanadium | 6010B | 0.02 | 0.01 | 1.0 | 08/20/11 | 09/03/11 | 0.25 | | |
| Zinc | 6010B | 0.017 | 0.005 | 1.0 | 08/20/11 | 09/03/11 | 6.41 | | |

Comments:

## Metals

- 1 -

**INORGANIC ANALYSIS DATA PACKAGE**

| | | | |
|---|---|---|---|
| **Client:** | Windward Environmental, LLC | **Service Request:** | K1107026 |
| **Project No.:** | Task 23.2.1 | **Date Collected:** | |
| **Project Name:** | Passaic RI/FS Caged Bivalve Stud | **Date Received:** | |
| **Matrix:** | TISSUE | **Units:** | mg/Kg |
| | | **Basis:** | WET |

**Sample Name:** Method Blank **Lab Code:** K1107026-MB

| Analyte | Analysis Method | MRL | MDL | Dilution Factor | Date Extracted | Date Analyzed | Result | C | Q |
|---|---|---|---|---|---|---|---|---|---|
| Aluminum | 6010B | 0.50 | 0.03 | 1.0 | 08/20/11 | 09/03/11 | 0.03 | U | |
| Antimony | 6020 | 0.005 | 0.002 | 5.0 | 08/20/11 | 09/01/11 | 0.002 | U | |
| Arsenic | 6020 | 0.050 | 0.004 | 5.0 | 08/20/11 | 09/01/11 | 0.004 | U | |
| Barium | 6010B | 0.03 | 0.00 | 1.0 | 08/20/11 | 09/03/11 | 0.00 | U | |
| Beryllium | 6020 | 0.0020 | 0.0004 | 5.0 | 08/20/11 | 09/01/11 | 0.0004 | U | |
| Cadmium | 6020 | 0.0020 | 0.0005 | 5.0 | 08/20/11 | 09/01/11 | 0.0005 | U | |
| Calcium | 6010B | 0.5 | 0.3 | 1.0 | 08/20/11 | 09/03/11 | 0.4 | J | |
| Chromium | 6010B | 0.02 | 0.01 | 1.0 | 08/20/11 | 09/03/11 | 0.01 | U | |
| Cobalt | 6020 | 0.0020 | 0.0002 | 5.0 | 08/20/11 | 09/01/11 | 0.0002 | U | |
| Copper | 6020 | 0.010 | 0.003 | 5.0 | 08/20/11 | 09/01/11 | 0.008 | J | N* |
| Iron | 6010B | 0.10 | 0.04 | 1.0 | 08/20/11 | 09/03/11 | 0.04 | U | |
| Lead | 6020 | 0.0020 | 0.0005 | 5.0 | 08/20/11 | 09/01/11 | 0.0005 | U | |
| Magnesium | 6010B | 0.20 | 0.04 | 1.0 | 08/20/11 | 09/03/11 | 0.09 | J | |
| Manganese | 6010B | 0.010 | 0.003 | 1.0 | 08/20/11 | 09/03/11 | 0.080 | | |
| Nickel | 6020 | 0.020 | 0.002 | 5.0 | 08/20/11 | 09/01/11 | 0.002 | U | |
| Potassium | 6010B | 4.0 | 0.6 | 1.0 | 08/20/11 | 09/03/11 | 0.6 | U | |
| Selenium | 7742 | 0.010 | 0.005 | 5.0 | 08/20/11 | 09/03/11 | 0.005 | U | |
| Silver | 6020 | 0.002 | 0.002 | 5.0 | 08/20/11 | 09/01/11 | 0.002 | U | |
| Sodium | 6010B | 2.0 | 0.4 | 1.0 | 08/20/11 | 09/03/11 | 0.4 | U | |
| Thallium | 6020 | 0.0020 | 0.0002 | 5.0 | 08/20/11 | 09/01/11 | 0.0002 | U | |
| Titanium | 6010B | 0.02 | 0.01 | 1.0 | 08/20/11 | 09/03/11 | 0.01 | U | |
| Vanadium | 6010B | 0.02 | 0.01 | 1.0 | 08/20/11 | 09/03/11 | 0.01 | U | |
| Zinc | 6010B | 0.020 | 0.006 | 1.0 | 08/20/11 | 09/03/11 | 0.009 | J | |

Comments:

# Metals

- 1 -

## INORGANIC ANALYSIS DATA PACKAGE

| | | | |
|---|---|---|---|
| **Client:** | Windward Environmental, LLC | **Service Request:** | K1107026 |
| **Project No.:** | Task 23.2.1 | **Date Collected:** | |
| **Project Name:** | Passaic RI/FS Caged Bivalve Stud | **Date Received:** | |
| **Matrix:** | TISSUE | **Units:** | mg/Kg |
| | | **Basis:** | WET |

**Sample Name:** **Method Blank** **Lab Code:** **K1107026-MB2**

| Analyte | Analysis Method | MRL | MDL | Dilution Factor | Date Extracted | Date Analyzed | Result | C | Q |
|---|---|---|---|---|---|---|---|---|---|
| Manganese | 6010B | 0.005 | 0.002 | 1.0 | 09/13/11 | 09/14/11 | 0.002 | U | |

Comments:

# Butyltins

# Organic Analysis:
# Butyltins (as cation)

## Summary Package

### Sample and QC Results

**COLUMBIA ANALYTICAL SERVICES, INC.**

**Client:** Windward Environmental, LLC **Service Request:** K1107026
**Project:** Passaic RI/FS Caged Bivalve Study/Task 23.2.1

## Cover Page - Organic Analysis Data Package
## Butyltins (as cation)

| Sample Name | Lab Code | Date Collected | Date Received |
|---|---|---|---|
| LPR6-ECST-Comp01 | K1107026-001 | 06/08/2011 | 08/02/2011 |
| LPRBG-ECST-Comp01 | K1107026-002 | 03/09/2011 | 08/02/2011 |
| LPR6-ECST-Comp02 | K1107026-003 | 06/08/2011 | 08/02/2011 |
| LPR7-ECST-Comp03 | K1107026-004 | 06/08/2011 | 08/02/2011 |
| LPR7-ECST-Comp04 | K1107026-005 | 06/08/2011 | 08/02/2011 |
| LPR8-ECST-Comp05 | K1107026-006 | 06/08/2011 | 08/02/2011 |
| LPR1-GDST-Comp01 | K1107026-007 | 05/09/2011 | 08/02/2011 |
| LPRBG-GDST-Comp01 | K1107026-008 | 03/08/2011 | 08/02/2011 |
| LPR2-GDST-Comp02 | K1107026-009 | 05/09/2011 | 08/02/2011 |
| LPR3-GDST-Comp03 | K1107026-010 | 05/09/2011 | 08/02/2011 |
| LPR6-ECST-Comp02MS | KWG1108300-1 | 06/08/2011 | 08/02/2011 |
| LPR6-ECST-Comp02DMS | KWG1108300-2 | 06/08/2011 | 08/02/2011 |

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the case narrative. Release of the data contained in this hardcopy data package and in the computer-readable data submitted on floppy diskette has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature.

Signature: _____ Name: Shane Murray

Date: 9/9/11 Title: _____

# COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

| | | | |
|---|---|---|---|
| **Client:** | Windward Environmental, LLC | **Service Request:** | K1107026 |
| **Project:** | Passaic RI/FS Caged Bivalve Study/Task 23.2.1 | **Date Collected:** | 06/08/2011 |
| **Sample Matrix:** | Animal tissue | **Date Received:** | 08/02/2011 |
| | | **Date Extracted:** | 08/22/2011 |
| | | **Date Analyzed:** | 08/27/2011 |

## Butyltins (as cation)

| | | | |
|---|---|---|---|
| **Sample Name:** | LPR6-ECST-Comp01 | **Units:** | ug/Kg |
| **Lab Code:** | K1107026-001 | **Basis:** | Wet |
| **File ID:** | J:\GC26\DATA\082611\0826F033.D | **Level:** | Low |
| **Instrument ID:** | GC26 | | |
| **Extraction Method:** | SOC-OSWT | **Extraction Lot:** | KWG1108300 |
| **Analysis Method:** | Krone | **Calibration ID:** | CAL10641 |
| | | **Column1:** | RTX-1 |
| **Sample Amount:** | 10.012 g | **Column2:** | RTX-35 |
| **% Solids:** | NA | | |
| **Dilution Factor:** | 1 | | |

| CAS No. | Analyte Name | Result | Q | MRL | MDL | Note |
|---|---|---|---|---|---|---|
| 1461-25-2 | Tetra-n-butyltin | 1.0 | U | 1.0 | 0.15 | |
| **36643-28-4** | Tri-n-butyltin Cation | **0.30** | J | 1.0 | 0.11 | |
| **14488-53-0** | Di-n-butyltin Cation | **0.37** | J | 1.0 | 0.11 | |
| **78763-54-9** | n-Butyltin Cation | **2.0** | | 1.0 | 0.18 | |

| Surrogate Name | %Rec | Control Limits | Date Analyzed | Note |
|---|---|---|---|---|
| Tri-n-propyltin | 76 | 28-134 | 08/27/11 | Acceptable |

**Comments:**

# COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

| | | | |
|---|---|---|---|
| **Client:** | Windward Environmental, LLC | **Service Request:** | K1107026 |
| **Project:** | Passaic RI/FS Caged Bivalve Study/Task 23.2.1 | **Date Collected:** | 03/09/2011 |
| **Sample Matrix:** | Animal tissue | **Date Received:** | 08/02/2011 |
| | | **Date Extracted:** | 08/22/2011 |
| | | **Date Analyzed:** | 08/27/2011 |

## Butyltins (as cation)

| | | | |
|---|---|---|---|
| **Sample Name:** | LPRBG-ECST-Comp01 | **Units:** | ug/Kg |
| **Lab Code:** | K1107026-002 | **Basis:** | Wet |
| **File ID:** | J:\GC26\DATA\082611\0826F034.D | **Level:** | Low |
| **Instrument ID:** | GC26 | | |
| **Extraction Method:** | SOC-OSWT | **Extraction Lot:** | KWG1108300 |
| **Analysis Method:** | Krone | **Calibration ID:** | CAL10641 |
| | | **Column1:** | RTX-1 |
| **Sample Amount:** | 10.049 g | **Column2:** | RTX-35 |
| **% Solids:** | NA | | |
| **Dilution Factor:** | 1 | | |

| CAS No. | Analyte Name | Result | Q | MRL | MDL | Note |
|---|---|---|---|---|---|---|
| 1461-25-2 | Tetra-n-butyltin | 1.0 | U | 1.0 | 0.15 | |
| 36643-28-4 | Tri-n-butyltin Cation | 1.0 | U | 1.0 | 0.11 | |
| 14488-53-0 | Di-n-butyltin Cation | 1.0 | U | 1.0 | 0.11 | |
| **78763-54-9** | n-Butyltin Cation | **1.4** | | 1.0 | 0.18 | |

| Surrogate Name | %Rec | Control Limits | Date Analyzed | Note |
|---|---|---|---|---|
| Tri-n-propyltin | 58 | 28-134 | 08/27/11 | Acceptable |

**Comments:**

# COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

| | | | |
|---|---|---|---|
| **Client:** | Windward Environmental, LLC | **Service Request:** | K1107026 |
| **Project:** | Passaic RI/FS Caged Bivalve Study/Task 23.2.1 | **Date Collected:** | 06/08/2011 |
| **Sample Matrix:** | Animal tissue | **Date Received:** | 08/02/2011 |
| | | **Date Extracted:** | 08/22/2011 |
| | | **Date Analyzed:** | 09/02/2011 |

## Butyltins (as cation)

| | | | |
|---|---|---|---|
| **Sample Name:** | LPR6-ECST-Comp02 | **Units:** | ug/Kg |
| **Lab Code:** | K1107026-003 | **Basis:** | Wet |
| **File ID:** | J:\GC26\DATA\090211A\0902F007.D | **Level:** | Low |
| **Instrument ID:** | GC26 | | |
| **Extraction Method:** | SOC-OSWT | **Extraction Lot:** | KWG1108300 |
| **Analysis Method:** | Krone | **Calibration ID:** | CAL10641 |
| | | **Column1:** | RTX-1 |
| **Sample Amount:** | 10.049 g | **Column2:** | RTX-35 |
| **% Solids:** | NA | | |
| **Dilution Factor:** | 1 | | |

| CAS No. | Analyte Name | Result | Q | MRL | MDL | Note |
|---|---|---|---|---|---|---|
| 1461-25-2 | Tetra-n-butyltin | 1.0 | U | 1.0 | 0.15 | |
| **36643-28-4** | Tri-n-butyltin Cation | **0.45** | J | 1.0 | 0.11 | |
| **14488-53-0** | Di-n-butyltin Cation | **0.74** | J | 1.0 | 0.11 | |
| **78763-54-9** | n-Butyltin Cation | **1.0** | | 1.0 | 0.18 | |

| Surrogate Name | %Rec | Control Limits | Date Analyzed | Note |
|---|---|---|---|---|
| Tri-n-propyltin | 48 | 28-134 | 09/02/11 | Acceptable |

**Comments:**

# COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

| | | | |
|---|---|---|---|
| **Client:** | Windward Environmental, LLC | **Service Request:** | K1107026 |
| **Project:** | Passaic RI/FS Caged Bivalve Study/Task 23.2.1 | **Date Collected:** | 06/08/2011 |
| **Sample Matrix:** | Animal tissue | **Date Received:** | 08/02/2011 |
| | | **Date Extracted:** | 08/22/2011 |
| | | **Date Analyzed:** | 08/27/2011 |

## Butyltins (as cation)

| | | | |
|---|---|---|---|
| **Sample Name:** | LPR7-ECST-Comp03 | **Units:** | ug/Kg |
| **Lab Code:** | K1107026-004 | **Basis:** | Wet |
| **File ID:** | J:\GC26\DATA\082611\0826F040.D | **Level:** | Low |
| **Instrument ID:** | GC26 | | |
| **Extraction Method:** | SOC-OSWT | **Extraction Lot:** | KWG1108300 |
| **Analysis Method:** | Krone | **Calibration ID:** | CAL10641 |
| | | **Column1:** | RTX-1 |
| **Sample Amount:** | 10.023 g | **Column2:** | RTX-35 |
| **% Solids:** | NA | | |
| **Dilution Factor:** | 1 | | |

| CAS No. | Analyte Name | Result | Q | MRL | MDL | Note |
|---|---|---|---|---|---|---|
| 1461-25-2 | Tetra-n-butyltin | 1.0 | U | 1.0 | 0.15 | |
| **36643-28-4** | Tri-n-butyltin Cation | **0.25** | J | 1.0 | 0.11 | |
| **14488-53-0** | Di-n-butyltin Cation | **0.16** | JP | 1.0 | 0.11 | |
| **78763-54-9** | n-Butyltin Cation | **1.6** | | 1.0 | 0.18 | |

| Surrogate Name | %Rec | Control Limits | Date Analyzed | Note |
|---|---|---|---|---|
| Tri-n-propyltin | 62 | 28-134 | 08/27/11 | Acceptable |

**Comments:**

# COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

| | | | |
|---|---|---|---|
| **Client:** | Windward Environmental, LLC | **Service Request:** | K1107026 |
| **Project:** | Passaic RI/FS Caged Bivalve Study/Task 23.2.1 | **Date Collected:** | 06/08/2011 |
| **Sample Matrix:** | Animal tissue | **Date Received:** | 08/02/2011 |
| | | **Date Extracted:** | 08/22/2011 |
| | | **Date Analyzed:** | 08/27/2011 |

## Butyltins (as cation)

| | | | |
|---|---|---|---|
| **Sample Name:** | LPR7-ECST-Comp04 | **Units:** | ug/Kg |
| **Lab Code:** | K1107026-005 | **Basis:** | Wet |
| **File ID:** | J:\GC26\DATA\082611\0826F041.D | **Level:** | Low |
| **Instrument ID:** | GC26 | | |
| **Extraction Method:** | SOC-OSWT | **Extraction Lot:** | KWG1108300 |
| **Analysis Method:** | Krone | **Calibration ID:** | CAL10641 |
| | | **Column1:** | RTX-1 |
| **Sample Amount:** | 10.010 g | **Column2:** | RTX-35 |
| **% Solids:** | NA | | |
| **Dilution Factor:** | 1 | | |

| CAS No. | Analyte Name | Result | Q | MRL | MDL | Note |
|---|---|---|---|---|---|---|
| 1461-25-2 | Tetra-n-butyltin | 1.0 | U | 1.0 | 0.15 | |
| 36643-28-4 | Tri-n-butyltin Cation | 1.0 | Ui | 1.0 | 0.19 | |
| 14488-53-0 | Di-n-butyltin Cation | 1.0 | U | 1.0 | 0.11 | |
| **78763-54-9** | n-Butyltin Cation | **1.6** | | 1.0 | 0.18 | |

| Surrogate Name | %Rec | Control Limits | Date Analyzed | Note |
|---|---|---|---|---|
| Tri-n-propyltin | 62 | 28-134 | 08/27/11 | Acceptable |

**Comments:**

# COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

| | | | |
|---|---|---|---|
| **Client:** | Windward Environmental, LLC | **Service Request:** | K1107026 |
| **Project:** | Passaic RI/FS Caged Bivalve Study/Task 23.2.1 | **Date Collected:** | 06/08/2011 |
| **Sample Matrix:** | Animal tissue | **Date Received:** | 08/02/2011 |
| | | **Date Extracted:** | 08/22/2011 |
| | | **Date Analyzed:** | 09/08/2011 |

## Butyltins (as cation)

| | | | |
|---|---|---|---|
| **Sample Name:** | LPR8-ECST-Comp05 | **Units:** | ug/Kg |
| **Lab Code:** | K1107026-006 | **Basis:** | Wet |
| **File ID:** | J:\GC26\DATA\090811\0908F007.D | **Level:** | Low |
| **Instrument ID:** | GC26 | | |
| **Extraction Method:** | SOC-OSWT | **Extraction Lot:** | KWG1108300 |
| **Analysis Method:** | Krone | **Calibration ID:** | CAL10641 |
| | | **Column1:** | RTX-1 |
| **Sample Amount:** | 10.006 g | **Column2:** | RTX-35 |
| **% Solids:** | NA | | |
| **Dilution Factor:** | 1 | | |

| CAS No. | Analyte Name | Result | Q | MRL | MDL | Note |
|---|---|---|---|---|---|---|
| 1461-25-2 | Tetra-n-butyltin | 1.0 | U | 1.0 | 0.15 | |
| **36643-28-4** | Tri-n-butyltin Cation | **0.16** | J | 1.0 | 0.11 | |
| **14488-53-0** | Di-n-butyltin Cation | **0.23** | JP | 1.0 | 0.11 | |
| **78763-54-9** | n-Butyltin Cation | **0.20** | J | 1.0 | 0.18 | |

| Surrogate Name | %Rec | Control Limits | Date Analyzed | Note |
|---|---|---|---|---|
| Tri-n-propyltin | 33 | 28-134 | 09/08/11 | Acceptable |

**Comments:**

# COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

| | | | |
|---|---|---|---|
| **Client:** | Windward Environmental, LLC | **Service Request:** | K1107026 |
| **Project:** | Passaic RI/FS Caged Bivalve Study/Task 23.2.1 | **Date Collected:** | 05/09/2011 |
| **Sample Matrix:** | Animal tissue | **Date Received:** | 08/02/2011 |
| | | **Date Extracted:** | 08/22/2011 |
| | | **Date Analyzed:** | 08/27/2011 |

## Butyltins (as cation)

| | | | |
|---|---|---|---|
| **Sample Name:** | LPR1-GDST-Comp01 | **Units:** | ug/Kg |
| **Lab Code:** | K1107026-007 | **Basis:** | Wet |
| **File ID:** | J:\GC26\DATA\082611\0826F043.D | **Level:** | Low |
| **Instrument ID:** | GC26 | | |
| **Extraction Method:** | SOC-OSWT | **Extraction Lot:** | KWG1108300 |
| **Analysis Method:** | Krone | **Calibration ID:** | CAL10641 |
| | | **Column1:** | RTX-1 |
| **Sample Amount:** | 10.014 g | **Column2:** | RTX-35 |
| **% Solids:** | NA | | |
| **Dilution Factor:** | 1 | | |

| CAS No. | Analyte Name | Result | Q | MRL | MDL | Note |
|---|---|---|---|---|---|---|
| 1461-25-2 | Tetra-n-butyltin | 1.0 | U | 1.0 | 0.15 | |
| **36643-28-4** | Tri-n-butyltin Cation | **0.90** | JP | 1.0 | 0.11 | |
| **14488-53-0** | Di-n-butyltin Cation | **0.37** | J | 1.0 | 0.11 | |
| **78763-54-9** | n-Butyltin Cation | **3.6** | | 1.0 | 0.18 | |

| Surrogate Name | %Rec | Control Limits | Date Analyzed | Note |
|---|---|---|---|---|
| Tri-n-propyltin | 78 | 28-134 | 08/27/11 | Acceptable |

**Comments:**

# COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

| | | | |
|---|---|---|---|
| **Client:** | Windward Environmental, LLC | **Service Request:** | K1107026 |
| **Project:** | Passaic RI/FS Caged Bivalve Study/Task 23.2.1 | **Date Collected:** | 03/08/2011 |
| **Sample Matrix:** | Animal tissue | **Date Received:** | 08/02/2011 |
| | | **Date Extracted:** | 08/22/2011 |
| | | **Date Analyzed:** | 08/27/2011 |

## Butyltins (as cation)

| | | | |
|---|---|---|---|
| **Sample Name:** | LPRBG-GDST-Comp01 | **Units:** | ug/Kg |
| **Lab Code:** | K1107026-008 | **Basis:** | Wet |
| **File ID:** | J:\GC26\DATA\082611\0826F044.D | **Level:** | Low |
| **Instrument ID:** | GC26 | | |
| **Extraction Method:** | SOC-OSWT | **Extraction Lot:** | KWG1108300 |
| **Analysis Method:** | Krone | **Calibration ID:** | CAL10641 |
| | | **Column1:** | RTX-1 |
| **Sample Amount:** | 10.098 g | **Column2:** | RTX-35 |
| **% Solids:** | NA | | |
| **Dilution Factor:** | 1 | | |

| CAS No. | Analyte Name | Result | Q | MRL | MDL | Note |
|---|---|---|---|---|---|---|
| 1461-25-2 | Tetra-n-butyltin | 1.0 | U | 1.0 | 0.15 | |
| **36643-28-4** | Tri-n-butyltin Cation | **0.58** | J | 1.0 | 0.11 | |
| **14488-53-0** | Di-n-butyltin Cation | **0.15** | JP | 1.0 | 0.11 | |
| **78763-54-9** | n-Butyltin Cation | **4.0** | | 1.0 | 0.18 | |

| Surrogate Name | %Rec | Control Limits | Date Analyzed | Note |
|---|---|---|---|---|
| Tri-n-propyltin | 83 | 28-134 | 08/27/11 | Acceptable |

**Comments:**

# COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

| | | | |
|---|---|---|---|
| **Client:** | Windward Environmental, LLC | **Service Request:** | K1107026 |
| **Project:** | Passaic RI/FS Caged Bivalve Study/Task 23.2.1 | **Date Collected:** | 05/09/2011 |
| **Sample Matrix:** | Animal tissue | **Date Received:** | 08/02/2011 |
| | | **Date Extracted:** | 08/22/2011 |
| | | **Date Analyzed:** | 08/27/2011 |

## Butyltins (as cation)

| | | | |
|---|---|---|---|
| **Sample Name:** | LPR2-GDST-Comp02 | **Units:** | ug/Kg |
| **Lab Code:** | K1107026-009 | **Basis:** | Wet |
| **File ID:** | J:\GC26\DATA\082611\0826F045.D | **Level:** | Low |
| **Instrument ID:** | GC26 | | |
| **Extraction Method:** | SOC-OSWT | **Extraction Lot:** | KWG1108300 |
| **Analysis Method:** | Krone | **Calibration ID:** | CAL10641 |
| | | **Column1:** | RTX-1 |
| **Sample Amount:** | 10.035 g | **Column2:** | RTX-35 |
| **% Solids:** | NA | | |
| **Dilution Factor:** | 1 | | |

| CAS No. | Analyte Name | Result | Q | MRL | MDL | Note |
|---|---|---|---|---|---|---|
| 1461-25-2 | Tetra-n-butyltin | 1.0 | U | 1.0 | 0.15 | |
| **36643-28-4** | Tri-n-butyltin Cation | **0.50** | J | 1.0 | 0.11 | |
| **14488-53-0** | Di-n-butyltin Cation | **0.13** | JP | 1.0 | 0.11 | |
| **78763-54-9** | n-Butyltin Cation | **2.1** | | 1.0 | 0.18 | |

| Surrogate Name | %Rec | Control Limits | Date Analyzed | Note |
|---|---|---|---|---|
| Tri-n-propyltin | 87 | 28-134 | 08/27/11 | Acceptable |

**Comments:**

# COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

| | | | |
|---|---|---|---|
| **Client:** | Windward Environmental, LLC | **Service Request:** | K1107026 |
| **Project:** | Passaic RI/FS Caged Bivalve Study/Task 23.2.1 | **Date Collected:** | 05/09/2011 |
| **Sample Matrix:** | Animal tissue | **Date Received:** | 08/02/2011 |
| | | **Date Extracted:** | 08/22/2011 |
| | | **Date Analyzed:** | 08/27/2011 |

## Butyltins (as cation)

| | | | |
|---|---|---|---|
| **Sample Name:** | LPR3-GDST-Comp03 | **Units:** | ug/Kg |
| **Lab Code:** | K1107026-010 | **Basis:** | Wet |
| **File ID:** | J:\GC26\DATA\082611\0826F046.D | **Level:** | Low |
| **Instrument ID:** | GC26 | | |
| **Extraction Method:** | SOC-OSWT | **Extraction Lot:** | KWG1108300 |
| **Analysis Method:** | Krone | **Calibration ID:** | CAL10641 |
| | | **Column1:** | RTX-1 |
| **Sample Amount:** | 10.008 g | **Column2:** | RTX-35 |
| **% Solids:** | NA | | |
| **Dilution Factor:** | 1 | | |

| CAS No. | Analyte Name | Result | Q | MRL | MDL | Note |
|---|---|---|---|---|---|---|
| 1461-25-2 | Tetra-n-butyltin | 1.0 | U | 1.0 | 0.15 | |
| **36643-28-4** | Tri-n-butyltin Cation | **0.59** | J | 1.0 | 0.11 | |
| **14488-53-0** | Di-n-butyltin Cation | **0.17** | JP | 1.0 | 0.11 | |
| **78763-54-9** | n-Butyltin Cation | **0.87** | J | 1.0 | 0.18 | |

| Surrogate Name | %Rec | Control Limits | Date Analyzed | Note |
|---|---|---|---|---|
| Tri-n-propyltin | 80 | 28-134 | 08/27/11 | Acceptable |

**Comments:**

# COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

| | | | |
|---|---|---|---|
| **Client:** | Windward Environmental, LLC | **Service Request:** | K1107026 |
| **Project:** | Passaic RI/FS Caged Bivalve Study/Task 23.2.1 | **Date Collected:** | NA |
| **Sample Matrix:** | Animal tissue | **Date Received:** | NA |
| | | **Date Extracted:** | 08/22/2011 |
| | | **Date Analyzed:** | 08/27/2011 |

## Butyltins (as cation)

| | | | |
|---|---|---|---|
| **Sample Name:** | Method Blank | **Units:** | ug/Kg |
| **Lab Code:** | KWG1108300-4 | **Basis:** | Wet |
| **File ID:** | J:\GC26\DATA\082611\0826F032.D | **Level:** | Low |
| **Instrument ID:** | GC26 | | |
| **Extraction Method:** | SOC-OSWT | **Extraction Lot:** | KWG1108300 |
| **Analysis Method:** | Krone | **Calibration ID:** | CAL10641 |
| | | **Column1:** | RTX-1 |
| **Sample Amount:** | 10.098 g | **Column2:** | RTX-35 |
| **% Solids:** | NA | | |
| **Dilution Factor:** | 1 | | |

| CAS No. | Analyte Name | Result | Q | MRL | MDL | Note |
|---|---|---|---|---|---|---|
| 1461-25-2 | Tetra-n-butyltin | 1.0 | U | 1.0 | 0.15 | |
| 36643-28-4 | Tri-n-butyltin Cation | 1.0 | U | 1.0 | 0.11 | |
| 14488-53-0 | Di-n-butyltin Cation | 1.0 | U | 1.0 | 0.11 | |
| **78763-54-9** | n-Butyltin Cation | **0.23** | J | 1.0 | 0.18 | |

| Surrogate Name | %Rec | Control Limits | Date Analyzed | Note |
|---|---|---|---|---|
| Tri-n-propyltin | 44 | 28-134 | 08/27/11 | Acceptable |

**Comments:**

# Lipids

## COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

| | | | |
|---|---|---|---|
| **Client:** | Windward Environmental, LLC | **Service Request:** | K1107026 |
| **Project:** | Passaic RI/FS Caged Bivalve Study/Task 23.2.1 | **Date Collected:** | 3/8-6/8/2011 |
| **Sample Matrix:** | Animal tissue | **Date Received:** | 8/2/2011 |

Lipids, Total

| | | | |
|---|---|---|---|
| Prep Method: | Bligh & Dyer | Units: | PERCENT |
| Analysis Method: | Bligh & Dyer | Basis: | AS RECEIVED |
| Test Notes: | | | |

| Sample Name | Lab Code | MRL | Date Extracted | Date Analyzed | Result | Result Notes |
|---|---|---|---|---|---|---|
| LPR6-ECST-Comp01 | K1107026-001 | 0.22 | 8/26/2011 | 8/26/2011 | 0.36 | |
| LPRBG-ECST-Comp01 | K1107026-002 | 0.24 | 8/26/2011 | 8/26/2011 | 0.76 | |
| LPR6-ECST-Comp02 | K1107026-003 | 0.22 | 8/26/2011 | 8/26/2011 | 0.53 | |
| LPR7-ECST-Comp03 | K1107026-004 | 0.22 | 8/26/2011 | 8/26/2011 | 0.44 | |
| LPR7-ECST-Comp04 | K1107026-005 | 0.23 | 8/26/2011 | 8/26/2011 | 0.59 | |
| LPR8-ECST-Comp05 | K1107026-006 | 0.24 | 8/26/2011 | 8/26/2011 | 0.77 | |
| LPR1-GDST-Comp01 | K1107026-007 | 0.24 | 8/26/2011 | 8/26/2011 | 0.49 | |
| LPRBG-GDST-Comp01 | K1107026-008 | 0.24 | 8/26/2011 | 8/26/2011 | 0.96 | |
| LPR2-GDST-Comp02 | K1107026-009 | 0.20 | 8/26/2011 | 8/26/2011 | 0.24 | |
| LPR3-GDST-Comp03 | K1107026-010 | 0.24 | 8/26/2011 | 8/26/2011 | 0.38 | |
| Method Blank | K1107026-MB | 0.20 | 8/26/2011 | 8/26/2011 | 0.20 | U |

Approved By: Elissa Erickson Date: 8-29-11

1A/092099p

**COLUMBIA ANALYTICAL SERVICES, INC.**

QA/QC Report

**Client:** Windward Environmental, LLC
**Project:** Passaic RI/FS Caged Bivalve Study/Task 23.2.1
**Sample Matrix:** Animal tissue

**Service Request:** K1107026
**Date Collected:** 6/8/2011
**Date Received:** 8/2/2011
**Date Extracted:** 8/26/2011
**Date Analyzed:** 8/26/2011

Triplicate Summary
Lipids, Total

Sample Name: LPR6-ECST-Comp02
Lab Code: K1107026-003
Test Notes:

Units: PERCENT
Basis: AS RECEIVED

| Analyte | Prep Method | Analysis Method | MRL | Sample Result | Duplicate Sample Result | Triplicate Sample Result | Average | Percent Relative Standard Deviation | Result Notes |
|---|---|---|---|---|---|---|---|---|---|
| Lipids, Total | Bligh & Dye | Bligh & Dyer | 0.21 | 0.5 | 0.5 | 0.4 | 0.5 | 15 | |

Approved By: Elissa Erickson Date: 8-29-11

DUP/091599p
K1107026svg.sm2 - TRP 8/29/2011

Page No.:

**COLUMBIA ANALYTICAL SERVICES, INC.**

QA/QC Report

| | | | |
|---|---|---|---|
| **Client:** | Windward Environmental, LLC | **Service Request:** | K1107026 |
| **Project:** | Passaic RI/FS Tissue/Task 16.1 (09.58.02.31) | **Date Collected:** | NA |
| **Matrix:** | Tissue | **Date Received:** | NA |
| | | **Date Extracted:** | 8/22/2011 |
| | | **Date Analyzed:** | 8/22/2011 |

Standard Reference Material
Lipids, Total

Sample Name: SRM 1946

Units: % (percent)
Basis: Wet Weight

Test Notes:

| Analyte | Prep Method | Analysis Method | Certified Value | Result | CAS Advisory Limits | Result Notes |
|---|---|---|---|---|---|---|
| Fat (Extractable) | Bligh & Dyer | Bligh & Dyer | 10.17 ± 0.48 | 7.5 | 5.1-15.3 | |

Approved By: Elissa Erickson Date: 8-29-11

# Maxxam Analytics

Maxxam

Success Through Science®

**LPR-071811-RB**

| | | | | | |
|---|---|---|---|---|---|
| Lab Name | Maxxam Analytics Inc. | | | | |
| Method | USEPA 1699 MOD | | | Lab Sample ID: | B1A8699-KG3768 |
| Matrix: | water | | | Project Number: | TASK 23.2.1 |
| Sample wt/vol: | 0.99 | (g/L) | L | Project Name: | CAGED BIVALVE STUDY SPRING 2011 |
| Level (low/med): | low | | | Lab File ID: | M5110907A014 |
| % Moisture: | Not applicable | Decanted (Y/N): | N | Date Received: | July 21, 2011 |
| Concentrated Extract Volume: | 200 | (uL) | | Date Extracted: | July 25, 2011 |
| Injection Volume: | 1 | (uL) | | Lab Batch: | 2604776 |
| Acid Wash Cleanup (Y/N): | N | pH | Not analyzed | Date Analyzed: | September 7, 2011 |
| Carbon Column Cleanup (Y/N): | N | | | Calib. Ref.: | September 7, 2011 |
| GPC Column Cleanup (Y/N): | N | | | Time Analyzed: | 23:15 |
| | | | | Dilution Factor: | 1 |

| CAS Number | Compound | Concentration (ng/L) | Qualifier | EDL (ng/L) | REPORTING LIMIT (ng/L) |
|---|---|---|---|---|---|
| 118-74-1 | Hexachlorobenzene | 0.0941 | J | 0.0047 | 1.0 |
| 319-84-6 | alpha-BHC | 0.16 | U | 0.16 | 1.0 |
| 959-98-8 | Endosulfan I | 2.4 | U | 2.4 | 2.0 |
| 39765-80-5 | trans-Nonachlor | 0.40 | U | 0.40 | 1.0 |
| 53-19-0 | o,p-DDD | 3.4 | U | 3.4 | 1.0 |
| 7421-93-4 | Endrin aldehyde | 0.24 | U | 0.24 | 1.0 |
| 72-55-9 | p,p-DDE | 4.9 | U | 4.9 | 1.0 |
| 60-57-1 | Dieldrin | 0.38 | U | 0.38 | 2.0 |
| 72-20-8 | Endrin | 0.49 | U | 0.49 | 1.0 |
| 33213-65-9 | Endosulfan II | 4.9 | U | 4.9 | 2.0 |
| 319-85-7 | beta-BHC | 0.20 | U | 0.20 | 1.0 |
| 789-02-6 | o,p-DDT | 4.1 | U | 4.1 | 1.0 |
| 72-54-8 | p,p-DDD | 4.1 | U | 4.1 | 1.0 |
| 5103-73-1 | cis-Nonachlor | 0.53 | U | 0.53 | 1.0 |
| 1031-07-8 | Endosulfan sulfate | 0.033 | U | 0.033 | 1.0 |
| 50-29-3 | p,p-DDT | 3.9 | U | 3.9 | 1.0 |
| 72-43-5 | Methoxychlor | 0.12 | U | 0.12 | 1.0 |
| 58-89-9 | Lindane | 0.33 | U | 0.33 | 1.0 |
| 53494-70-5 | Endrin ketone | 0.56 | U | 0.56 | 1.0 |
| 319-86-8 | delta-BHC | 0.22 | U | 0.22 | 1.0 |
| 5103-71-9 | a-Chlordane | 0.13 | U | 0.13 | 1.0 |
| 12789-03-6 | g-Chlordane | 0.12 | U | 0.12 | 1.0 |
| 76-44-8 | Heptachlor | 0.17 | U | 0.17 | 1.0 |
| 309-00-2 | Aldrin | 0.059 | U | 0.059 | 1.0 |
| 1024-57-3 | Heptachlor epoxide | 0.062 | U | 0.062 | 1.0 |
| 26880-48-8 | Oxychlordane | 0.077 | U | 0.077 | 1.0 |
| 3424-82-6 | o,p-DDE | 3.5 | U | 3.5 | 1.0 |

| CAS Number | Surrogate | Recovery (%) | Acceptance Criteria (%) |
|---|---|---|---|
| | 13C10-Chlordane | 89 | 10 - 200 |
| | 13C10-cis Nonachlor | 66 | 10 - 200 |
| | 13C10-Heptachlor Epoxide | 63 | 10 - 200 |
| | 13C10-Heptachlor | 67 | 10 - 200 |
| | 13C10-Mirex | 72 | 10 - 200 |
| | 13C10-Oxychlordane | 60 | 10 - 200 |
| | 13C10-trans Nonachlor | 89 | 10 - 200 |
| | 13C12-Aldrin | 69 | 10 - 200 |
| | 13C12-Dieldrin | 75 | 10 - 200 |
| | 13C12-Endrin Aldehyde | 53 | 10 - 200 |
| | 13C12-Endrin Ketone | 71 | 10 - 200 |
| | 13C12-Endrin | 77 | 10 - 200 |
| | 13C9-Endosulfan I | 76 | 10 - 200 |
| | 13C9-Endosulfan II | 56 | 10 - 200 |
| | 13C-Methoxychlor | 54 | 10 - 200 |
| | 13C-pp-DDD | 53 | 10 - 200 |
| | 13C-pp-DDE | 77 | 10 - 200 |
| | 13C-pp-DDT | 53 | 10 - 200 |
| | 13C6-beta BHC | 84 | 10 - 200 |

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Success Through Science®

**LPR-071811-RB**

| | | | | | |
|---|---|---|---|---|---|
| Lab Name | Maxxam Analytics Inc. | | | | |
| Method | USEPA 1699 MOD | | | Lab Sample ID: | B1A8699-KG3768 |
| Matrix: | water | | | Project Number: | TASK 23.2.1 |
| Sample wt/vol: | 0.99 | (g/L) | L | Project Name: | CAGED BIVALVE STUDY SPRING 2011 |
| Level (low/med): | low | | | Lab File ID: | M5110907A014 |
| % Moisture: | Not applicable | Decanted (Y/N): | N | Date Received: | July 21, 2011 |
| Concentrated Extract Volume: | 200 | (uL) | | Date Extracted: | July 25, 2011 |
| Injection Volume: | 1 | (uL) | | Lab Batch: | 2604776 |
| Acid Wash Cleanup (Y/N): | N | pH | Not analyzed | Date Analyzed: | September 7, 2011 |
| Carbon Column Cleanup (Y/N): | N | | | Calib. Ref.: | September 7, 2011 |
| GPC Column Cleanup (Y/N): | N | | | Time Analyzed: | 23:15 |
| | | | | Dilution Factor: | 1 |

| CAS Number | Compound | Concentration (%) | Qualifier | EDL (%) | REPORTING LIMIT (%) |
|---|---|---|---|---|---|

| CAS Number | Surrogate | Recovery (%) | Acceptance Criteria (%) |
|---|---|---|---|
| | 13C6-d6-gamma BHC (Lindane) | 89 | 10 - 200 |
| | C13-Hexachlorobenzene | 94 | 10 - 200 |

Maxxam

Success Through Science®

**LPR6-ECST-COMP01**

| | | | | | |
|---|---|---|---|---|---|
| Lab Name | Maxxam Analytics Inc. | | | | |
| Method | USEPA 1699 MOD | | | Lab Sample ID: | B1A8699-KJ5480 |
| Matrix: | tissue | | | Project Number: | TASK 23.2.1 |
| Sample wt/vol: | 5.14 | (g) | g (wet weight) | Project Name: | CAGED BIVALVE STUDY SPRING 2011 |
| Level (low/med): | low | | | Lab File ID: | M5110907A020 |
| % Moisture: | Not applicable | Decanted (Y/N): | N | Date Received: | July 28, 2011 |
| Concentrated Extract Volume: | 1000 | (uL) | | Date Extracted: | August 24, 2011 |
| Injection Volume: | 1 | (uL) | | Lab Batch: | 2604778 |
| Acid Wash Cleanup (Y/N): | N | pH | Not analyzed | Date Analyzed: | September 8, 2011 |
| Carbon Column Cleanup (Y/N): | N | | | Calib. Ref.: | September 7, 2011 |
| GPC Column Cleanup (Y/N): | Y | | | Time Analyzed: | 03:11 |
| | | | | Dilution Factor: | 2 |

| CAS Number | Compound | Concentration (ng/g) | Qualifier | EDL (ng/g) | REPORTING LIMIT (ng/g) |
|---|---|---|---|---|---|
| 118-74-1 | Hexachlorobenzene | 0.174 | J | 0.0026 | 0.97 |
| 319-84-6 | alpha-BHC | 0.082 | U | 0.082 | 0.97 |
| 959-98-8 | Endosulfan I | 2.5 | U | 2.5 | 1.6 |
| 39765-80-5 | trans-Nonachlor | 3.33 | | 0.56 | 0.97 |
| 53-19-0 | o,p-DDD | 1.3 | U | 1.3 | 0.97 |
| 7421-93-4 | Endrin aldehyde | 0.17 | U | 0.17 | 0.97 |
| 72-55-9 | p,p-DDE | 4.03 | | 1.6 | 0.97 |
| 60-57-1 | Dieldrin | 2.28 | | 0.55 | 0.97 |
| 72-20-8 | Endrin | 0.29 | U | 0.29 | 0.97 |
| 33213-65-9 | Endosulfan II | 1.5 | U | 1.5 | 1.6 |
| 319-85-7 | beta-BHC | 0.10 | U | 0.10 | 0.97 |
| 789-02-6 | o,p-DDT | 0.97 | UQ | 0.97 | 0.97 |
| 72-54-8 | p,p-DDD | 1.74 | | 0.99 | 0.97 |
| 5103-73-1 | cis-Nonachlor | 1.00 | | 0.31 | 0.97 |
| 1031-07-8 | Endosulfan sulfate | 0.170 | J | 0.034 | 0.97 |
| 50-29-3 | p,p-DDT | 0.94 | UQ | 0.94 | 0.97 |
| 72-43-5 | Methoxychlor | 0.21 | U | 0.21 | 0.97 |
| 58-89-9 | Lindane | 0.17 | U | 0.17 | 0.97 |
| 53494-70-5 | Endrin ketone | 0.14 | U | 0.14 | 0.97 |
| 319-86-8 | delta-BHC | 0.11 | U | 0.11 | 0.97 |
| 5103-71-9 | a-Chlordane | 3.76 | | 0.32 | 0.97 |
| 12789-03-6 | g-Chlordane | 2.99 | | 0.30 | 0.97 |
| 76-44-8 | Heptachlor | 0.039 | UQ | 0.039 | 0.97 |
| 309-00-2 | Aldrin | 0.0393 | J | 0.0046 | 0.97 |
| 1024-57-3 | Heptachlor epoxide | 0.99 | | 0.18 | 0.97 |
| 26880-48-8 | Oxychlordane | 0.367 | JQ | 0.074 | 0.97 |
| 3424-82-6 | o,p-DDE | 1.1 | UQ | 1.1 | 0.97 |

| CAS Number | Surrogate | Recovery (%) | Acceptance Criteria (%) |
|---|---|---|---|
| | 13C10-Chlordane | 65 | 10 - 200 |
| | 13C10-cis Nonachlor | 40 | 10 - 200 |
| | 13C10-Heptachlor Epoxide | 76 | 10 - 200 |
| | 13C10-Heptachlor | 65 | 10 - 200 |
| | 13C10-Mirex | 65 | 10 - 200 |
| | 13C10-Oxychlordane | 91 | 10 - 200 |
| | 13C10-trans Nonachlor | 64 | 10 - 200 |
| | 13C12-Aldrin | 89 | 10 - 200 |
| | 13C12-Dieldrin | 51 | 10 - 200 |
| | 13C12-Endrin Aldehyde | 29 | 10 - 200 |
| | 13C12-Endrin Ketone | 83 | 10 - 200 |
| | 13C12-Endrin | 39 | 10 - 200 |
| | 13C9-Endosulfan I | 41 | 10 - 200 |
| | 13C9-Endosulfan II | 37 | 10 - 200 |
| | 13C-Methoxychlor | 51 | 10 - 200 |
| | 13C-pp-DDD | 44 | 10 - 200 |
| | 13C-pp-DDE | 62 | 10 - 200 |
| | 13C-pp-DDT | 32 | 10 - 200 |
| | 13C6-beta BHC | 82 | 10 - 200 |
| | 13C6-d6-gamma BHC (Lindane) | 100 | 10 - 200 |
| | C13-Hexachlorobenzene | 105 | 10 - 200 |

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**LPRBG-ECST-COMP01**

| | | | | | |
|---|---|---|---|---|---|
| Lab Name | Maxxam Analytics Inc. | | | | |
| Method | USEPA 1699 MOD | | | Lab Sample ID: | B1A8699-KJ5483 |
| Matrix: | tissue | | | Project Number: | TASK 23.2.1 |
| Sample wt/vol: | 5.05 | (g) | g (wet weight) | Project Name: | CAGED BIVALVE STUDY SPRING 2011 |
| Level (low/med): | low | | | Lab File ID: | M5110907A021 |
| % Moisture: | Not applicable | Decanted (Y/N): | N | Date Received: | July 28, 2011 |
| Concentrated Extract Volume: | 1000 | (uL) | | Date Extracted: | August 24, 2011 |
| Injection Volume: | 1 | (uL) | | Lab Batch: | 2604778 |
| Acid Wash Cleanup (Y/N): | N | pH | Not analyzed | Date Analyzed: | September 8, 2011 |
| Carbon Column Cleanup (Y/N): | N | | | Calib. Ref.: | September 7, 2011 |
| GPC Column Cleanup (Y/N): | Y | | | Time Analyzed: | 03:50 |
| | | | | Dilution Factor: | 2 |

| CAS Number | Compound | Concentration (ng/g) | Qualifier | EDL (ng/g) | REPORTING LIMIT (ng/g) |
|---|---|---|---|---|---|
| 118-74-1 | Hexachlorobenzene | 0.0418 | J | 0.0046 | 0.99 |
| 319-84-6 | alpha-BHC | 0.12 | U | 0.12 | 0.99 |
| 959-98-8 | Endosulfan I | 1.6 | U | 1.6 | 2.0 |
| 39765-80-5 | trans-Nonachlor | 0.15 | J | 0.11 | 0.99 |
| 53-19-0 | o,p-DDD | 2.0 | U | 2.0 | 0.99 |
| 7421-93-4 | Endrin aldehyde | 0.51 | U | 0.51 | 0.99 |
| 72-55-9 | p,p-DDE | 3.5 | U | 3.5 | 0.99 |
| 60-57-1 | Dieldrin | 0.11 | U | 0.11 | 0.99 |
| 72-20-8 | Endrin | 0.32 | U | 0.32 | 0.99 |
| 33213-65-9 | Endosulfan II | 2.6 | U | 2.6 | 2.0 |
| 319-85-7 | beta-BHC | 0.15 | U | 0.15 | 0.99 |
| 789-02-6 | o,p-DDT | 2.4 | UQ | 2.4 | 0.99 |
| 72-54-8 | p,p-DDD | 2.4 | U | 2.4 | 0.99 |
| 5103-73-1 | cis-Nonachlor | 0.34 | U | 0.34 | 0.99 |
| 1031-07-8 | Endosulfan sulfate | 0.63 | U | 0.63 | 0.99 |
| 50-29-3 | p,p-DDT | 2.3 | UQ | 2.3 | 0.99 |
| 72-43-5 | Methoxychlor | 0.46 | U | 0.46 | 0.99 |
| 58-89-9 | Lindane | 0.24 | U | 0.24 | 0.99 |
| 53494-70-5 | Endrin ketone | 0.29 | U | 0.29 | 0.99 |
| 319-86-8 | delta-BHC | 0.16 | U | 0.16 | 0.99 |
| 5103-71-9 | a-Chlordane | 0.541 | J | 0.066 | 0.99 |
| 12789-03-6 | g-Chlordane | 0.166 | J | 0.062 | 0.99 |
| 76-44-8 | Heptachlor | 0.059 | UQ | 0.059 | 0.99 |
| 309-00-2 | Aldrin | 0.030 | U | 0.030 | 0.99 |
| 1024-57-3 | Heptachlor epoxide | 0.108 | J | 0.097 | 0.99 |
| 26880-48-8 | Oxychlordane | 0.32 | UQ | 0.32 | 0.99 |
| 3424-82-6 | o,p-DDE | 2.6 | UQ | 2.6 | 0.99 |

| CAS Number | Surrogate | Recovery (%) | Acceptance Criteria (%) |
|---|---|---|---|
| | 13C10-Chlordane | 63 | 10 - 200 |
| | 13C10-cis Nonachlor | 70 | 10 - 200 |
| | 13C10-Heptachlor Epoxide | 81 | 10 - 200 |
| | 13C10-Heptachlor | 66 | 10 - 200 |
| | 13C10-Mirex | 55 | 10 - 200 |
| | 13C10-Oxychlordane | 92 | 10 - 200 |
| | 13C10-trans Nonachlor | 66 | 10 - 200 |
| | 13C12-Aldrin | 85 | 10 - 200 |
| | 13C12-Dieldrin | 62 | 10 - 200 |
| | 13C12-Endrin Aldehyde | 38 | 10 - 200 |
| | 13C12-Endrin Ketone | 75 | 10 - 200 |
| | 13C12-Endrin | 47 | 10 - 200 |
| | 13C9-Endosulfan I | 60 | 10 - 200 |
| | 13C9-Endosulfan II | 46 | 10 - 200 |
| | 13C-Methoxychlor | 52 | 10 - 200 |
| | 13C-pp-DDD | 49 | 10 - 200 |
| | 13C-pp-DDE | 65 | 10 - 200 |
| | 13C-pp-DDT | 34 | 10 - 200 |
| | 13C6-beta BHC | 90 | 10 - 200 |
| | 13C6-d6-gamma BHC (Lindane) | 111 | 10 - 200 |
| | C13-Hexachlorobenzene | 149 | 10 - 200 |

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**LPR6-ECST-COMP02**

| | | | | | |
|---|---|---|---|---|---|
| Lab Name | Maxxam Analytics Inc. | | | | |
| Method | USEPA 1699 MOD | | | Lab Sample ID: | B1A8699-KJ5484 |
| Matrix: | tissue | | | Project Number: | TASK 23.2.1 |
| Sample wt/vol: | 5.07 | (g) | g (wet weight) | Project Name: | CAGED BIVALVE STUDY SPRING 2011 |
| Level (low/med): | low | | | Lab File ID: | M5110907A022 |
| % Moisture: | Not applicable | Decanted (Y/N): | N | Date Received: | July 28, 2011 |
| Concentrated Extract Volume: | 1000 | (uL) | | Date Extracted: | August 24, 2011 |
| Injection Volume: | 1 | (uL) | | Lab Batch: | 2604778 |
| Acid Wash Cleanup (Y/N): | N | pH | Not analyzed | Date Analyzed: | September 8, 2011 |
| Carbon Column Cleanup (Y/N): | N | | | Calib. Ref.: | September 7, 2011 |
| GPC Column Cleanup (Y/N): | Y | | | Time Analyzed: | 04:30 |
| | | | | Dilution Factor: | 2 |

| CAS Number | Compound | Concentration (ng/g) | Qualifier | EDL (ng/g) | REPORTING LIMIT (ng/g) |
|---|---|---|---|---|---|
| 118-74-1 | Hexachlorobenzene | 0.202 | J | 0.0079 | 0.99 |
| 319-84-6 | alpha-BHC | 0.12 | U | 0.12 | 0.99 |
| 959-98-8 | Endosulfan I | 1.6 | U | 1.6 | 2.0 |
| 39765-80-5 | trans-Nonachlor | 3.97 | | 0.11 | 0.99 |
| 53-19-0 | o,p-DDD | 2.5 | U | 2.5 | 0.99 |
| 7421-93-4 | Endrin aldehyde | 0.31 | U | 0.31 | 0.99 |
| 72-55-9 | p,p-DDE | 3.81 | | 2.4 | 0.99 |
| 60-57-1 | Dieldrin | 2.92 | | 0.11 | 0.99 |
| 72-20-8 | Endrin | 0.31 | U | 0.31 | 0.99 |
| 33213-65-9 | Endosulfan II | 2.8 | U | 2.8 | 2.0 |
| 319-85-7 | beta-BHC | 0.14 | U | 0.14 | 0.99 |
| 789-02-6 | o,p-DDT | 2.0 | UQ | 2.0 | 0.99 |
| 72-54-8 | p,p-DDD | 2.10 | | 2.0 | 0.99 |
| 5103-73-1 | cis-Nonachlor | 1.10 | | 0.34 | 0.99 |
| 1031-07-8 | Endosulfan sulfate | 0.12 | U | 0.12 | 0.99 |
| 50-29-3 | p,p-DDT | 1.9 | UQ | 1.9 | 0.99 |
| 72-43-5 | Methoxychlor | 0.63 | U | 0.63 | 0.99 |
| 58-89-9 | Lindane | 0.24 | U | 0.24 | 0.99 |
| 53494-70-5 | Endrin ketone | 0.41 | U | 0.41 | 0.99 |
| 319-86-8 | delta-BHC | 0.21 | J | 0.16 | 0.99 |
| 5103-71-9 | a-Chlordane | 5.26 | | 0.049 | 0.99 |
| 12789-03-6 | g-Chlordane | 3.62 | | 0.046 | 0.99 |
| 76-44-8 | Heptachlor | 0.0600 | JQ | 0.0012 | 0.99 |
| 309-00-2 | Aldrin | 0.070 | J | 0.014 | 0.99 |
| 1024-57-3 | Heptachlor epoxide | 0.96 | J | 0.11 | 0.99 |
| 26880-48-8 | Oxychlordane | 0.346 | JQ | 0.043 | 0.99 |
| 3424-82-6 | o,p-DDE | 1.7 | UQ | 1.7 | 0.99 |

| CAS Number | Surrogate | Recovery (%) | Acceptance Criteria (%) |
|---|---|---|---|
| | 13C10-Chlordane | 54 | 10 - 200 |
| | 13C10-cis Nonachlor | 40 | 10 - 200 |
| | 13C10-Heptachlor Epoxide | 71 | 10 - 200 |
| | 13C10-Heptachlor | 60 | 10 - 200 |
| | 13C10-Mirex | 46 | 10 - 200 |
| | 13C10-Oxychlordane | 77 | 10 - 200 |
| | 13C10-trans Nonachlor | 55 | 10 - 200 |
| | 13C12-Aldrin | 70 | 10 - 200 |
| | 13C12-Dieldrin | 58 | 10 - 200 |
| | 13C12-Endrin Aldehyde | 35 | 10 - 200 |
| | 13C12-Endrin Ketone | 64 | 10 - 200 |
| | 13C12-Endrin | 42 | 10 - 200 |
| | 13C9-Endosulfan I | 55 | 10 - 200 |
| | 13C9-Endosulfan II | 38 | 10 - 200 |
| | 13C-Methoxychlor | 37 | 10 - 200 |
| | 13C-pp-DDD | 38 | 10 - 200 |
| | 13C-pp-DDE | 60 | 10 - 200 |
| | 13C-pp-DDT | 33 | 10 - 200 |
| | 13C6-beta BHC | 76 | 10 - 200 |
| | 13C6-d6-gamma BHC (Lindane) | 94 | 10 - 200 |
| | C13-Hexachlorobenzene | 122 | 10 - 200 |

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## LPR6-ECST-COMP02 DUPLICATE

| | | | | | |
|---|---|---|---|---|---|
| Lab Name | Maxxam Analytics Inc. | | | | |
| Method | USEPA 1699 MOD | | | Lab Sample ID: | B1A8699-KJ5484 |
| Matrix: | tissue | | | Project Number: | TASK 23.2.1 |
| Sample wt/vol: | 5.04 | (g) | g (wet weight) | Project Name: | CAGED BIVALVE STUDY SPRING 2011 |
| Level (low/med): | low | | | Lab File ID: | M5110907A023 |
| % Moisture: | Not applicable | Decanted (Y/N): | N | Date Received: | July 28, 2011 |
| Concentrated Extract Volume: | 1000 | (uL) | | Date Extracted: | August 24, 2011 |
| Injection Volume: | 1 | (uL) | | Lab Batch: | 2604778 |
| Acid Wash Cleanup (Y/N): | N | pH | Not analyzed | Date Analyzed: | September 8, 2011 |
| Carbon Column Cleanup (Y/N): | N | | | Calib. Ref.: | September 7, 2011 |
| GPC Column Cleanup (Y/N): | Y | | | Time Analyzed: | 05:09 |
| | | | | Dilution Factor: | 2 |

| CAS Number | Compound | Concentration (ng/g) | Qualifier | EDL (ng/g) | REPORTING LIMIT (ng/g) |
|---|---|---|---|---|---|
| 118-74-1 | Hexachlorobenzene | 0.161 | J | 0.0035 | 0.99 |
| 319-84-6 | alpha-BHC | 0.12 | U | 0.12 | 0.99 |
| 959-98-8 | Endosulfan I | 1.6 | U | 1.6 | 2.0 |
| 39765-80-5 | trans-Nonachlor | 3.39 | | 0.057 | 0.99 |
| 53-19-0 | o,p-DDD | 2.9 | U | 2.9 | 0.99 |
| 7421-93-4 | Endrin aldehyde | 0.28 | U | 0.28 | 0.99 |
| 72-55-9 | p,p-DDE | 3.67 | | 2.8 | 0.99 |
| 60-57-1 | Dieldrin | 2.17 | | 0.055 | 0.99 |
| 72-20-8 | Endrin | 0.58 | U | 0.58 | 0.99 |
| 33213-65-9 | Endosulfan II | 3.1 | U | 3.1 | 2.0 |
| 319-85-7 | beta-BHC | 0.15 | U | 0.15 | 0.99 |
| 789-02-6 | o,p-DDT | 1.9 | UQ | 1.9 | 0.99 |
| 72-54-8 | p,p-DDD | 2.00 | | 2.0 | 0.99 |
| 5103-73-1 | cis-Nonachlor | 1.05 | | 0.63 | 0.99 |
| 1031-07-8 | Endosulfan sulfate | 0.093 | J | 0.036 | 0.99 |
| 50-29-3 | p,p-DDT | 1.9 | UQ | 1.9 | 0.99 |
| 72-43-5 | Methoxychlor | 0.75 | U | 0.75 | 0.99 |
| 58-89-9 | Lindane | 0.24 | U | 0.24 | 0.99 |
| 53494-70-5 | Endrin ketone | 0.31 | U | 0.31 | 0.99 |
| 319-86-8 | delta-BHC | 0.18 | J | 0.16 | 0.99 |
| 5103-71-9 | a-Chlordane | 4.33 | | 0.067 | 0.99 |
| 12789-03-6 | g-Chlordane | 2.86 | | 0.063 | 0.99 |
| 76-44-8 | Heptachlor | 0.11 | UQ | 0.11 | 0.99 |
| 309-00-2 | Aldrin | 0.071 | J | 0.012 | 0.99 |
| 1024-57-3 | Heptachlor epoxide | 0.883 | J | 0.013 | 0.99 |
| 26880-48-8 | Oxychlordane | 0.314 | JQ | 0.017 | 0.99 |
| 3424-82-6 | o,p-DDE | 2.0 | UQ | 2.0 | 0.99 |

| CAS Number | Surrogate | Recovery (%) | Acceptance Criteria (%) |
|---|---|---|---|
| | 13C10-Chlordane | 74 | 10 - 200 |
| | 13C10-cis Nonachlor | 43 | 10 - 200 |
| | 13C10-Heptachlor Epoxide | 84 | 10 - 200 |
| | 13C10-Heptachlor | 72 | 10 - 200 |
| | 13C10-Mirex | 51 | 10 - 200 |
| | 13C10-Oxychlordane | 94 | 10 - 200 |
| | 13C10-trans Nonachlor | 68 | 10 - 200 |
| | 13C12-Aldrin | 87 | 10 - 200 |
| | 13C12-Dieldrin | 67 | 10 - 200 |
| | 13C12-Endrin Aldehyde | 47 | 10 - 200 |
| | 13C12-Endrin Ketone | 68 | 10 - 200 |
| | 13C12-Endrin | 61 | 10 - 200 |
| | 13C9-Endosulfan I | 70 | 10 - 200 |
| | 13C9-Endosulfan II | 50 | 10 - 200 |
| | 13C-Methoxychlor | 45 | 10 - 200 |
| | 13C-pp-DDD | 43 | 10 - 200 |
| | 13C-pp-DDE | 71 | 10 - 200 |
| | 13C-pp-DDT | 34 | 10 - 200 |
| | 13C6-beta BHC | 85 | 10 - 200 |
| | 13C6-d6-gamma BHC (Lindane) | 108 | 10 - 200 |
| | C13-Hexachlorobenzene | 141 | 10 - 200 |

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**LPR7-ECST-COMP03**

| | | | | | |
|---|---|---|---|---|---|
| Lab Name | Maxxam Analytics Inc. | | | | |
| Method | USEPA 1699 MOD | | | Lab Sample ID: | B1A8699-KJ5485 |
| Matrix: | tissue | | | Project Number: | TASK 23.2.1 |
| Sample wt/vol: | 5.26 | (g) | g (wet weight) | Project Name: | CAGED BIVALVE STUDY SPRING 2011 |
| Level (low/med): | low | | | Lab File ID: | M5110907A024 |
| % Moisture: | Not applicable | Decanted (Y/N): | N | Date Received: | July 28, 2011 |
| Concentrated Extract Volume: | 1000 | (uL) | | Date Extracted: | August 24, 2011 |
| Injection Volume: | 1 | (uL) | | Lab Batch: | 2604778 |
| Acid Wash Cleanup (Y/N): | N | pH | Not analyzed | Date Analyzed: | September 8, 2011 |
| Carbon Column Cleanup (Y/N): | N | | | Calib. Ref.: | September 7, 2011 |
| GPC Column Cleanup (Y/N): | Y | | | Time Analyzed: | 05:48 |
| | | | | Dilution Factor: | 2 |

| CAS Number | Compound | Concentration (ng/g) | Qualifier | EDL (ng/g) | REPORTING LIMIT (ng/g) |
|---|---|---|---|---|---|
| 118-74-1 | Hexachlorobenzene | 0.243 | J | 0.0075 | 0.95 |
| 319-84-6 | alpha-BHC | 0.12 | U | 0.12 | 0.95 |
| 959-98-8 | Endosulfan I | 1.5 | U | 1.5 | 1.9 |
| 39765-80-5 | trans-Nonachlor | 3.46 | | 0.15 | 0.95 |
| 53-19-0 | o,p-DDD | 2.4 | U | 2.4 | 0.95 |
| 7421-93-4 | Endrin aldehyde | 0.47 | U | 0.47 | 0.95 |
| 72-55-9 | p,p-DDE | 3.42 | | 2.1 | 0.95 |
| 60-57-1 | Dieldrin | 2.89 | | 0.15 | 0.95 |
| 72-20-8 | Endrin | 0.42 | U | 0.42 | 0.95 |
| 33213-65-9 | Endosulfan II | 3.0 | U | 3.0 | 1.9 |
| 319-85-7 | beta-BHC | 0.15 | U | 0.15 | 0.95 |
| 789-02-6 | o,p-DDT | 2.7 | UQ | 2.7 | 0.95 |
| 72-54-8 | p,p-DDD | 2.8 | U | 2.8 | 0.95 |
| 5103-73-1 | cis-Nonachlor | 1.06 | | 0.46 | 0.95 |
| 1031-07-8 | Endosulfan sulfate | 0.77 | U | 0.77 | 0.95 |
| 50-29-3 | p,p-DDT | 2.7 | UQ | 2.7 | 0.95 |
| 72-43-5 | Methoxychlor | 0.64 | U | 0.64 | 0.95 |
| 58-89-9 | Lindane | 0.25 | U | 0.25 | 0.95 |
| 53494-70-5 | Endrin ketone | 0.44 | U | 0.44 | 0.95 |
| 319-86-8 | delta-BHC | 0.17 | U | 0.17 | 0.95 |
| 5103-71-9 | a-Chlordane | 4.16 | | 0.074 | 0.95 |
| 12789-03-6 | g-Chlordane | 2.68 | | 0.070 | 0.95 |
| 76-44-8 | Heptachlor | 0.076 | UQ | 0.076 | 0.95 |
| 309-00-2 | Aldrin | 0.026 | J | 0.014 | 0.95 |
| 1024-57-3 | Heptachlor epoxide | 1.05 | | 0.17 | 0.95 |
| 26880-48-8 | Oxychlordane | 0.356 | JQ | 0.074 | 0.95 |
| 3424-82-6 | o,p-DDE | 1.5 | UQ | 1.5 | 0.95 |

| CAS Number | Surrogate | Recovery (%) | Acceptance Criteria (%) |
|---|---|---|---|
| | 13C10-Chlordane | 63 | 10 - 200 |
| | 13C10-cis Nonachlor | 34 | 10 - 200 |
| | 13C10-Heptachlor Epoxide | 67 | 10 - 200 |
| | 13C10-Heptachlor | 65 | 10 - 200 |
| | 13C10-Mirex | 43 | 10 - 200 |
| | 13C10-Oxychlordane | 78 | 10 - 200 |
| | 13C10-trans Nonachlor | 57 | 10 - 200 |
| | 13C12-Aldrin | 71 | 10 - 200 |
| | 13C12-Dieldrin | 54 | 10 - 200 |
| | 13C12-Endrin Aldehyde | 37 | 10 - 200 |
| | 13C12-Endrin Ketone | 68 | 10 - 200 |
| | 13C12-Endrin | 40 | 10 - 200 |
| | 13C9-Endosulfan I | 56 | 10 - 200 |
| | 13C9-Endosulfan II | 37 | 10 - 200 |
| | 13C-Methoxychlor | 46 | 10 - 200 |
| | 13C-pp-DDD | 37 | 10 - 200 |
| | 13C-pp-DDE | 54 | 10 - 200 |
| | 13C-pp-DDT | 29 | 10 - 200 |
| | 13C6-beta BHC | 77 | 10 - 200 |
| | 13C6-d6-gamma BHC (Lindane) | 96 | 10 - 200 |
| | C13-Hexachlorobenzene | 111 | 10 - 200 |

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**LPR7-ECST-COMP04**

| | | | | | |
|---|---|---|---|---|---|
| Lab Name | Maxxam Analytics Inc. | | | | |
| Method | USEPA 1699 MOD | | | Lab Sample ID: | B1A8699-KJ5486 |
| Matrix: | tissue | | | Project Number: | TASK 23.2.1 |
| Sample wt/vol: | 5.25 | (g) | g (wet weight) | Project Name: | CAGED BIVALVE STUDY SPRING 2011 |
| Level (low/med): | low | | | Lab File ID: | M5110907A025 |
| % Moisture: | Not applicable | Decanted (Y/N): | N | Date Received: | July 28, 2011 |
| Concentrated Extract Volume: | 1000 | (uL) | | Date Extracted: | August 24, 2011 |
| Injection Volume: | 1 | (uL) | | Lab Batch: | 2604778 |
| Acid Wash Cleanup (Y/N): | N | pH | Not analyzed | Date Analyzed: | September 8, 2011 |
| Carbon Column Cleanup (Y/N): | N | | | Calib. Ref.: | September 7, 2011 |
| GPC Column Cleanup (Y/N): | Y | | | Time Analyzed: | 06:27 |
| | | | | Dilution Factor: | 2 |

| CAS Number | Compound | Concentration (ng/g) | Qualifier | EDL (ng/g) | REPORTING LIMIT (ng/g) |
|---|---|---|---|---|---|
| 118-74-1 | Hexachlorobenzene | 0.127 | J | 0.0050 | 0.95 |
| 319-84-6 | alpha-BHC | 0.13 | U | 0.13 | 0.95 |
| 959-98-8 | Endosulfan I | 1.1 | U | 1.1 | 1.9 |
| 39765-80-5 | trans-Nonachlor | 3.57 | | 0.18 | 0.95 |
| 53-19-0 | o,p-DDD | 1.8 | U | 1.8 | 0.95 |
| 7421-93-4 | Endrin aldehyde | 0.18 | U | 0.18 | 0.95 |
| 72-55-9 | p,p-DDE | 3.37 | | 2.4 | 0.95 |
| 60-57-1 | Dieldrin | 3.00 | | 0.17 | 0.95 |
| 72-20-8 | Endrin | 0.29 | U | 0.29 | 0.95 |
| 33213-65-9 | Endosulfan II | 2.1 | U | 2.1 | 1.9 |
| 319-85-7 | beta-BHC | 0.16 | U | 0.16 | 0.95 |
| 789-02-6 | o,p-DDT | 2.0 | UQ | 2.0 | 0.95 |
| 72-54-8 | p,p-DDD | 2.1 | U | 2.1 | 0.95 |
| 5103-73-1 | cis-Nonachlor | 1.03 | | 0.31 | 0.95 |
| 1031-07-8 | Endosulfan sulfate | 0.37 | J | 0.15 | 0.95 |
| 50-29-3 | p,p-DDT | 2.0 | UQ | 2.0 | 0.95 |
| 72-43-5 | Methoxychlor | 0.077 | U | 0.077 | 0.95 |
| 58-89-9 | Lindane | 0.27 | U | 0.27 | 0.95 |
| 53494-70-5 | Endrin ketone | 0.27 | U | 0.27 | 0.95 |
| 319-86-8 | delta-BHC | 0.18 | U | 0.18 | 0.95 |
| 5103-71-9 | a-Chlordane | 4.58 | | 0.12 | 0.95 |
| 12789-03-6 | g-Chlordane | 3.04 | | 0.11 | 0.95 |
| 76-44-8 | Heptachlor | 0.074 | UQ | 0.074 | 0.95 |
| 309-00-2 | Aldrin | 0.029 | U | 0.029 | 0.95 |
| 1024-57-3 | Heptachlor epoxide | 1.30 | | 0.10 | 0.95 |
| 26880-48-8 | Oxychlordane | 0.51 | JQ | 0.11 | 0.95 |
| 3424-82-6 | o,p-DDE | 1.7 | UQ | 1.7 | 0.95 |

| CAS Number | Surrogate | Recovery (%) | Acceptance Criteria (%) |
|---|---|---|---|
| | 13C10-Chlordane | 64 | 10 - 200 |
| | 13C10-cis Nonachlor | 48 | 10 - 200 |
| | 13C10-Heptachlor Epoxide | 57 | 10 - 200 |
| | 13C10-Heptachlor | 61 | 10 - 200 |
| | 13C10-Mirex | 45 | 10 - 200 |
| | 13C10-Oxychlordane | 63 | 10 - 200 |
| | 13C10-trans Nonachlor | 59 | 10 - 200 |
| | 13C12-Aldrin | 60 | 10 - 200 |
| | 13C12-Dieldrin | 71 | 10 - 200 |
| | 13C12-Endrin Aldehyde | 46 | 10 - 200 |
| | 13C12-Endrin Ketone | 70 | 10 - 200 |
| | 13C12-Endrin | 53 | 10 - 200 |
| | 13C9-Endosulfan I | 65 | 10 - 200 |
| | 13C9-Endosulfan II | 44 | 10 - 200 |
| | 13C-Methoxychlor | 36 | 10 - 200 |
| | 13C-pp-DDD | 51 | 10 - 200 |
| | 13C-pp-DDE | 68 | 10 - 200 |
| | 13C-pp-DDT | 37 | 10 - 200 |
| | 13C6-beta BHC | 71 | 10 - 200 |
| | 13C6-d6-gamma BHC (Lindane) | 90 | 10 - 200 |
| | C13-Hexachlorobenzene | 97 | 10 - 200 |

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**LPR8-ECST-COMP05**

| | | | | | |
|---|---|---|---|---|---|
| Lab Name | Maxxam Analytics Inc. | | | | |
| Method | USEPA 1699 MOD | | | Lab Sample ID: | B1A8699-KJ5487 |
| Matrix: | tissue | | | Project Number: | TASK 23.2.1 |
| Sample wt/vol: | 5.10 | (g) | g (wet weight) | Project Name: | CAGED BIVALVE STUDY SPRING 2011 |
| Level (low/med): | low | | | Lab File ID: | M5110907A026 |
| % Moisture: | Not applicable | Decanted (Y/N): | N | Date Received: | July 28, 2011 |
| Concentrated Extract Volume: | 1000 | (uL) | | Date Extracted: | August 24, 2011 |
| Injection Volume: | 1 | (uL) | | Lab Batch: | 2604778 |
| Acid Wash Cleanup (Y/N): | N | pH | Not analyzed | Date Analyzed: | September 8, 2011 |
| Carbon Column Cleanup (Y/N): | N | | | Calib. Ref.: | September 7, 2011 |
| GPC Column Cleanup (Y/N): | Y | | | Time Analyzed: | 07:07 |
| | | | | Dilution Factor: | 2 |

| CAS Number | Compound | Concentration (ng/g) | Qualifier | EDL (ng/g) | REPORTING LIMIT (ng/g) |
|---|---|---|---|---|---|
| 118-74-1 | Hexachlorobenzene | 0.166 | J | 0.0060 | 0.98 |
| 319-84-6 | alpha-BHC | 0.12 | U | 0.12 | 0.98 |
| 959-98-8 | Endosulfan I | 1.1 | U | 1.1 | 2.0 |
| 39765-80-5 | trans-Nonachlor | 3.31 | | 0.19 | 0.98 |
| 53-19-0 | o,p-DDD | 1.5 | U | 1.5 | 0.98 |
| 7421-93-4 | Endrin aldehyde | 0.77 | U | 0.77 | 0.98 |
| 72-55-9 | p,p-DDE | 2.60 | | 1.8 | 0.98 |
| 60-57-1 | Dieldrin | 2.53 | | 0.19 | 0.98 |
| 72-20-8 | Endrin | 0.059 | U | 0.059 | 0.98 |
| 33213-65-9 | Endosulfan II | 0.53 | U | 0.53 | 2.0 |
| 319-85-7 | beta-BHC | 0.15 | U | 0.15 | 0.98 |
| 789-02-6 | o,p-DDT | 1.4 | UQ | 1.4 | 0.98 |
| 72-54-8 | p,p-DDD | 1.4 | U | 1.4 | 0.98 |
| 5103-73-1 | cis-Nonachlor | 0.885 | J | 0.064 | 0.98 |
| 1031-07-8 | Endosulfan sulfate | 0.16 | U | 0.16 | 0.98 |
| 50-29-3 | p,p-DDT | 1.4 | UQ | 1.4 | 0.98 |
| 72-43-5 | Methoxychlor | 0.54 | U | 0.54 | 0.98 |
| 58-89-9 | Lindane | 0.25 | U | 0.25 | 0.98 |
| 53494-70-5 | Endrin ketone | 0.33 | U | 0.33 | 0.98 |
| 319-86-8 | delta-BHC | 0.56 | J | 0.16 | 0.98 |
| 5103-71-9 | a-Chlordane | 3.92 | | 0.12 | 0.98 |
| 12789-03-6 | g-Chlordane | 2.89 | | 0.12 | 0.98 |
| 76-44-8 | Heptachlor | 0.10 | UQ | 0.10 | 0.98 |
| 309-00-2 | Aldrin | 0.032 | U | 0.032 | 0.98 |
| 1024-57-3 | Heptachlor epoxide | 1.04 | | 0.015 | 0.98 |
| 26880-48-8 | Oxychlordane | 0.403 | JQ | 0.086 | 0.98 |
| 3424-82-6 | o,p-DDE | 1.3 | UQ | 1.3 | 0.98 |

| CAS Number | Surrogate | Recovery (%) | Acceptance Criteria (%) |
|---|---|---|---|
| | 13C10-Chlordane | 63 | 10 - 200 |
| | 13C10-cis Nonachlor | 40 | 10 - 200 |
| | 13C10-Heptachlor Epoxide | 66 | 10 - 200 |
| | 13C10-Heptachlor | 67 | 10 - 200 |
| | 13C10-Mirex | 44 | 10 - 200 |
| | 13C10-Oxychlordane | 75 | 10 - 200 |
| | 13C10-trans Nonachlor | 56 | 10 - 200 |
| | 13C12-Aldrin | 70 | 10 - 200 |
| | 13C12-Dieldrin | 71 | 10 - 200 |
| | 13C12-Endrin Aldehyde | 41 | 10 - 200 |
| | 13C12-Endrin Ketone | 71 | 10 - 200 |
| | 13C12-Endrin | 52 | 10 - 200 |
| | 13C9-Endosulfan I | 61 | 10 - 200 |
| | 13C9-Endosulfan II | 51 | 10 - 200 |
| | 13C-Methoxychlor | 40 | 10 - 200 |
| | 13C-pp-DDD | 51 | 10 - 200 |
| | 13C-pp-DDE | 65 | 10 - 200 |
| | 13C-pp-DDT | 32 | 10 - 200 |
| | 13C6-beta BHC | 74 | 10 - 200 |
| | 13C6-d6-gamma BHC (Lindane) | 92 | 10 - 200 |
| | C13-Hexachlorobenzene | 104 | 10 - 200 |

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**LPR1-GDST-COMP01**

| | | | | | |
|---|---|---|---|---|---|
| Lab Name | Maxxam Analytics Inc. | | | | |
| Method | USEPA 1699 MOD | | | Lab Sample ID: | B1A8699-KJ5488 |
| Matrix: | tissue | | | Project Number: | TASK 23.2.1 |
| Sample wt/vol: | 5.08 | (g) | g (wet weight) | Project Name: | CAGED BIVALVE STUDY SPRING 2011 |
| Level (low/med): | low | | | Lab File ID: | M5110907A027 |
| % Moisture: | Not applicable | Decanted (Y/N): | N | Date Received: | July 28, 2011 |
| Concentrated Extract Volume: | 1000 | (uL) | | Date Extracted: | August 24, 2011 |
| Injection Volume: | 1 | (uL) | | Lab Batch: | 2604778 |
| Acid Wash Cleanup (Y/N): | N | pH | Not analyzed | Date Analyzed: | September 8, 2011 |
| Carbon Column Cleanup (Y/N): | N | | | Calib. Ref.: | September 7, 2011 |
| GPC Column Cleanup (Y/N): | Y | | | Time Analyzed: | 07:46 |
| | | | | Dilution Factor: | 2 |

| CAS Number | Compound | Concentration (ng/g) | Qualifier | EDL (ng/g) | REPORTING LIMIT (ng/g) |
|---|---|---|---|---|---|
| 118-74-1 | Hexachlorobenzene | 0.0323 | J | 0.0056 | 0.98 |
| 319-84-6 | alpha-BHC | 0.12 | U | 0.12 | 0.98 |
| 959-98-8 | Endosulfan I | 1.6 | U | 1.6 | 2.0 |
| 39765-80-5 | trans-Nonachlor | 2.43 | | 0.13 | 0.98 |
| 53-19-0 | o,p-DDD | 2.6 | U | 2.6 | 0.98 |
| 7421-93-4 | Endrin aldehyde | 0.47 | U | 0.47 | 0.98 |
| 72-55-9 | p,p-DDE | 3.93 | | 2.1 | 0.98 |
| 60-57-1 | Dieldrin | 1.80 | | 0.13 | 0.98 |
| 72-20-8 | Endrin | 0.24 | U | 0.24 | 0.98 |
| 33213-65-9 | Endosulfan II | 2.4 | U | 2.4 | 2.0 |
| 319-85-7 | beta-BHC | 0.15 | U | 0.15 | 0.98 |
| 789-02-6 | o,p-DDT | 1.7 | UQ | 1.7 | 0.98 |
| 72-54-8 | p,p-DDD | 2.96 | | 1.7 | 0.98 |
| 5103-73-1 | cis-Nonachlor | 0.62 | J | 0.26 | 0.98 |
| 1031-07-8 | Endosulfan sulfate | 0.42 | U | 0.42 | 0.98 |
| 50-29-3 | p,p-DDT | 1.6 | UQ | 1.6 | 0.98 |
| 72-43-5 | Methoxychlor | 0.80 | U | 0.80 | 0.98 |
| 58-89-9 | Lindane | 0.25 | U | 0.25 | 0.98 |
| 53494-70-5 | Endrin ketone | 0.34 | U | 0.34 | 0.98 |
| 319-86-8 | delta-BHC | 0.42 | J | 0.17 | 0.98 |
| 5103-71-9 | a-Chlordane | 2.94 | | 0.075 | 0.98 |
| 12789-03-6 | g-Chlordane | 2.32 | | 0.071 | 0.98 |
| 76-44-8 | Heptachlor | 0.053 | UQ | 0.053 | 0.98 |
| 309-00-2 | Aldrin | 0.033 | J | 0.016 | 0.98 |
| 1024-57-3 | Heptachlor epoxide | 0.43 | J | 0.11 | 0.98 |
| 26880-48-8 | Oxychlordane | 0.089 | JQ | 0.016 | 0.98 |
| 3424-82-6 | o,p-DDE | 1.5 | UQ | 1.5 | 0.98 |

| CAS Number | Surrogate | Recovery (%) | Acceptance Criteria (%) |
|---|---|---|---|
| | 13C10-Chlordane | 61 | 10 - 200 |
| | 13C10-cis Nonachlor | 36 | 10 - 200 |
| | 13C10-Heptachlor Epoxide | 66 | 10 - 200 |
| | 13C10-Heptachlor | 57 | 10 - 200 |
| | 13C10-Mirex | 44 | 10 - 200 |
| | 13C10-Oxychlordane | 76 | 10 - 200 |
| | 13C10-trans Nonachlor | 56 | 10 - 200 |
| | 13C12-Aldrin | 73 | 10 - 200 |
| | 13C12-Dieldrin | 65 | 10 - 200 |
| | 13C12-Endrin Aldehyde | 46 | 10 - 200 |
| | 13C12-Endrin Ketone | 66 | 10 - 200 |
| | 13C12-Endrin | 45 | 10 - 200 |
| | 13C9-Endosulfan I | 55 | 10 - 200 |
| | 13C9-Endosulfan II | 46 | 10 - 200 |
| | 13C-Methoxychlor | 36 | 10 - 200 |
| | 13C-pp-DDD | 43 | 10 - 200 |
| | 13C-pp-DDE | 66 | 10 - 200 |
| | 13C-pp-DDT | 33 | 10 - 200 |
| | 13C6-beta BHC | 69 | 10 - 200 |
| | 13C6-d6-gamma BHC (Lindane) | 90 | 10 - 200 |
| | C13-Hexachlorobenzene | 116 | 10 - 200 |

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**LPRBG-GDST-COMP01**

| | | | | | |
|---|---|---|---|---|---|
| Lab Name | Maxxam Analytics Inc. | | | | |
| Method | USEPA 1699 MOD | | | Lab Sample ID: | B1A8699-KJ5489 |
| Matrix: | tissue | | | Project Number: | TASK 23.2.1 |
| Sample wt/vol: | 5.13 | (g) | g (wet weight) | Project Name: | CAGED BIVALVE STUDY SPRING 2011 |
| Level (low/med): | low | | | Lab File ID: | M5110907A028 |
| % Moisture: | Not applicable | Decanted (Y/N): | N | Date Received: | July 28, 2011 |
| Concentrated Extract Volume: | 1000 | (uL) | | Date Extracted: | August 24, 2011 |
| Injection Volume: | 1 | (uL) | | Lab Batch: | 2604778 |
| Acid Wash Cleanup (Y/N): | N | pH | Not analyzed | Date Analyzed: | September 8, 2011 |
| Carbon Column Cleanup (Y/N): | N | | | Calib. Ref.: | September 7, 2011 |
| GPC Column Cleanup (Y/N): | Y | | | Time Analyzed: | 08:25 |
| | | | | Dilution Factor: | 2 |

| CAS Number | Compound | Concentration (ng/g) | Qualifier | EDL (ng/g) | REPORTING LIMIT (ng/g) |
|---|---|---|---|---|---|
| 118-74-1 | Hexachlorobenzene | 0.0136 | J | 0.0033 | 0.97 |
| 319-84-6 | alpha-BHC | 0.10 | U | 0.10 | 0.97 |
| 959-98-8 | Endosulfan I | 1.3 | U | 1.3 | 1.9 |
| 39765-80-5 | trans-Nonachlor | 0.28 | U | 0.28 | 0.97 |
| 53-19-0 | o,p-DDD | 1.6 | U | 1.6 | 0.97 |
| 7421-93-4 | Endrin aldehyde | 0.24 | U | 0.24 | 0.97 |
| 72-55-9 | p,p-DDE | 2.2 | U | 2.2 | 0.97 |
| 60-57-1 | Dieldrin | 0.27 | U | 0.27 | 0.97 |
| 72-20-8 | Endrin | 0.19 | U | 0.19 | 0.97 |
| 33213-65-9 | Endosulfan II | 2.3 | U | 2.3 | 1.9 |
| 319-85-7 | beta-BHC | 0.13 | U | 0.13 | 0.97 |
| 789-02-6 | o,p-DDT | 1.7 | UQ | 1.7 | 0.97 |
| 72-54-8 | p,p-DDD | 1.7 | U | 1.7 | 0.97 |
| 5103-73-1 | cis-Nonachlor | 0.21 | U | 0.21 | 0.97 |
| 1031-07-8 | Endosulfan sulfate | 0.32 | U | 0.32 | 0.97 |
| 50-29-3 | p,p-DDT | 1.6 | UQ | 1.6 | 0.97 |
| 72-43-5 | Methoxychlor | 0.35 | U | 0.35 | 0.97 |
| 58-89-9 | Lindane | 0.21 | U | 0.21 | 0.97 |
| 53494-70-5 | Endrin ketone | 0.29 | U | 0.29 | 0.97 |
| 319-86-8 | delta-BHC | 0.14 | U | 0.14 | 0.97 |
| 5103-71-9 | a-Chlordane | 0.15 | U | 0.15 | 0.97 |
| 12789-03-6 | g-Chlordane | 0.14 | U | 0.14 | 0.97 |
| 76-44-8 | Heptachlor | 0.0078 | UQ | 0.0078 | 0.97 |
| 309-00-2 | Aldrin | 0.027 | U | 0.027 | 0.97 |
| 1024-57-3 | Heptachlor epoxide | 0.28 | U | 0.28 | 0.97 |
| 26880-48-8 | Oxychlordane | 0.35 | UQ | 0.35 | 0.97 |
| 3424-82-6 | o,p-DDE | 1.6 | UQ | 1.6 | 0.97 |

| CAS Number | Surrogate | Recovery (%) | Acceptance Criteria (%) |
|---|---|---|---|
| | 13C10-Chlordane | 59 | 10 - 200 |
| | 13C10-cis Nonachlor | 41 | 10 - 200 |
| | 13C10-Heptachlor Epoxide | 65 | 10 - 200 |
| | 13C10-Heptachlor | 73 | 10 - 200 |
| | 13C10-Mirex | 56 | 10 - 200 |
| | 13C10-Oxychlordane | 82 | 10 - 200 |
| | 13C10-trans Nonachlor | 56 | 10 - 200 |
| | 13C12-Aldrin | 77 | 10 - 200 |
| | 13C12-Dieldrin | 69 | 10 - 200 |
| | 13C12-Endrin Aldehyde | 46 | 10 - 200 |
| | 13C12-Endrin Ketone | 85 | 10 - 200 |
| | 13C12-Endrin | 61 | 10 - 200 |
| | 13C9-Endosulfan I | 60 | 10 - 200 |
| | 13C9-Endosulfan II | 43 | 10 - 200 |
| | 13C-Methoxychlor | 43 | 10 - 200 |
| | 13C-pp-DDD | 51 | 10 - 200 |
| | 13C-pp-DDE | 69 | 10 - 200 |
| | 13C-pp-DDT | 34 | 10 - 200 |
| | 13C6-beta BHC | 82 | 10 - 200 |
| | 13C6-d6-gamma BHC (Lindane) | 108 | 10 - 200 |
| | C13-Hexachlorobenzene | 133 | 10 - 200 |

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**LPR2-GDST-COMP02**

| | | | | | |
|---|---|---|---|---|---|
| Lab Name | Maxxam Analytics Inc. | | | | |
| Method | USEPA 1699 MOD | | | Lab Sample ID: | B1A8699-KJ5490 |
| Matrix: | tissue | | | Project Number: | TASK 23.2.1 |
| Sample wt/vol: | 5.42 | (g) | g (wet weight) | Project Name: | CAGED BIVALVE STUDY SPRING 2011 |
| Level (low/med): | low | | | Lab File ID: | M5110907A029 |
| % Moisture: | Not applicable | Decanted (Y/N): | N | Date Received: | July 28, 2011 |
| Concentrated Extract Volume: | 1000 | (uL) | | Date Extracted: | August 24, 2011 |
| Injection Volume: | 1 | (uL) | | Lab Batch: | 2604778 |
| Acid Wash Cleanup (Y/N): | N | pH | Not analyzed | Date Analyzed: | September 8, 2011 |
| Carbon Column Cleanup (Y/N): | N | | | Calib. Ref.: | September 7, 2011 |
| GPC Column Cleanup (Y/N): | Y | | | Time Analyzed: | 09:04 |
| | | | | Dilution Factor: | 2 |

| CAS Number | Compound | Concentration (ng/g) | Qualifier | EDL (ng/g) | REPORTING LIMIT (ng/g) |
|---|---|---|---|---|---|
| 118-74-1 | Hexachlorobenzene | 0.0192 | J | 0.0050 | 0.92 |
| 319-84-6 | alpha-BHC | 0.13 | U | 0.13 | 0.92 |
| 959-98-8 | Endosulfan I | 1.2 | U | 1.2 | 1.8 |
| 39765-80-5 | trans-Nonachlor | 1.15 | | 0.13 | 0.92 |
| 53-19-0 | o,p-DDD | 1.4 | U | 1.4 | 0.92 |
| 7421-93-4 | Endrin aldehyde | 0.13 | U | 0.13 | 0.92 |
| 72-55-9 | p,p-DDE | 2.29 | | 1.7 | 0.92 |
| 60-57-1 | Dieldrin | 1.27 | | 0.13 | 0.92 |
| 72-20-8 | Endrin | 0.32 | U | 0.32 | 0.92 |
| 33213-65-9 | Endosulfan II | 2.1 | U | 2.1 | 1.8 |
| 319-85-7 | beta-BHC | 0.16 | U | 0.16 | 0.92 |
| 789-02-6 | o,p-DDT | 1.7 | UQ | 1.7 | 0.92 |
| 72-54-8 | p,p-DDD | 1.7 | U | 1.7 | 0.92 |
| 5103-73-1 | cis-Nonachlor | 0.34 | U | 0.34 | 0.92 |
| 1031-07-8 | Endosulfan sulfate | 0.10 | U | 0.10 | 0.92 |
| 50-29-3 | p,p-DDT | 1.6 | UQ | 1.6 | 0.92 |
| 72-43-5 | Methoxychlor | 0.58 | U | 0.58 | 0.92 |
| 58-89-9 | Lindane | 0.26 | U | 0.26 | 0.92 |
| 53494-70-5 | Endrin ketone | 0.27 | U | 0.27 | 0.92 |
| 319-86-8 | delta-BHC | 0.63 | J | 0.17 | 0.92 |
| 5103-71-9 | a-Chlordane | 1.42 | | 0.091 | 0.92 |
| 12789-03-6 | g-Chlordane | 1.20 | | 0.085 | 0.92 |
| 76-44-8 | Heptachlor | 0.070 | UQ | 0.070 | 0.92 |
| 309-00-2 | Aldrin | 0.0312 | J | 0.0097 | 0.92 |
| 1024-57-3 | Heptachlor epoxide | 0.43 | J | 0.13 | 0.92 |
| 26880-48-8 | Oxychlordane | 0.13 | UQ | 0.13 | 0.92 |
| 3424-82-6 | o,p-DDE | 1.2 | UQ | 1.2 | 0.92 |

| CAS Number | Surrogate | Recovery (%) | Acceptance Criteria (%) |
|---|---|---|---|
| | 13C10-Chlordane | 53 | 10 - 200 |
| | 13C10-cis Nonachlor | 39 | 10 - 200 |
| | 13C10-Heptachlor Epoxide | 57 | 10 - 200 |
| | 13C10-Heptachlor | 52 | 10 - 200 |
| | 13C10-Mirex | 44 | 10 - 200 |
| | 13C10-Oxychlordane | 68 | 10 - 200 |
| | 13C10-trans Nonachlor | 53 | 10 - 200 |
| | 13C12-Aldrin | 62 | 10 - 200 |
| | 13C12-Dieldrin | 64 | 10 - 200 |
| | 13C12-Endrin Aldehyde | 45 | 10 - 200 |
| | 13C12-Endrin Ketone | 63 | 10 - 200 |
| | 13C12-Endrin | 49 | 10 - 200 |
| | 13C9-Endosulfan I | 50 | 10 - 200 |
| | 13C9-Endosulfan II | 40 | 10 - 200 |
| | 13C-Methoxychlor | 37 | 10 - 200 |
| | 13C-pp-DDD | 52 | 10 - 200 |
| | 13C-pp-DDE | 62 | 10 - 200 |
| | 13C-pp-DDT | 29 | 10 - 200 |
| | 13C6-beta BHC | 64 | 10 - 200 |
| | 13C6-d6-gamma BHC (Lindane) | 85 | 10 - 200 |
| | C13-Hexachlorobenzene | 105 | 10 - 200 |

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**LPR3-GDST-COMP03**

| | | | | | |
|---|---|---|---|---|---|
| Lab Name | Maxxam Analytics Inc. | | | | |
| Method | USEPA 1699 MOD | | | Lab Sample ID: | B1A8699-KJ5491 |
| Matrix: | tissue | | | Project Number: | TASK 23.2.1 |
| Sample wt/vol: | 4.59 | (g) | g (wet weight) | Project Name: | CAGED BIVALVE STUDY SPRING 2011 |
| Level (low/med): | low | | | Lab File ID: | M5110907A030 |
| % Moisture: | Not applicable | Decanted (Y/N): | N | Date Received: | July 28, 2011 |
| Concentrated Extract Volume: | 1000 | (uL) | | Date Extracted: | August 24, 2011 |
| Injection Volume: | 1 | (uL) | | Lab Batch: | 2604778 |
| Acid Wash Cleanup (Y/N): | N | pH | Not analyzed | Date Analyzed: | September 8, 2011 |
| Carbon Column Cleanup (Y/N): | N | | | Calib. Ref.: | September 7, 2011 |
| GPC Column Cleanup (Y/N): | Y | | | Time Analyzed: | 09:44 |
| | | | | Dilution Factor: | 2 |

| CAS Number | Compound | Concentration (ng/g) | Qualifier | EDL (ng/g) | REPORTING LIMIT (ng/g) |
|---|---|---|---|---|---|
| 118-74-1 | Hexachlorobenzene | 0.0199 | J | 0.0020 | 1.1 |
| 319-84-6 | alpha-BHC | 0.14 | U | 0.14 | 1.1 |
| 959-98-8 | Endosulfan I | 1.7 | U | 1.7 | 2.2 |
| 39765-80-5 | trans-Nonachlor | 0.430 | J | 0.032 | 1.1 |
| 53-19-0 | o,p-DDD | 2.6 | U | 2.6 | 1.1 |
| 7421-93-4 | Endrin aldehyde | 0.64 | U | 0.64 | 1.1 |
| 72-55-9 | p,p-DDE | 2.5 | U | 2.5 | 1.1 |
| 60-57-1 | Dieldrin | 0.641 | J | 0.032 | 1.1 |
| 72-20-8 | Endrin | 0.24 | U | 0.24 | 1.1 |
| 33213-65-9 | Endosulfan II | 2.5 | U | 2.5 | 2.2 |
| 319-85-7 | beta-BHC | 0.18 | U | 0.18 | 1.1 |
| 789-02-6 | o,p-DDT | 2.7 | UQ | 2.7 | 1.1 |
| 72-54-8 | p,p-DDD | 2.7 | U | 2.7 | 1.1 |
| 5103-73-1 | cis-Nonachlor | 0.26 | U | 0.26 | 1.1 |
| 1031-07-8 | Endosulfan sulfate | 0.33 | U | 0.33 | 1.1 |
| 50-29-3 | p,p-DDT | 2.6 | UQ | 2.6 | 1.1 |
| 72-43-5 | Methoxychlor | 0.67 | U | 0.67 | 1.1 |
| 58-89-9 | Lindane | 0.30 | U | 0.30 | 1.1 |
| 53494-70-5 | Endrin ketone | 0.44 | U | 0.44 | 1.1 |
| 319-86-8 | delta-BHC | 0.20 | U | 0.20 | 1.1 |
| 5103-71-9 | a-Chlordane | 0.800 | J | 0.036 | 1.1 |
| 12789-03-6 | g-Chlordane | 0.292 | J | 0.034 | 1.1 |
| 76-44-8 | Heptachlor | 0.016 | UQ | 0.016 | 1.1 |
| 309-00-2 | Aldrin | 0.046 | U | 0.046 | 1.1 |
| 1024-57-3 | Heptachlor epoxide | 0.15 | J | 0.12 | 1.1 |
| 26880-48-8 | Oxychlordane | 0.064 | JQ | 0.012 | 1.1 |
| 3424-82-6 | o,p-DDE | 1.8 | UQ | 1.8 | 1.1 |

| CAS Number | Surrogate | Recovery (%) | Acceptance Criteria (%) |
|---|---|---|---|
| | 13C10-Chlordane | 58 | 10 - 200 |
| | 13C10-cis Nonachlor | 42 | 10 - 200 |
| | 13C10-Heptachlor Epoxide | 68 | 10 - 200 |
| | 13C10-Heptachlor | 61 | 10 - 200 |
| | 13C10-Mirex | 49 | 10 - 200 |
| | 13C10-Oxychlordane | 81 | 10 - 200 |
| | 13C10-trans Nonachlor | 57 | 10 - 200 |
| | 13C12-Aldrin | 72 | 10 - 200 |
| | 13C12-Dieldrin | 79 | 10 - 200 |
| | 13C12-Endrin Aldehyde | 57 | 10 - 200 |
| | 13C12-Endrin Ketone | 75 | 10 - 200 |
| | 13C12-Endrin | 66 | 10 - 200 |
| | 13C9-Endosulfan I | 56 | 10 - 200 |
| | 13C9-Endosulfan II | 47 | 10 - 200 |
| | 13C-Methoxychlor | 38 | 10 - 200 |
| | 13C-pp-DDD | 50 | 10 - 200 |
| | 13C-pp-DDE | 75 | 10 - 200 |
| | 13C-pp-DDT | 33 | 10 - 200 |
| | 13C6-beta BHC | 74 | 10 - 200 |
| | 13C6-d6-gamma BHC (Lindane) | 93 | 10 - 200 |
| | C13-Hexachlorobenzene | 130 | 10 - 200 |

# QA/QC

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## LABORATORY METHOD BLANK

| | | | | | |
|---|---|---|---|---|---|
| Lab Name | Maxxam Analytics Inc. | | | | |
| Method | USEPA 1699 MOD | | | Lab Sample ID: | B1A8699-2604776B |
| Matrix: | water | | | Project Number: | TASK 23.2.1 |
| Sample wt/vol: | 1.00 | (g/L) | L | Project Name: | CAGED BIVALVE STUDY SPRING 2011 |
| Level (low/med): | low | | | Lab File ID: | M5110907A013 |
| % Moisture: | N/A | Decanted (Y/N): | N | Date Received: | Not applicable |
| Concentrated Extract Volume: | 200 | (uL) | | Date Extracted: | July 25, 2011 |
| Injection Volume: | 1 | (uL) | | Lab Batch: | 2604776 |
| Acid Wash Cleanup (Y/N): | N | pH | Not analyzed | Date Analyzed: | September 7, 2011 |
| Carbon Column Cleanup (Y/N): | N | | | Calib. Ref.: | September 7, 2011 |
| GPC Column Cleanup (Y/N): | N | | | Time Analyzed: | 22:36 |
| | | | | Dilution Factor: | 1 |

| CAS Number | Compound | Concentration (ng/L) | Qualifier | EDL (ng/L) | REPORTING LIMIT (ng/L) |
|---|---|---|---|---|---|
| 118-74-1 | Hexachlorobenzene | 0.119 | J | 0.010 | 1.0 |
| 319-84-6 | alpha-BHC | 0.16 | U | 0.16 | 1.0 |
| 959-98-8 | Endosulfan I | 2.9 | U | 2.9 | 2.0 |
| 39765-80-5 | trans-Nonachlor | 0.44 | U | 0.44 | 1.0 |
| 53-19-0 | o,p-DDD | 3.1 | U | 3.1 | 1.0 |
| 7421-93-4 | Endrin aldehyde | 0.31 | U | 0.31 | 1.0 |
| 72-55-9 | p,p-DDE | 5.3 | U | 5.3 | 1.0 |
| 60-57-1 | Dieldrin | 0.43 | U | 0.43 | 2.0 |
| 72-20-8 | Endrin | 0.40 | U | 0.40 | 1.0 |
| 33213-65-9 | Endosulfan II | 6.5 | U | 6.5 | 2.0 |
| 319-85-7 | beta-BHC | 0.20 | U | 0.20 | 1.0 |
| 789-02-6 | o,p-DDT | 4.9 | U | 4.9 | 1.0 |
| 72-54-8 | p,p-DDD | 5.0 | U | 5.0 | 1.0 |
| 5103-73-1 | cis-Nonachlor | 0.44 | U | 0.44 | 1.0 |
| 1031-07-8 | Endosulfan sulfate | 1.2 | U | 1.2 | 1.0 |
| 50-29-3 | p,p-DDT | 4.8 | U | 4.8 | 1.0 |
| 72-43-5 | Methoxychlor | 0.138 | J | 0.050 | 1.0 |
| 58-89-9 | Lindane | 0.32 | U | 0.32 | 1.0 |
| 53494-70-5 | Endrin ketone | 0.46 | U | 0.46 | 1.0 |
| 319-86-8 | delta-BHC | 0.21 | U | 0.21 | 1.0 |
| 5103-71-9 | a-Chlordane | 0.080 | U | 0.080 | 1.0 |
| 12789-03-6 | g-Chlordane | 0.076 | U | 0.076 | 1.0 |
| 76-44-8 | Heptachlor | 0.25 | U | 0.25 | 1.0 |
| 309-00-2 | Aldrin | 0.034 | U | 0.034 | 1.0 |
| 1024-57-3 | Heptachlor epoxide | 0.060 | U | 0.060 | 1.0 |
| 26880-48-8 | Oxychlordane | 0.035 | U | 0.035 | 1.0 |
| 3424-82-6 | o,p-DDE | 3.8 | U | 3.8 | 1.0 |

| CAS Number | Surrogate | Recovery (%) | Acceptance Criteria (%) |
|---|---|---|---|
| | 13C10-Chlordane | 86 | 10 - 200 |
| | 13C10-cis Nonachlor | 65 | 10 - 200 |
| | 13C10-Heptachlor Epoxide | 57 | 10 - 200 |
| | 13C10-Heptachlor | 59 | 10 - 200 |
| | 13C10-Mirex | 67 | 10 - 200 |
| | 13C10-Oxychlordane | 55 | 10 - 200 |
| | 13C10-trans Nonachlor | 86 | 10 - 200 |
| | 13C12-Aldrin | 61 | 10 - 200 |
| | 13C12-Dieldrin | 76 | 10 - 200 |
| | 13C12-Endrin Aldehyde | 53 | 10 - 200 |
| | 13C12-Endrin Ketone | 68 | 10 - 200 |
| | 13C12-Endrin | 69 | 10 - 200 |
| | 13C9-Endosulfan I | 63 | 10 - 200 |
| | 13C9-Endosulfan II | 40 | 10 - 200 |
| | 13C-Methoxychlor | 50 | 10 - 200 |
| | 13C-pp-DDD | 49 | 10 - 200 |
| | 13C-pp-DDE | 73 | 10 - 200 |
| | 13C-pp-DDT | 51 | 10 - 200 |
| | 13C6-beta BHC | 88 | 10 - 200 |

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## LABORATORY METHOD BLANK

| | | | | | |
|---|---|---|---|---|---|
| Lab Name | Maxxam Analytics Inc. | | | | |
| Method | USEPA 1699 MOD | | | Lab Sample ID: | B1A8699-2604776B |
| Matrix: | water | | | Project Number: | TASK 23.2.1 |
| Sample wt/vol: | 1.00 | (g/L) | L | Project Name: | CAGED BIVALVE STUDY SPRING 2011 |
| Level (low/med): | low | | | Lab File ID: | M5110907A013 |
| % Moisture: | N/A | Decanted (Y/N): | N | Date Received: | Not applicable |
| Concentrated Extract Volume: | 200 | (uL) | | Date Extracted: | July 25, 2011 |
| Injection Volume: | 1 | (uL) | | Lab Batch: | 2604776 |
| Acid Wash Cleanup (Y/N): | N | pH | Not analyzed | Date Analyzed: | September 7, 2011 |
| Carbon Column Cleanup (Y/N): | N | | | Calib. Ref.: | September 7, 2011 |
| GPC Column Cleanup (Y/N): | N | | | Time Analyzed: | 22:36 |
| | | | | Dilution Factor: | 1 |

| CAS Number | Compound | Concentration (%) | Qualifier | EDL (%) | REPORTING LIMIT (%) |
|---|---|---|---|---|---|

| CAS Number | Surrogate | Recovery (%) | Acceptance Criteria (%) |
|---|---|---|---|
| | 13C6-d6-gamma BHC (Lindane) | 94 | 10 - 200 |
| | C13-Hexachlorobenzene | 79 | 10 - 200 |

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## LABORATORY METHOD BLANK

| | | | | | |
|---|---|---|---|---|---|
| Lab Name | Maxxam Analytics Inc. | | | | |
| Method | USEPA 1699 MOD | | | Lab Sample ID: | B1A8699-2604778B |
| Matrix: | tissue | | | Project Number: | TASK 23.2.1 |
| Sample wt/vol: | 10.47 | (g) | g (wet weight) | Project Name: | CAGED BIVALVE STUDY SPRING 2011 |
| Level (low/med): | low | | | Lab File ID: | M5110907A018 |
| % Moisture: | N/A | Decanted (Y/N): | N | Date Received: | Not applicable |
| Concentrated Extract Volume: | 1000 | (uL) | | Date Extracted: | August 24, 2011 |
| Injection Volume: | 1 | (uL) | | Lab Batch: | 2604778 |
| Acid Wash Cleanup (Y/N): | N | pH | Not analyzed | Date Analyzed: | September 8, 2011 |
| Carbon Column Cleanup (Y/N): | N | | | Calib. Ref.: | September 7, 2011 |
| GPC Column Cleanup (Y/N): | Y | | | Time Analyzed: | 01:52 |
| | | | | Dilution Factor: | 2 |

| CAS Number | Compound | Concentration (ng/g) | Qualifier | EDL (ng/g) | REPORTING LIMIT (ng/g) |
|---|---|---|---|---|---|
| 118-74-1 | Hexachlorobenzene | 0.0184 | J | 0.0034 | 0.48 |
| 319-84-6 | alpha-BHC | 0.047 | U | 0.047 | 0.48 |
| 959-98-8 | Endosulfan I | 0.70 | U | 0.70 | 0.96 |
| 39765-80-5 | trans-Nonachlor | 0.15 | U | 0.15 | 0.48 |
| 53-19-0 | o,p-DDD | 0.80 | U | 0.80 | 0.48 |
| 7421-93-4 | Endrin aldehyde | 0.52 | U | 0.52 | 0.48 |
| 72-55-9 | p,p-DDE | 1.6 | U | 1.6 | 0.48 |
| 60-57-1 | Dieldrin | 0.15 | U | 0.15 | 0.48 |
| 72-20-8 | Endrin | 0.11 | U | 0.11 | 0.48 |
| 33213-65-9 | Endosulfan II | 1.2 | U | 1.2 | 0.96 |
| 319-85-7 | beta-BHC | 0.059 | U | 0.059 | 0.48 |
| 789-02-6 | o,p-DDT | 1.2 | U | 1.2 | 0.48 |
| 72-54-8 | p,p-DDD | 1.2 | U | 1.2 | 0.48 |
| 5103-73-1 | cis-Nonachlor | 0.12 | U | 0.12 | 0.48 |
| 1031-07-8 | Endosulfan sulfate | 0.047 | U | 0.047 | 0.48 |
| 50-29-3 | p,p-DDT | 1.1 | U | 1.1 | 0.48 |
| 72-43-5 | Methoxychlor | 0.064 | J | 0.039 | 0.48 |
| 58-89-9 | Lindane | 0.097 | U | 0.097 | 0.48 |
| 53494-70-5 | Endrin ketone | 0.16 | U | 0.16 | 0.48 |
| 319-86-8 | delta-BHC | 0.088 | J | 0.064 | 0.48 |
| 5103-71-9 | a-Chlordane | 0.037 | U | 0.037 | 0.48 |
| 12789-03-6 | g-Chlordane | 0.035 | U | 0.035 | 0.48 |
| 76-44-8 | Heptachlor | 0.014 | U | 0.014 | 0.48 |
| 309-00-2 | Aldrin | 0.013 | U | 0.013 | 0.48 |
| 1024-57-3 | Heptachlor epoxide | 0.023 | U | 0.023 | 0.48 |
| 26880-48-8 | Oxychlordane | 0.010 | U | 0.010 | 0.48 |
| 3424-82-6 | o,p-DDE | 1.2 | U | 1.2 | 0.48 |

| CAS Number | Surrogate | Recovery (%) | Acceptance Criteria (%) |
|---|---|---|---|
| | 13C10-Chlordane | 69 | 10 - 200 |
| | 13C10-cis Nonachlor | 61 | 10 - 200 |
| | 13C10-Heptachlor Epoxide | 56 | 10 - 200 |
| | 13C10-Heptachlor | 64 | 10 - 200 |
| | 13C10-Mirex | 68 | 10 - 200 |
| | 13C10-Oxychlordane | 52 | 10 - 200 |
| | 13C10-trans Nonachlor | 68 | 10 - 200 |
| | 13C12-Aldrin | 62 | 10 - 200 |
| | 13C12-Dieldrin | 61 | 10 - 200 |
| | 13C12-Endrin Aldehyde | 26 | 10 - 200 |
| | 13C12-Endrin Ketone | 71 | 10 - 200 |
| | 13C12-Endrin | 65 | 10 - 200 |
| | 13C9-Endosulfan I | 67 | 10 - 200 |
| | 13C9-Endosulfan II | 52 | 10 - 200 |
| | 13C-Methoxychlor | 62 | 10 - 200 |
| | 13C-pp-DDD | 54 | 10 - 200 |
| | 13C-pp-DDE | 69 | 10 - 200 |
| | 13C-pp-DDT | 55 | 10 - 200 |
| | 13C6-beta BHC | 73 | 10 - 200 |
| | 13C6-d6-gamma BHC (Lindane) | 80 | 10 - 200 |
| | C13-Hexachlorobenzene | 80 | 10 - 200 |

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## LABORATORY SPIKED BLANK

| | | | | | |
|---|---|---|---|---|---|
| Lab Name | Maxxam Analytics Inc. | | | | |
| Method | USEPA 1699 MOD | | | Lab Sample ID: | B1A8699-2604776S |
| Matrix: | water | | | Project Number: | TASK 23.2.1 |
| Sample wt/vol: | 1.00 | (g/L) | L | Project Name: | CAGED BIVALVE STUDY SPRING 2011 |
| Level (low/med): | low | | | Lab File ID: | M5110907A011 |
| % Moisture: | N/A | Decanted (Y/N): | N | Date Received: | Not applicable |
| Concentrated Extract Volume: | 200 | (uL) | | Date Extracted: | July 25, 2011 |
| Injection Volume: | 1 | (uL) | | Lab Batch: | 2604776 |
| Acid Wash Cleanup (Y/N): | N | pH | Not analyzed | Date Analyzed: | September 7, 2011 |
| Carbon Column Cleanup (Y/N): | N | | | Calib. Ref.: | September 7, 2011 |
| GPC Column Cleanup (Y/N): | N | | | Time Analyzed: | 21:17 |
| | | | | Dilution Factor: | 1 |

| CAS Number | Compound | Concentration (ng/L) | Spike Level (ng/L) | Recovery (%) | Acceptance Criteria (%) |
|---|---|---|---|---|---|
| 1024-57-3 | Heptachlor epoxide | 23.4 | 20.0 | 117 | 50 - 200 |
| 26880-48-8 | Oxychlordane | 20.4 | 20.0 | 102 | 50 - 200 |
| 3424-82-6 | o,p-DDE | 20.4 | 20.0 | 102 | 50 - 200 |
| 5103-71-9 | a-Chlordane | 16.4 | 20.0 | 82 | 50 - 200 |
| 12789-03-6 | g-Chlordane | 20.0 | 20.0 | 100 | 50 - 200 |
| 76-44-8 | Heptachlor | 19.8 | 20.0 | 99 | 50 - 200 |
| 309-00-2 | Aldrin | 17.6 | 20.0 | 88 | 50 - 200 |
| 53-19-0 | o,p-DDD | 26.6 | 20.0 | 133 | 50 - 200 |
| 7421-93-4 | Endrin aldehyde | 35.4 | 20.0 | 177 | 50 - 200 |
| 72-55-9 | p,p-DDE | 19.8 | 20.0 | 99 | 50 - 200 |
| 60-57-1 | Dieldrin | 22.0 | 20.0 | 110 | 50 - 200 |
| 72-20-8 | Endrin | 24.0 | 20.0 | 120 | 50 - 200 |
| 33213-65-9 | Endosulfan II | 52.8 | 40.0 | 132 | 50 - 200 |
| 319-85-7 | beta-BHC | 38.0 | 20.0 | 190 | 50 - 200 |
| 789-02-6 | o,p-DDT | 22.4 | 20.0 | 112 | 50 - 200 |
| 72-54-8 | p,p-DDD | 29.2 | 20.0 | 146 | 50 - 200 |
| 5103-73-1 | cis-Nonachlor | 26.4 | 20.0 | 132 | 50 - 200 |
| 1031-07-8 | Endosulfan sulfate | 32.2 | 20.0 | 161 | 50 - 200 |
| 50-29-3 | p,p-DDT | 19.2 | 20.0 | 96 | 50 - 200 |
| 72-43-5 | Methoxychlor | 27.6 | 20.0 | 138 | 50 - 200 |
| 58-89-9 | Lindane | 29.0 | 20.0 | 145 | 50 - 200 |
| 53494-70-5 | Endrin ketone | 31.8 | 20.0 | 159 | 50 - 200 |
| 319-86-8 | delta-BHC | 35.0 | 20.0 | 175 | 50 - 200 |
| 118-74-1 | Hexachlorobenzene | 138 | 200 | 69 | 50 - 200 |
| 319-84-6 | alpha-BHC | 28.4 | 20.0 | 142 | 50 - 200 |
| 959-98-8 | Endosulfan I | 44.4 | 40.0 | 111 | 50 - 200 |
| 39765-80-5 | trans-Nonachlor | 24.2 | 20.0 | 121 | 50 - 200 |

| CAS Number | Surrogate | Recovery (%) | Acceptance Criteria (%) |
|---|---|---|---|
| | 13C-pp-DDT | 58 | 10 - 200 |
| | 13C6-beta BHC | 78 | 10 - 200 |
| | 13C6-d6-gamma BHC (Lindane) | 80 | 10 - 200 |
| | C13-Hexachlorobenzene | 77 | 10 - 200 |
| | 13C12-Endrin Aldehyde | 55 | 10 - 200 |
| | 13C12-Endrin Ketone | 69 | 10 - 200 |
| | 13C12-Endrin | 70 | 10 - 200 |
| | 13C9-Endosulfan I | 68 | 10 - 200 |
| | 13C9-Endosulfan II | 60 | 10 - 200 |
| | 13C-Methoxychlor | 51 | 10 - 200 |
| | 13C-pp-DDD | 53 | 10 - 200 |
| | 13C-pp-DDE | 75 | 10 - 200 |
| | 13C10-Chlordane | 87 | 10 - 200 |
| | 13C10-cis Nonachlor | 66 | 10 - 200 |
| | 13C10-Heptachlor Epoxide | 57 | 10 - 200 |
| | 13C10-Heptachlor | 55 | 10 - 200 |
| | 13C10-Mirex | 67 | 10 - 200 |
| | 13C10-Oxychlordane | 55 | 10 - 200 |
| | 13C10-trans Nonachlor | 82 | 10 - 200 |

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## LABORATORY SPIKED BLANK

| | | | | | |
|---|---|---|---|---|---|
| Lab Name | Maxxam Analytics Inc. | | | | |
| Method | USEPA 1699 MOD | | | Lab Sample ID: | B1A8699-2604776S |
| Matrix: | water | | | Project Number: | TASK 23.2.1 |
| Sample wt/vol: | 1.00 | (g/L) | L | Project Name: | CAGED BIVALVE STUDY SPRING 2011 |
| Level (low/med): | low | | | Lab File ID: | M5110907A011 |
| % Moisture: | N/A | Decanted (Y/N): | N | Date Received: | Not applicable |
| Concentrated Extract Volume: | 200 | (uL) | | Date Extracted: | July 25, 2011 |
| Injection Volume: | 1 | (uL) | | Lab Batch: | 2604776 |
| Acid Wash Cleanup (Y/N): | N | pH | Not analyzed | Date Analyzed: | September 7, 2011 |
| Carbon Column Cleanup (Y/N): | N | | | Calib. Ref.: | September 7, 2011 |
| GPC Column Cleanup (Y/N): | N | | | Time Analyzed: | 21:17 |
| | | | | Dilution Factor: | 1 |

| CAS Number | Compound | Concentration (%) | Spike Level (%) | Recovery (%) | Acceptance Criteria (%) |
|---|---|---|---|---|---|

| CAS Number | Surrogate | Recovery (%) | Acceptance Criteria (%) |
|---|---|---|---|
| | 13C12-Aldrin | 53 | 10 - 200 |
| | 13C12-Dieldrin | 74 | 10 - 200 |

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## LABORATORY SPIKED BLANK DUPLICATE

| | | | | | |
|---|---|---|---|---|---|
| Lab Name | Maxxam Analytics Inc. | | | | |
| Method | USEPA 1699 MOD | | | Lab Sample ID: | B1A8699-2604776SD |
| Matrix: | water | | | Project Number: | TASK 23.2.1 |
| Sample wt/vol: | 1.00 | (g/L) | L | Project Name: | CAGED BIVALVE STUDY SPRING 2011 |
| Level (low/med): | low | | | Lab File ID: | M5110907A012 |
| % Moisture: | N/A | Decanted (Y/N): | N | Date Received: | Not applicable |
| Concentrated Extract Volume: | 200 | (uL) | | Date Extracted: | July 25, 2011 |
| Injection Volume: | 1 | (uL) | | Lab Batch: | 2604776 |
| Acid Wash Cleanup (Y/N): | N | pH | Not analyzed | Date Analyzed: | September 7, 2011 |
| Carbon Column Cleanup (Y/N): | N | | | Calib. Ref.: | September 7, 2011 |
| GPC Column Cleanup (Y/N): | N | | | Time Analyzed: | 21:56 |
| | | | | Dilution Factor: | 1 |

| CAS Number | Compound | Concentration (ng/L) | Spike Level (ng/L) | Recovery (%) | %RPD (%) | Acceptance Criteria (%) |
|---|---|---|---|---|---|---|
| 39765-80-5 | trans-Nonachlor | 25.0 | 20.0 | 125 | 3.3 | 50 - 200 |
| 959-98-8 | Endosulfan I | 47.6 | 40.0 | 119 | 7.0 | 50 - 200 |
| 319-84-6 | alpha-BHC | 27.6 | 20.0 | 138 | 2.9 | 50 - 200 |
| 118-74-1 | Hexachlorobenzene | 196 | 200 | 98 Q | !! 34.7 | 50 - 200 |
| 319-86-8 | delta-BHC | 30.2 | 20.0 | 151 | 14.7 | 50 - 200 |
| 53494-70-5 | Endrin ketone | 34.8 | 20.0 | 174 | 9.0 | 50 - 200 |
| 58-89-9 | Lindane | 26.4 | 20.0 | 132 | 9.4 | 50 - 200 |
| 72-43-5 | Methoxychlor | 25.8 | 20.0 | 129 | 6.7 | 50 - 200 |
| 50-29-3 | p,p-DDT | 26.4 | 20.0 | 132 Q | !! 31.6 | 50 - 200 |
| 1031-07-8 | Endosulfan sulfate | 26.8 | 20.0 | 134 | 18.3 | 50 - 200 |
| 5103-73-1 | cis-Nonachlor | 28.2 | 20.0 | 141 | 6.6 | 50 - 200 |
| 72-54-8 | p,p-DDD | 26.4 | 20.0 | 132 | 10.1 | 50 - 200 |
| 789-02-6 | o,p-DDT | 28.2 | 20.0 | 141 | 22.9 | 50 - 200 |
| 319-85-7 | beta-BHC | 28.2 | 20.0 | 141 Q | !! 29.6 | 50 - 200 |
| 33213-65-9 | Endosulfan II | 49.6 | 40.0 | 124 | 6.3 | 50 - 200 |
| 72-20-8 | Endrin | 24.8 | 20.0 | 124 | 3.3 | 50 - 200 |
| 60-57-1 | Dieldrin | 22.6 | 20.0 | 113 | 2.7 | 50 - 200 |
| 72-55-9 | p,p-DDE | 23.6 | 20.0 | 118 | 17.5 | 50 - 200 |
| 7421-93-4 | Endrin aldehyde | 28.4 | 20.0 | 142 | 21.9 | 50 - 200 |
| 53-19-0 | o,p-DDD | 26.6 | 20.0 | 133 | 0 | 50 - 200 |
| 309-00-2 | Aldrin | 22.6 | 20.0 | 113 | 24.9 | 50 - 200 |
| 76-44-8 | Heptachlor | 24.6 | 20.0 | 123 | 21.6 | 50 - 200 |
| 12789-03-6 | g-Chlordane | 24.2 | 20.0 | 121 | 19.0 | 50 - 200 |
| 5103-71-9 | a-Chlordane | 23.4 | 20.0 | 117 Q | !! 35.2 | 50 - 200 |
| 3424-82-6 | o,p-DDE | 24.0 | 20.0 | 120 | 16.2 | 50 - 200 |
| 26880-48-8 | Oxychlordane | 22.4 | 20.0 | 112 | 9.3 | 50 - 200 |
| 1024-57-3 | Heptachlor epoxide | 25.6 | 20.0 | 128 | 9.0 | 50 - 200 |

| CAS Number | Surrogate | Recovery (%) | Acceptance Criteria (%) |
|---|---|---|---|
| | C13-Hexachlorobenzene | 74 | 10 - 200 |
| | 13C6-d6-gamma BHC (Lindane) | 76 | 10 - 200 |
| | 13C6-beta BHC | 72 | 10 - 200 |
| | 13C-pp-DDT | 47 | 10 - 200 |
| | 13C-pp-DDE | 70 | 10 - 200 |
| | 13C-pp-DDD | 48 | 10 - 200 |
| | 13C-Methoxychlor | 44 | 10 - 200 |
| | 13C9-Endosulfan II | 52 | 10 - 200 |
| | 13C9-Endosulfan I | 66 | 10 - 200 |
| | 13C12-Endrin | 64 | 10 - 200 |
| | 13C12-Endrin Ketone | 55 | 10 - 200 |
| | 13C12-Endrin Aldehyde | 47 | 10 - 200 |
| | 13C12-Dieldrin | 70 | 10 - 200 |
| | 13C12-Aldrin | 52 | 10 - 200 |
| | 13C10-trans Nonachlor | 73 | 10 - 200 |
| | 13C10-Oxychlordane | 53 | 10 - 200 |
| | 13C10-Mirex | 61 | 10 - 200 |
| | 13C10-Heptachlor | 52 | 10 - 200 |
| | 13C10-Heptachlor Epoxide | 52 | 10 - 200 |

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## LABORATORY SPIKED BLANK DUPLICATE

| | | | | | |
|---|---|---|---|---|---|
| Lab Name | Maxxam Analytics Inc. | | | | |
| Method | USEPA 1699 MOD | | | Lab Sample ID: | B1A8699-2604776SD |
| Matrix: | water | | | Project Number: | TASK 23.2.1 |
| Sample wt/vol: | 1.00 | (g/L) | L | Project Name: | CAGED BIVALVE STUDY SPRING 2011 |
| Level (low/med): | low | | | Lab File ID: | M5110907A012 |
| % Moisture: | N/A | Decanted (Y/N): | N | Date Received: | Not applicable |
| Concentrated Extract Volume: | 200 | (uL) | | Date Extracted: | July 25, 2011 |
| Injection Volume: | 1 | (uL) | | Lab Batch: | 2604776 |
| Acid Wash Cleanup (Y/N): | N | pH | Not analyzed | Date Analyzed: | September 7, 2011 |
| Carbon Column Cleanup (Y/N): | N | | | Calib. Ref.: | September 7, 2011 |
| GPC Column Cleanup (Y/N): | N | | | Time Analyzed: | 21:56 |
| | | | | Dilution Factor: | 1 |

| CAS Number | Compound | Concentration (%) | Spike Level (%) | Recovery (%) | %RPD (%) | Acceptance Criteria (%) |
|---|---|---|---|---|---|---|

| CAS Number | Surrogate | Recovery (%) | Acceptance Criteria (%) |
|---|---|---|---|
| | 13C10-cis Nonachlor | 57 | 10 - 200 |
| | 13C10-Chlordane | 74 | 10 - 200 |

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## LABORATORY SPIKED BLANK

| | | | | | |
|---|---|---|---|---|---|
| Lab Name | Maxxam Analytics Inc. | | | | |
| Method | USEPA 1699 MOD | | | Lab Sample ID: | B1A8699-2604778S |
| Matrix: | tissue | | | Project Number: | TASK 23.2.1 |
| Sample wt/vol: | 10.03 | (g) | g (wet weight) | Project Name: | CAGED BIVALVE STUDY SPRING 2011 |
| Level (low/med): | low | | | Lab File ID: | M5110907A017 |
| % Moisture: | N/A | Decanted (Y/N): | N | Date Received: | Not applicable |
| Concentrated Extract Volume: | 1000 | (uL) | | Date Extracted: | August 24, 2011 |
| Injection Volume: | 1 | (uL) | | Lab Batch: | 2604778 |
| Acid Wash Cleanup (Y/N): | N | pH | Not analyzed | Date Analyzed: | September 8, 2011 |
| Carbon Column Cleanup (Y/N): | N | | | Calib. Ref.: | September 7, 2011 |
| GPC Column Cleanup (Y/N): | Y | | | Time Analyzed: | 01:13 |
| | | | | Dilution Factor: | 2 |

| CAS Number | Compound | Concentration (ng/g) | Spike Level (ng/g) | Recovery (%) | Acceptance Criteria (%) |
|---|---|---|---|---|---|
| 118-74-1 | Hexachlorobenzene | 200 | 200 | 100 | 50 - 200 |
| 319-84-6 | alpha-BHC | 19.1 | 20.0 | 95 | 50 - 200 |
| 959-98-8 | Endosulfan I | 35.5 | 40.0 | 89 | 50 - 200 |
| 39765-80-5 | trans-Nonachlor | 17.4 | 20.0 | 87 | 50 - 200 |
| 53-19-0 | o,p-DDD | 18.3 | 20.0 | 91 | 50 - 200 |
| 7421-93-4 | Endrin aldehyde | 17.7 | 20.0 | 89 | 50 - 200 |
| 72-55-9 | p,p-DDE | 19.0 | 20.0 | 95 | 50 - 200 |
| 60-57-1 | Dieldrin | 18.2 | 20.0 | 91 | 50 - 200 |
| 72-20-8 | Endrin | 16.8 | 20.0 | 84 | 50 - 200 |
| 33213-65-9 | Endosulfan II | 37.2 | 40.0 | 93 | 50 - 200 |
| 319-85-7 | beta-BHC | 19.1 | 20.0 | 95 | 50 - 200 |
| 789-02-6 | o,p-DDT | 20.7 | 20.0 | 103 | 50 - 200 |
| 72-54-8 | p,p-DDD | 18.8 | 20.0 | 94 | 50 - 200 |
| 5103-73-1 | cis-Nonachlor | 20.3 | 20.0 | 101 | 50 - 200 |
| 1031-07-8 | Endosulfan sulfate | 20.8 | 20.0 | 104 | 50 - 200 |
| 50-29-3 | p,p-DDT | 16.7 | 20.0 | 83 | 50 - 200 |
| 72-43-5 | Methoxychlor | 19.6 | 20.0 | 98 | 50 - 200 |
| 58-89-9 | Lindane | 18.7 | 20.0 | 94 | 50 - 200 |
| 53494-70-5 | Endrin ketone | 18.8 | 20.0 | 94 | 50 - 200 |
| 319-86-8 | delta-BHC | 18.2 | 20.0 | 91 | 50 - 200 |
| 5103-71-9 | a-Chlordane | 16.3 | 20.0 | 81 | 50 - 200 |
| 12789-03-6 | g-Chlordane | 19.3 | 20.0 | 96 | 50 - 200 |
| 76-44-8 | Heptachlor | 18.5 | 20.0 | 93 | 50 - 200 |
| 309-00-2 | Aldrin | 19.2 | 20.0 | 96 | 50 - 200 |
| 1024-57-3 | Heptachlor epoxide | 19.3 | 20.0 | 96 | 50 - 200 |
| 26880-48-8 | Oxychlordane | 20.8 | 20.0 | 104 | 50 - 200 |
| 3424-82-6 | o,p-DDE | 20.0 | 20.0 | 100 | 50 - 200 |

| CAS Number | Surrogate | Recovery (%) | Acceptance Criteria (%) |
|---|---|---|---|
| | 13C10-Chlordane | 78 | 10 - 200 |
| | 13C10-cis Nonachlor | 72 | 10 - 200 |
| | 13C10-Heptachlor Epoxide | 59 | 10 - 200 |
| | 13C10-Heptachlor | 67 | 10 - 200 |
| | 13C10-Mirex | 79 | 10 - 200 |
| | 13C10-Oxychlordane | 59 | 10 - 200 |
| | 13C10-trans Nonachlor | 91 | 10 - 200 |
| | 13C12-Aldrin | 64 | 10 - 200 |
| | 13C12-Dieldrin | 71 | 10 - 200 |
| | 13C12-Endrin Aldehyde | 34 | 10 - 200 |
| | 13C12-Endrin Ketone | 85 | 10 - 200 |
| | 13C12-Endrin | 78 | 10 - 200 |
| | 13C9-Endosulfan I | 72 | 10 - 200 |
| | 13C9-Endosulfan II | 64 | 10 - 200 |
| | 13C-Methoxychlor | 71 | 10 - 200 |
| | 13C-pp-DDD | 64 | 10 - 200 |
| | 13C-pp-DDE | 77 | 10 - 200 |
| | 13C-pp-DDT | 66 | 10 - 200 |
| | 13C6-beta BHC | 77 | 10 - 200 |

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## LABORATORY SPIKED BLANK

| | | | | | |
|---|---|---|---|---|---|
| Lab Name | Maxxam Analytics Inc. | | | | |
| Method | USEPA 1699 MOD | | | Lab Sample ID: | B1A8699-2604778S |
| Matrix: | tissue | | | Project Number: | TASK 23.2.1 |
| Sample wt/vol: | 10.03 | (g) | g (wet weight) | Project Name: | CAGED BIVALVE STUDY SPRING 2011 |
| Level (low/med): | low | | | Lab File ID: | M5110907A017 |
| % Moisture: | N/A | Decanted (Y/N): | N | Date Received: | Not applicable |
| Concentrated Extract Volume: | 1000 | (uL) | | Date Extracted: | August 24, 2011 |
| Injection Volume: | 1 | (uL) | | Lab Batch: | 2604778 |
| Acid Wash Cleanup (Y/N): | N | pH | Not analyzed | Date Analyzed: | September 8, 2011 |
| Carbon Column Cleanup (Y/N): | N | | | Calib. Ref.: | September 7, 2011 |
| GPC Column Cleanup (Y/N): | Y | | | Time Analyzed: | 01:13 |
| | | | | Dilution Factor: | 2 |

| CAS Number | Compound | Concentration (%) | Spike Level (%) | Recovery (%) | Acceptance Criteria (%) |
|---|---|---|---|---|---|

| CAS Number | Surrogate | Recovery (%) | Acceptance Criteria (%) |
|---|---|---|---|
| | 13C6-d6-gamma BHC (Lindane) | 83 | 10 - 200 |
| | C13-Hexachlorobenzene | 78 | 10 - 200 |

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## LABORATORY QC STANDARD

| | | | | | |
|---|---|---|---|---|---|
| Lab Name | Maxxam Analytics Inc. | | | | |
| Method | USEPA 1699 MOD | | | Lab Sample ID: | B1A8699-2604778T |
| Matrix: | tissue | | | Project Number: | TASK 23.2.1 |
| Sample wt/vol: | 9.77 | (g) | g (wet weight) | Project Name: | CAGED BIVALVE STUDY SPRING 2011 |
| Level (low/med): | low | | | Lab File ID: | M5110907A019 |
| % Moisture: | N/A | Decanted (Y/N): | N | Date Received: | Not applicable |
| Concentrated Extract Volume: | 1000 | (uL) | | Date Extracted: | August 24, 2011 |
| Injection Volume: | 1 | (uL) | | Lab Batch: | 2604778 |
| Acid Wash Cleanup (Y/N): | N | pH | Not analyzed | Date Analyzed: | September 8, 2011 |
| Carbon Column Cleanup (Y/N): | N | | | Calib. Ref.: | September 7, 2011 |
| GPC Column Cleanup (Y/N): | Y | | | Time Analyzed: | 02:31 |
| | | | | Dilution Factor: | 2 |

| CAS Number | Compound | Concentration (ng/g) | Spike Level (ng/g) | Recovery (%) | Acceptance Criteria (%) |
|---|---|---|---|---|---|
| 39765-80-5 | trans-Nonachlor | 1.12 | 1.30 | 86 | 50 - 200 |
| 53-19-0 | o,p-DDD | 1.01 | 1.09 | 93 | 50 - 200 |
| 72-55-9 | p,p-DDE | 3.89 | 4.15 | 94 | 50 - 200 |
| 60-57-1 | Dieldrin | 0.483 | 0.620 | 78 | 20 - 200 |
| 789-02-6 | o,p-DDT | | 0.894 | 0 Q | 50 - 200 |
| 72-54-8 | p,p-DDD | 2.98 | 3.34 | 89 | 50 - 200 |
| 5103-73-1 | cis-Nonachlor | 0.474 | 0.640 | 74 | 50 - 200 |
| 50-29-3 | p,p-DDT | | 0.396 | 0 Q | 50 - 200 |
| 5103-71-9 | a-Chlordane | 0.979 | 1.36 | 72 | 50 - 200 |
| 12789-03-6 | g-Chlordane | 0.961 | 1.14 | 84 | 50 - 200 |
| 76-44-8 | Heptachlor | 0.0277 | 0.212 | 13 Q | 50 - 200 |
| 26880-48-8 | Oxychlordane | 0.0839 | 0.362 | 23 Q | 50 - 200 |
| 3424-82-6 | o,p-DDE | | 0.336 | 0 Q | 50 - 200 |

| CAS Number | Surrogate | Recovery (%) | Acceptance Criteria (%) |
|---|---|---|---|
| | 13C10-Chlordane | 57 | 10 - 200 |
| | 13C10-cis Nonachlor | 36 | 10 - 200 |
| | 13C10-Heptachlor Epoxide | 78 | 10 - 200 |
| | 13C10-Heptachlor | 61 | 10 - 200 |
| | 13C10-Mirex | 60 | 10 - 200 |
| | 13C10-Oxychlordane | 86 | 10 - 200 |
| | 13C10-trans Nonachlor | 54 | 10 - 200 |
| | 13C12-Aldrin | 78 | 10 - 200 |
| | 13C12-Dieldrin | 42 | 10 - 200 |
| | 13C12-Endrin Aldehyde | 29 | 10 - 200 |
| | 13C12-Endrin Ketone | 76 | 10 - 200 |
| | 13C12-Endrin | 38 | 10 - 200 |
| | 13C9-Endosulfan I | 30 | 10 - 200 |
| | 13C9-Endosulfan II | 34 | 10 - 200 |
| | 13C-Methoxychlor | 49 | 10 - 200 |
| | 13C-pp-DDD | 40 | 10 - 200 |
| | 13C-pp-DDE | 59 | 10 - 200 |
| | 13C-pp-DDT | 31 | 10 - 200 |
| | 13C6-beta BHC | 73 | 10 - 200 |
| | 13C6-d6-gamma BHC (Lindane) | 79 | 10 - 200 |
| | C13-Hexachlorobenzene | 82 | 10 - 200 |

**GENERAL COMMENTS**

OC Pesticides Rinsate Analysis: As per the client's permission and to avoid holding time issues, the rinsate water was spiked with old standards that had just expired. The expired standards were used as the new ones were not yet available from the supplier.

**Results relate only to the items tested.**

# Notification Log

Maxxam Job #: B1A8699
Report Date: 2011/10/03

SNC-Lavalin Inc. Environment Division
PROJECT #: TASK 23.2.1
Site: CAGED BIVALVE STUDY SPRING 2011

No Reportable Exceedences Noted.

# APPENDIX N. FULL LABORATORY DATA REPORTS (ON CD)

# APPENDIX O. DATA VALIDATION REPORTS

# Butyltins

**LABORATORY DATA CONSULTANTS, INC.**
7750 El Camino Real, Suite 2L Carlsbad, CA 92009 Phone: 760/634-0437 Fax: 760/634-0439

Windward Environmental, LLC
200 West Mercer Street, Suite 401
Seattle, WA 98119
ATTN: Ms. Jennifer Parker

September 28, 2011

SUBJECT: Lower Passaic River Restoration Project, Data Validation

Dear Ms. Parker,

Enclosed are the final validation reports for the fractions listed below. These SDGs were received on September 12, 2011. Attachment 1 is a summary of the samples that were reviewed for each analysis.

**LDC Project # 26203:**

| SDG # | Fraction |
|---|---|
| K1106643 | Metals, Butyltins |
| A3380 | Polychlorinated Biphenyls as Congeners Dioxins/Dibenzofurans |

The data validation was performed under EPA Level III/IV guidelines. The analyses were validated using the following documents, as applicable to each method:

- Final Surface Sediment Chemical Analyses and Benthic Invertebrate Toxicity and Bioaccumulation Testing Quality Assurance Project Plan (QAPP) for the Lower Passaic River Restoration Project, October 2009
- Caged Bivalve Study Addendum, March 2011
- USEPA Region II Validation SOP HW-2, (Revision 13, September 2006) for Metals
- USEPA, Contract Laboratory Program National Functional Guidelines for Inorganic Data Review, October 2004
- USEPA, Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review, June 2008
- USEPA Region II Validation SOP HW-25, (Revision 3, September 2006) forTetra-through Octochlorinated Dioxins and Furans by Isotope Dilution, modified as necessary to accommodate the QAPP criteria
- USEPA Region II Validation SOP HW-46, (Revision 1, September 2008) for Chlorinated Biphenyls Congeners in Water, Soil, Sediment, and Tissue, modified as necessary to accommodate the QAPP criteria

Please feel free to contact us if you have any questions.

Sincerely,

Stella S. Cuenco
Data Validation Operations Manager/Senior Chemist

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DL/CD 1555 Pages

Attachment 1

EDD

# LDC #26203 (Windward Environmental, LLC - Seattle WA / Lower Passaic River Restoration Project)

PO# 2011-0012

| LDC | SDG# | DATE REC'D | (3) DATE DUE | Pest. (1699M) | | PCB Cong (1668B) | | Dioxin (1613B) | | Butyltin (Krone) | | Metals (6010B) | | Metals (6020) | | Se (7742) | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Matrix: | Water/Tissue | | | W | T | W | T | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S |
| A | K1106643 | 09/12/11 | 10/03/11 | - | - | - | - | - | - | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | | | | | | | | | | | | | | | | | | |
| B | A3380 | 09/12/11 | 10/03/11 | - | - | 1 | 0 | 1 | 0 | - | - | - | - | - | - | - | - | | | | | | | | | | | | | | | | | | |
| C | B1A8699 | 09/12/11 | 10/03/11 | 1 | 10 | - | - | - | - | - | - | - | - | - | - | - | - | | | | | | | | | | | | | | | | | | |
| Total | A/SC | | | 1 | 10 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 17 |

For Internal Use Only: Shaded cells indicate Level IV validation (all other cells are Level III validation). These sample counts do not include MS/MSD

26203ST.wpd

# Laboratory Data Consultants, Inc.
# Data Validation Report

| | |
|---|---|
| **Project/Site Name:** | Lower Passaic River Restoration Project |
| **Collection Date:** | July 18, 2010 |
| **LDC Report Date:** | September 27, 2011 |
| **Matrix:** | Water |
| **Parameters:** | Butyltins |
| **Validation Level:** | EPA Level III |
| **Laboratory:** | Columbia Analytical Services, Inc. |
| **Sample Delivery Group (SDG):** | K1106643 |

**Sample Identification**

LPR-071811-RB

## Introduction

This data review covers one water sample listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per the Krone Method for Butyltins.

This review follows the Final Surface Sediment Chemical Analyses and Benthic Invertebrate Toxicity and Bioaccumulation Testing Quality Assurance Project Plan (QAPP) for the Lower Passaic River Restoration Project, (October 8, 2009), the Caged Bivalve Study Addendum (March 2, 2011) and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

NJ Presumptive evidence of presence of the compound at an estimated quantity.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

## I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

## II. Initial Calibration

Initial calibration of compounds was performed for the primary (quantitation) column as required by the method. Initial calibration of compounds requiring confirmation was performed for the confirmation column as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 20.0% .

In the case where the laboratory used a calibration curve to evaluate the compounds, all coefficients of determination ($r^2$) were greater than or equal to 0.990 .

## III. Calibration Verification

Calibration verification was performed at the required frequencies.

The percent differences (%D) of continuing standard mixtures were within the 25.0% QC limits.

The percent difference (%D) of the second source calibration standard were less than or equal to 25.0% for all compounds.

## IV. Blanks

Method blanks were reviewed for each matrix as applicable. No butyltin contaminants were found in the method blanks.

Sample LPR-071811-RB was identified as a rinsate blank. No butyltin contaminants were found in this blank.

## V. Surrogate Recovery

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

## VI. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there was insufficient sample volume for analysis of the matrix spike and matrix spike duplicate.

## VII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

## VIII. Target Compound Identification

Raw data were not reviewed for this SDG.

## IX. Compound Quantitation and RLs

Raw data were not reviewed for this SDG.

## X. System Performance

Raw data were not reviewed for this SDG.

## XI. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

## XII. Field Duplicates

No field duplicates were identified in this SDG.

LDC #: 26203A19 **VALIDATION COMPLETENESS WORKSHEET** Date: 9/16/11

SDG #: K1106643 Level III Page: 1 of 1

Laboratory: Columbia Analytical Services Reviewer: SC

2nd Reviewer: [illegible]

**METHOD:** GC Butyltins (Krone Method)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

| | Validation Area | | Comments |
|---|---|---|---|
| I. | Technical holding times | A | Sampling dates: 7/18/11 |
| IIa. | Initial calibration | A | %RSD ≤ 20, r² |
| IIb. | Calibration verification/ICV | A | ccv/icv ≤ 25 |
| III. | Blanks | A | |
| IVa. | Surrogate recovery | A | |
| IVb. | Matrix spike/Matrix spike duplicates | N | insuf. sample |
| IVc. | Laboratory control samples | A | LCS/D |
| V. | Target compound identification | N | |
| VI. | Compound Quantitation and CRQLs | N | |
| VII. | System Performance | N | |
| VIII. | Overall assessment of data | A | |
| IX. | Field duplicates | N | |
| X. | Field blanks | ND | RB = 1 |

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples:

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1 | LPR-071811-RB W | 11 | | 21 | | 31 | |
| 2 | | 12 | | 22 | | 32 | |
| 3 | | 13 | | 23 | | 33 | |
| 4 | | 14 | | 24 | | 34 | |
| 5 | | 15 | | 25 | | 35 | |
| 6 | | 16 | | 26 | | 36 | |
| 7 | | 17 | | 27 | | 37 | |
| 8 | | 18 | | 28 | | 38 | |
| 9 | | 19 | | 29 | | 39 | |
| 10 | | 20 | | 30 | | 40 | |

Notes:

**LABORATORY DATA CONSULTANTS, INC.**
7750 El Camino Real, Suite 2L Carlsbad, CA 92009 Phone: 760/634-0437 Fax: 760/634-0439

Windward Environmental, LLC
200 West Mercer Street, Suite 401
Seattle, WA 98119
ATTN: Ms. Jennifer Parker

October 6, 2011

SUBJECT: Lower Passaic River Restoration Project, Data Validation

Dear Ms. Parker,

Enclosed are the final validation reports for the fractions listed below. These SDGs were received on September 19, 2011. Attachment 1 is a summary of the samples that were reviewed for each analysis.

**LDC Project # 26278:**

| SDG # | Fraction |
|---|---|
| 1132006 | Mercury & Methyl Mercury |
| K1107026 | Metals, Percent Lipids, Butyltins |

The data validation was performed under EPA Level IV guidelines. The analyses were validated using the following documents, as applicable to each method:

- Final Surface Sediment Chemical Analyses and Benthic Invertebrate Toxicity and Bioaccumulation Testing Quality Assurance Project Plan (QAPP) for the Lower Passaic River Restoration Project, October 2009
- Caged Bivalve Study Addendum, March 2011
- USEPA Region II Validation SOP HW-2, (Revision 13, September 2006) for Metals, modified as necessary to accommodate the QAPP criteria
- USEPA, Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review, June 2008
- USEPA, Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review, January 2010

Please feel free to contact us if you have any questions.

Sincerely,

Stella Cuenco

Stella S. Cuenco
Data Validation Operations Manager/Senior Chemist

L:\Windward\Passaic\26278COV.wpd

Attachment 1

| EDD | LDC #26278 (Windward Environmental, LLC - Seattle WA / Lower Passaic River Restoration Project) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | PO# 2011-0012 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LDC | SDG# | DATE REC'D | (3) DATE DUE | Hg (1631) | | Methyl Hg (1630) | | Metals (SW846) | | Se (7742) | | Lipids (B&D) | | Butyltin (KRONE) | | | | | | | | | | | | | | | | | | | | | | |
| Matrix: Water/Tissue | | | | W | T | W | T | W | T | W | T | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S |
| A | 1132006 | 09/19/11 | 10/10/11 | 0 | 11 | 0 | 11 | - | - | - | - | - | - | - | - | | | | | | | | | | | | | | | | | | | | | |
| B | K1107026 | 09/19/11 | 10/10/11 | - | - | - | - | 0 | 10 | 0 | 10 | 0 | 10 | 0 | 10 | | | | | | | | | | | | | | | | | | | | | |
| Total | A/SC | | | 0 | 11 | 0 | 11 | 0 | 10 | 0 | 10 | 0 | 10 | 0 | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 62 |

For Internal Use Only: Shaded cells indicate Level IV validation (all other cells are Level III validation). These sample counts do not include MS/MSD, and DUPs

26278ST.wpd

**LDC Report#** 26278B19

# Laboratory Data Consultants, Inc.
# Data Validation Report

| | |
|---|---|
| **Project/Site Name:** | Lower Passaic River Restoration Project |
| **Collection Date:** | March 8 through June 8, 2011 |
| **LDC Report Date:** | October 10, 2011 |
| **Matrix:** | Tissue |
| **Parameters:** | Butyltins |
| **Validation Level:** | EPA Level IV |
| **Laboratory:** | Columbia Analytical Services, Inc. |
| **Sample Delivery Group (SDG):** | K1107026 |

**Sample Identification**

LPR6-ECST-Comp01
LPRBG-ECST-Comp01
LPR6-ECST-Comp02
LPR7-ECST-Comp03
LPR7-ECST-Comp04
LPR8-ECST-Comp05
LPR1-GDST-Comp01
LPRBG-GDST-Comp01
LPR2-GDST-Comp02
LPR3-GDST-Comp03
LPR6-ECST-Comp02MS
LPR6-ECST-Comp02MSD

## Introduction

This data review covers 12 tissue samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per the Krone Method for Butyltins.

This review follows the Final Fish and Decapod Crustacean Tissue Collection for Chemical Analysis and Fish Community Survey Quality Assurance Project Plan (QAPP) for the Lower Passaic River Restoration Project, Lower Passaic River Study Area RI/FS (August 6, 2009), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

NJ Presumptive evidence of presence of the compound at an estimated quantity.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

## I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

## II. Initial Calibration

Initial calibration of compounds was performed for the primary (quantitation) column as required by the method. Initial calibration of compounds requiring confirmation was performed for the confirmation column as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 20.0% for all compounds.

In the case where the laboratory used a calibration curve to evaluate the compounds, all coefficients of determination ($r^2$) were greater than or equal to 0.990 .

## III. Calibration Verification

Calibration verification was performed at the required frequencies.

The percent differences (%D) of continuing standard mixtures were within the 25.0% QC limits.

The percent difference (%D) of the second source calibration standard were less than or equal to 25.0% for all compounds.

## IV. Blanks

Method blanks were reviewed for each matrix as applicable. No butyltin contaminants were found in the method blanks with the following exceptions:

| Method Blank ID | Extraction Date | Compound | Concentration | Associated Samples |
|---|---|---|---|---|
| KWG1108300-4 | 8/22/11 | n-Butyltin cation | 0.23 ug/Kg | All samples in SDG K1107026 |

Sample concentrations were compared to concentrations detected in the method blanks. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated method blanks with the following exceptions:

| Sample | Compound | Reported Concentration | Modified Final Concentration |
|---|---|---|---|
| LPR6-ECST-Comp02 | n-Butyltin cation | 1.0 ug/Kg | 1.0U ug/Kg |

| Sample | Compound | Reported Concentration | Modified Final Concentration |
|---|---|---|---|
| LPR8-ECST-Comp05 | n-Butyltin cation | 0.20 ug/Kg | 1.0U ug/Kg |
| LPR3-GDST-Comp03 | n-Butyltin cation | 0.87 ug/Kg | 1.0U ug/Kg |

Sample LPR-071811-RB (from SDG K1106643) was identified as a rinsate blank. No butyltin contaminants were found in this blank.

## V. Surrogate Recovery

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

## VI. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

## VII. Laboratory Control Samples (LCS) and Standard Reference Material (SRM) Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

The percent differences (%D) of the standard reference material (SRM) were within the QC limits for all compounds with the following exceptions:

| SRM ID | Compound | %D (Limits) | Associated Samples | Flag | A or P |
|---|---|---|---|---|---|
| SRM ERM 477 | Di-n-butyltin cation | 25.3 (≤25) | All samples in SDG K1107026 | J (all detects)<br>UJ (all non-detects) | A |

## VIII. Target Compound Identification

All target compound identifications were within validation criteria.

## IX. Compound Quantitation and RLs

All compound quantitation and CRQLs were within validation criteria.

The sample results for detected compounds from the two columns were within 25% relative percent difference (RPD) with the following exceptions:

| Sample | Compound | RPD | Flag | A or P |
|---|---|---|---|---|
| LPR7-ECST-Comp03 | Di-n-butyltin cation | 66.7 | J (all detects) | A |
| LPR8-ECST-Comp05 | Tri-n-butyltin cation<br>Di-n-butyltin cation<br>n-Butyltin cation | 31.6<br>70.4<br>33.3 | J (all detects)<br>J (all detects)<br>J (all detects) | A |
| LPR1-GDST-Comp01 | Tri-n-butyltin cation<br>Di-n-butyltin cation | 43.5<br>29.9 | J (all detects)<br>J (all detects) | A |
| LPRBG-GDST-Comp01 | Di-n-butyltin cation | 69.6 | J (all detects) | A |
| LPR2-GDST-Comp02 | Di-n-butyltin cation | 87.0 | J (all detects) | A |
| LPR3-GDST-Comp03 | Di-n-butyltin cation | 69.2 | J (all detects) | A |

## X. System Performance

The system performance was acceptable.

## XI. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

## XII. Field Duplicates

No field duplicates were identified in this SDG.

## Lower Passaic River Restoration Project
## Butyltins - Data Qualification Summary - SDG K1107026

| SDG | Sample | Compound | Flag | A or P | Reason |
|---|---|---|---|---|---|
| K1107026 | LPR6-ECST-Comp01<br>LPRBG-ECST-Comp01<br>LPR6-ECST-Comp02<br>LPR7-ECST-Comp03<br>LPR7-ECST-Comp04<br>LPR8-ECST-Comp05<br>LPR1-GDST-Comp01<br>LPRBG-GDST-Comp01<br>LPR2-GDST-Comp02<br>LPR3-GDST-Comp03 | Di-n-butyltin cation | J (all detects)<br>UJ (all non-detects) | A | Standard reference material (%D) |
| K1107026 | LPR7-ECST-Comp03<br>LPRBG-GDST-Comp01<br>LPR2-GDST-Comp02<br>LPR3-GDST-Comp03 | Di-n-butyltin cation | J (all detects) | A | Compound quantitation and RLs (RPD) |
| K1107026 | LPR8-ECST-Comp05 | Tri-n-butyltin cation<br>Di-n-butyltin cation<br>n-Butyltin cation | J (all detects)<br>J (all detects)<br>J (all detects) | A | Compound quantitation and RLs (RPD) |
| K1107026 | LPR1-GDST-Comp01 | Tri-n-butyltin cation<br>Di-n-butyltin cation | J (all detects)<br>J (all detects) | A | Compound quantitation and RLs (RPD) |

## Lower Passaic River Restoration Project
## Butyltins - Laboratory Blank Data Qualification Summary - SDG K1107026

| SDG | Sample | Compound | Modified Final Concentration | A or P |
|---|---|---|---|---|
| K1107026 | LPR6-ECST-Comp02 | n-Butyltin cation | 1.0U ug/Kg | A |
| K1107026 | LPR8-ECST-Comp05 | n-Butyltin cation | 1.0U ug/Kg | A |
| K1107026 | LPR3-GDST-Comp03 | n-Butyltin cation | 1.0U ug/Kg | A |

## Lower Passaic River Restoration Project
## Butyltins - Field Blank Data Qualification Summary - SDG K1107026

No Sample Data Qualified in this SDG

LDC #: 26278B19 **VALIDATION COMPLETENESS WORKSHEET** Date: 9/28/11
SDG #: K1107026 Level IV Page: 1 of 1
Laboratory: Columbia Analytical Services Reviewer: [illegible]
2nd Reviewer: [illegible]

**METHOD:** GC Butyltins (Krone Method)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

| | Validation Area | | Comments |
|---|---|---|---|
| I. | Technical holding times | A | Sampling dates: 3/8-6/8/11 |
| IIa. | Initial calibration | A | RSD ≤ 20, r2 |
| IIb. | Calibration verification/ICV | A | CCV/ICV ≤ 25 |
| III. | Blanks | SW | |
| IVa. | Surrogate recovery | A | |
| IVb. | Matrix spike/Matrix spike duplicates | A | |
| IVc. | Laboratory control samples | SW | LCS, SRM |
| V. | Target compound identification | A | |
| VI. | Compound Quantitation/RLs | SW | |
| VII. | System Performance | A | |
| VIII. | Overall assessment of data | A | |
| IX. | Field duplicates | N | |
| X. | Field blanks | ND | RB= LPR-071811-RB (K1106643) |

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: Tissue

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1 | LPR6-ECST-Comp01 | 11 | LPR6-ECST-Comp02MS | 21 | | 31 | |
| 2 | LPRBG-ECST-Comp01 | 12 | LPR6-ECST-Comp02MSD | 22 | | 32 | |
| 3 | LPR6-ECST-Comp02 | 13 | | 23 | | 33 | |
| 4 | LPR7-ECST-Comp03 | 14 | | 24 | | 34 | |
| 5 | LPR7-ECST-Comp04 | 15 | | 25 | | 35 | |
| 6 | LPR8-ECST-Comp05 | 16 | | 26 | | 36 | |
| 7 | LPR1-GDST-Comp01 | 17 | | 27 | | 37 | |
| 8 | LPRBG-GDST-Comp01 | 18 | | 28 | | 38 | |
| 9 | LPR2-GDST-Comp02 | 19 | | 29 | | 39 | |
| 10 | LPR3-GDST-Comp03 | 20 | | 30 | | 40 | |

Notes:

LDC #: 26278B19

# VALIDATION FINDINGS CHECKLIST


Reviewer: R
2nd Reviewer: Q

**Method:** ✓ GC ____ HPLC

| Validation Area | Yes | No | NA | Findings/Comments |
|---|---|---|---|---|
| I. Technical holding times | | | | |
| All technical holding times were met. | ✓ | | | |
| Cooler temperature criteria was met. | ✓ | | | |
| II. Initial calibration | | | | |
| Did the laboratory perform a 5 point calibration prior to sample analysis? | ✓ | | | |
| Were all percent relative standard deviations (%RSD) ≤ 20%? | ✓ | | | |
| Was a curve fit used for evaluation? | ✓ | | | |
| Did the initial calibration meet the curve fit acceptance criteria of ≥ 0.990? | ✓ | | | |
| Were the RT windows properly established? | ✓ | | | |
| IV. Continuing calibration | | | | |
| Was a continuing calibration analyzed daily? | ✓ | | | |
| Were all percent differences (%D) ≤ ~~15.0% or ≤ 20.0%~~ 25% ? | ✓ | | | |
| Were all the retention times within the acceptance windows? | ✓ | | | |
| V. Blanks | | | | |
| Was a method blank associated with every sample in this SDG? | ✓ | | | |
| Was a method blank analyzed for each matrix and concentration? | ✓ | | | |
| Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet. | ✓ | | | |
| VI. Surrogate spikes | | | | |
| Were all surrogate %R within the QC limits? | ✓ | | | |
| If the percent recovery (%R) for one or more surrogates was out of QC limits, was a reanalysis performed to confirm samples with %R outside of criteria? | | | ✓ | |
| VII. Matrix spike/Matrix spike duplicates | | | | |
| Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water. | ✓ | | | |
| Was a MS/MSD analyzed every 20 samples of each matrix? | ✓ | | | |
| Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits? | ✓ | | | |
| VIII. Laboratory control samples | | | | |
| Was an LCS analyzed for this SDG? | ✓ | | | |
| Was an LCS analyzed per extraction batch? | ✓ | | | |
| Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits? | ✓ | | | |
| IX. Regional Quality Assurance and Quality Control | | | | |
| Were performance evaluation (PE) samples performed? | | | ✓ | |
| Were the performance evaluation (PE) samples within the acceptance limits? | | | ✓ | |

LDC #: 26278B19

# VALIDATION FINDINGS CHECKLIST


Reviewer: 8
2nd Reviewer: 

| Validation Area | Yes | No | NA | Findings/Comments |
|---|---|---|---|---|
| X. Target compound identification | | | | |
| Were the retention times of reported detects within the RT windows? | ✓ | | | |
| XI. Compound quantitation/CRQLs | | | | |
| Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation? | ✓ | | | |
| XII. System performance | | | | |
| System performance was found to be acceptable. | ✓ | | | |
| XIII. Overall assessment of data | | | | |
| Overall assessment of data was found to be acceptable. | ✓ | | | |
| XIV. Field duplicates | | | | |
| Field duplicate pairs were identified in this SDG. | | ✓ | | |
| Target compounds were detected in the field duplicates. | | | ✓ | |
| XV. Field blanks | | | | |
| Field blanks were identified in this SDG. | ✓ | | | |
| Target compounds were detected in the field blanks. | | ✓ | | |

LDC #: 26278B19

# VALIDATION FINDINGS WORKSHEET
## Blanks


Reviewer: n
2nd Reviewer: 9

**METHOD:** ✓ GC __ HPLC (EPA_____)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were all samples associated with a given method blank?
Y N N/A Was a method blank performed for each matrix and whenever a sample extraction procedure was performed?
Y N N/A Was a method blank performed with each extraction batch?
Y N N/A Were any contaminants found in the method blanks? If yes, please see findings below.

**Blank extraction date:** 8/22/11 **Blank analysis date:** 8/27/11 **Associated samples:** All

**Conc. units:** ug/kg

| Compound | Blank ID | Sample Identification | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | KWG1108300-4 | 3 | 6 | 10 | | | | | | |
| n-Butyltin Cation | 0.23 | 1.0/U | 0.20/1.0U | 0.87/1.0U | | | | | | |
| | | | | | | | | | | |
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**Blank extraction date:**_____ **Blank analysis date:**_____ **Associated samples:**_____

**Conc. units:**_____

| Compound | Blank ID | Sample Identification | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
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ALL CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
All contaminants within five times the method blank concentration were qualified as not detected, "U".

LDC #: 26278B19

# VALIDATION FINDINGS WORKSHEET
## Laboratory Control Samples (LCS)

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

**METHOD:** ✓ GC __ HPLC

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were a laboratory control samples (LCS) and laboratory control sample duplicate (LCSD) analyzed for each matrix in this SDG? _____

Y N N/A Was a blank spike analyzed for each matrix or whenever a sample extraction was performed?

Y N N/A Were the blank spike percent recoveries (%R) and relative percent differences (RPD) within the QC limits?

| # | Date | LCS/LCSD ID | Compound | LCS %R (Limits) | LCSD %R (Limits) | RPD (Limits) | Associated Samples | Qualifications |
|---|---|---|---|---|---|---|---|---|
| | | ERM 477 (SRM) | Dibutyltin cation | %D 25.3 (≤25) | ( ) | ( ) | All | J/UJ/A |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
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LDC #: 26278B19

# VALIDATION FINDINGS WORKSHEET
## Compound Quantitation and Reported CRQLs


Reviewer: [illegible]
2nd Reviewer: [illegible]

**METHOD:** ✓ GC

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".
Y (N) N/A Did the relative percent difference of detected compounds between two columns./detectors ≤25%?

| # | Compound Name | Sample ID | %RPD Between Two Columns/Detectors Limit (≤ 25%) | Qualifications |
|---|---|---|---|---|
| | Di-n-butyltin cation | 4 | 66.7 | Jdets /A |
| | | | | |
| | Tri-n-butyltin cation | 6 | 31.6 | |
| | Di-n-butyltin | | 70.4 | |
| | n-Butyltin | | 33.3 | |
| | | | | |
| | Tri-n-butyltin cation | 7 | 43.5 | |
| | Di-n-butyltin | | 29.9 | |
| | | | | |
| | | 8 | 69.6 | |
| | | | | |
| | | 9 | 87.0 | |
| | | | | |
| | | 10 | 69.2 | |
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LDC #: 26278B19

# VALIDATION FINDINGS WORKSHEET
## Initial Calibration Calculation Verification


Reviewer: [illegible]
2nd Reviewer: [illegible]

**METHOD:** GC ✓ HPLC ____

The calibration Factor (CF), average CF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

CF = A/C
average CF = sum of the CF/number of standards
%RSD = 100 * (S/X)

A = Area of compound,
C = Concentration of compound,
S = Standard deviation of the CF
X = Mean of the CFs

| # | Standard ID | Calibration Date | Compound | Reported 18 CF (~~50~~ std) | Recalculated 18 CF (~~50~~ std) | Reported Average CF (initial) | Recalculated Average CF (initial) | Reported %RSD | Recalculated %RSD |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1dl | 7/6/11 | Tri-n-butyltin cation (A) | 23100 | 23100 | 22300 | 22300 | 13.2 | 13.2 |
| | ~~(RTX-1)~~ | | ↓ (B) | 21500 | 21500 | 20400 | 20400 | 8.3 | 8.3 |
| | | | | | | | | | |
| 2 | | | | | | | | | |
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| 4 | | | | | | | | | |
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Comments: Refer to Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

A = RTX-1
B = RTX-35

LDC #: 26278B19

# VALIDATION FINDINGS WORKSHEET
## Continuing Calibration Results Verification


Reviewer: A
2nd Reviewer: A

**METHOD:** GC ✓ HPLC ____

The percent difference (%D) of the initial calibration average Calibration Factors (CF) and the continuing calibration CF were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. CF - CF)/ave. CF
CF = A/C

Where: ave. CF = initial calibration average CF
CF = continuing calibration CF
A = Area of compound
C = Concentration of compound

| # | Standard ID | Calibration Date | Compound | Average CF(Ical)/ CCV Conc. | Reported CF/Conc. CCV | Recalculated CF/Conc. CCV | Reported %D | Recalculated %D |
|---|---|---|---|---|---|---|---|---|
| 1 | 0826F024 | 8/26/11 | Tri-n-butyltin cation (A) | 22300 | 22500 | 22500 | 1 | 1 |
| | | | (B) | 20400 | 17800 | 17800 | 13 | 13 |
| | | | | | | | | |
| 2 | 0826F038 | 8/27/11 | (A) | 22300 | 20900 | 20900 | 6 | 6 |
| | | | (B) | 20400 | 18200 | 18000 | 11 | 11 |
| | | | | | | | | |
| 3 | 0901F011 | 9/2/11 | (A) | 22300 | 19600 | 19600 | 12 | 12 |
| | | | (B) | 20400 | 15800 | 15800 | 22 | 22 |
| | | | | | | | | |
| 4 | 0908F003 | 9/8/11 | (A) | 22300 | 23900 | 23900 | 7 | 7 |
| | | | (B) | 20400 | 15700 | 15700 | 23 | 23 |
| | | | | | | | | |

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 26278B19

# VALIDATION FINDINGS WORKSHEET
## Surrogate Results Verification


Reviewer: [illegible]
2nd reviewer: [illegible]

**METHOD:** ✓ **GC** ___ **HPLC**

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
SS = Surrogate Spiked

**Sample ID:** 1

| Surrogate | Column/Detector | Surrogate Spiked | Surrogate Found | Percent Recovery | Percent Recovery | Percent Difference |
|---|---|---|---|---|---|---|
| | | | | Reported | Recalculated | |
| Tri-n-propylsn | | 250 | 189.04 | 76 | 76 | 0 |
| | | | | | | |
| | | | | | | |
| | | | | | | |

**Sample ID:** _____

| Surrogate | Column/Detector | Surrogate Spiked | Surrogate Found | Percent Recovery | Percent Recovery | Percent Difference |
|---|---|---|---|---|---|---|
| | | | | Reported | Recalculated | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

**Sample ID:** _____

| Surrogate | Column/Detector | Surrogate Spiked | Surrogate Found | Percent Recovery | Percent Recovery | Percent Difference |
|---|---|---|---|---|---|---|
| | | | | Reported | Recalculated | |
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LDC #: 26298B19

# VALIDATION FINDINGS WORKSHEET
## Matrix Spike/Matrix Spike Duplicates Results Verification


Reviewer: M
2nd Reviewer: 9

**METHOD:** ✓ GC ___HPLC

The percent recoveries (%R) and relative percent differences (RPD) of the matrix spike and matrix spike duplicate were recalculated for the compounds identified below using the following calculation:

%Recovery = 100 * (SSC - SC)/SA  Where  SSC = Spiked sample concentration  SC = Sample concentration
SA = Spike added

RPD =(({SSCMS - SSCMSD} * 2) / (SSCMS + SSCMSD))*100  MS = Matrix spike  MSD = Matrix spike duplicate

MS/MSD samples: 11/12

| Compound | Spike Added (ug/kg) | | Sample Conc. (ug/kg) | Spike Sample Concentration (ug/kg) | | Matrix spike Percent Recovery | | Matrix Spike Duplicate Percent Recovery | | MS/MSD RPD | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | MS | MSD | --- | MS | MSD | Reported | Recalc. | Reported | Recalc. | Reported | Recalc. |
| Gasoline (8015) | | | | | | | | | | | |
| Diesel (8015) | | | | | | | | | | | |
| Benzene (8021B) | | | | | | | | | | | |
| Methane (RSK-175) | | | | | | | | | | | |
| 2,4-D (8151) | | | | | | | | | | | |
| Dinoseb (8151) | | | | | | | | | | | |
| Naphthalene (8310) | | | | | | | | | | | |
| Anthracene (8310) | | | | | | | | | | | |
| HMX (8330) | | | | | | | | | | | |
| 2,4,6-Trinitrotoluene (8330) | | | | | | | | | | | |
| Tri-n-butyltin cation | 22.1 | 22.3 | 0.45 | 11.0 | 11.0 | 48 | 48 | 48 | 48 | 0 | 0 |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

Comments: Refer to Matrix Spike/Matrix Spike Duplicates findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 26278B19

# VALIDATION FINDINGS WORKSHEET

## Laboratory Control Sample/Laboratory Control Sample Duplicate Results Verification



Reviewer: K

2nd Reviewer: Q

**METHOD:** ✓ GC __HPLC

The percent recoveries (%R) and Relative Percent difference (RPD) of the laboratory control sample and laboratory control sample duplicate were recalculated for the compounds identified below using the following calculation:

% Recovery = 100* (SSC-SC)/SA

RPD = I SSCLCS - SSCLCSD I * 2/(SSCLCS + SSCLCSD)

Where: SSC = Spiked sample concentration
SA = Spike added
LCS = Laboratory control sample percent recovery

SC = Concentration

LCSD = Laboratory control sample duplicate percent recovery

LCS/LCSD samples: KWG1083000-3

| Compound | Spike Added (ug/kg) | | Spiked Sample Concentration (ug/kg) | | LCS Percent Recovery | | LCSD Percent Recovery | | LCS/LCSD RPD | |
|---|---|---|---|---|---|---|---|---|---|---|
| | LCS | ~~LCSD~~ | LCS | ~~LCSD~~ | Reported | Recalc. | Reported | Recalc. | Reported | Recalc. |
| Gasoline (8015) | | | | | | | | | | |
| Diesel (8015) | | | | | | | | | | |
| Benzene (8021B) | | | | | | | | | | |
| Methane (RSK-175) | | | | | | | | | | |
| 2,4-D (8151) | | | | | | | | | | |
| Dinoseb (8151) | | | | | | | | | | |
| Naphthalene (8310) | | | | | | | | | | |
| Anthracene (8310) | | | | | | | | | | |
| HMX (8330) | | | | | | | | | | |
| 2,4,6-Trinitrotoluene (8330) | | | | | | | | | | |
| Tri-n-butyltin cation | 22.2 | | 15.2 | | 68 | 68 | | | | |
| | | | | | | | | | | |

Comments: Refer to Laboratory Control Sample/Laboratory Control Sample Duplicate findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 26278B19

# VALIDATION FINDINGS WORKSHEET
## Sample Calculation Verification


Reviewer: X
2nd Reviewer: Q

**METHOD:** ✓ GC ___ HPLC

Y N N/A Were all reported results recalculated and verified for all level IV samples?
Y N N/A Were all recalculated results for detected target compounds agree within 10% of the reported results?

Concentration= (A)(Fv)(Df) / (RF)(Vs or Ws)(%S/100)

A= Area or height of the compound to be measured
Fv= Final Volume of extract
Df= Dilution Factor
RF= Average response factor of the compound In the initial calibration
Vs= Initial volume of the sample
Ws= Initial weight of the sample
%S= Percent Solid

Example:

Sample ID. 1 Compound Name Tri-n-butyltin cation

Concentration = (66657) (1) / (22300) (10.012)

= 0.30 ug/kg

| # | Sample ID | Compound | Reported Concentrations ( ) | Recalculated Results Concentrations ( ) | Qualifications |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

Comments: _____

# Total Metals

**LABORATORY DATA CONSULTANTS, INC.**
7750 El Camino Real, Suite 2L Carlsbad, CA 92009 Phone: 760/634-0437 Fax: 760/634-0439

Windward Environmental, LLC
200 West Mercer Street, Suite 401
Seattle, WA 98119
ATTN: Ms. Jennifer Parker

September 28, 2011

SUBJECT: Lower Passaic River Restoration Project, Data Validation

Dear Ms. Parker,

Enclosed are the final validation reports for the fractions listed below. These SDGs were received on September 12, 2011. Attachment 1 is a summary of the samples that were reviewed for each analysis.

**LDC Project # 26203:**

| SDG # | Fraction |
|---|---|
| K1106643 | Metals, Butyltins |
| A3380 | Polychlorinated Biphenyls as Congeners Dioxins/Dibenzofurans |

The data validation was performed under EPA Level III/IV guidelines. The analyses were validated using the following documents, as applicable to each method:

- Final Surface Sediment Chemical Analyses and Benthic Invertebrate Toxicity and Bioaccumulation Testing Quality Assurance Project Plan (QAPP) for the Lower Passaic River Restoration Project, October 2009
- Caged Bivalve Study Addendum, March 2011
- USEPA Region II Validation SOP HW-2, (Revision 13, September 2006) for Metals
- USEPA, Contract Laboratory Program National Functional Guidelines for Inorganic Data Review, October 2004
- USEPA, Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review, June 2008
- USEPA Region II Validation SOP HW-25, (Revision 3, September 2006) forTetra-through Octochlorinated Dioxins and Furans by Isotope Dilution, modified as necessary to accommodate the QAPP criteria
- USEPA Region II Validation SOP HW-46, (Revision 1, September 2008) for Chlorinated Biphenyls Congeners in Water, Soil, Sediment, and Tissue, modified as necessary to accommodate the QAPP criteria

Please feel free to contact us if you have any questions.

Sincerely,

Stella S. Cuenco
Data Validation Operations Manager/Senior Chemist

L:\Windward\Passaic\26203COV.wpd

DL/CD 1555 Pages

Attachment 1

EDD

# LDC #26203 (Windward Environmental, LLC - Seattle WA / Lower Passaic River Restoration Project)

PO# 2011-0012

| LDC | SDG# | DATE REC'D | (3) DATE DUE | Pest. (1699M) | | PCB Cong (1668B) | | Dioxin (1613B) | | Butyltin (Krone) | | Metals (6010B) | | Metals (6020) | | Se (7742) | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Matrix: | Water/Tissue | | | W | T | W | T | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S |
| A | K1106643 | 09/12/11 | 10/03/11 | - | - | - | - | - | - | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | | | | | | | | | | | | | | | | | | |
| B | A3380 | 09/12/11 | 10/03/11 | - | - | 1 | 0 | 1 | 0 | - | - | - | - | - | - | - | - | | | | | | | | | | | | | | | | | | |
| C | B1A8699 | 09/12/11 | 10/03/11 | 1 | 10 | - | - | - | - | - | - | - | - | - | - | - | - | | | | | | | | | | | | | | | | | | |
| Total | A/SC | | | 1 | 10 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 17 |

For Internal Use Only: Shaded cells indicate Level IV validation (all other cells are Level III validation). These sample counts do not include MS/MSD

26203ST.wpd

# Laboratory Data Consultants, Inc.
# Data Validation Report

| | |
|---|---|
| **Project/Site Name:** | Lower Passaic River Restoration Project |
| **Collection Date:** | July 18, 2011 |
| **LDC Report Date:** | September 27, 2011 |
| **Matrix:** | Water |
| **Parameters:** | Metals |
| **Validation Level:** | EPA Level III |
| **Laboratory:** | Columbia Analytical Services, Inc. |
| **Sample Delivery Group (SDG):** | K1106643 |

**Sample Identification**

LPR-071811-RB

## Introduction

This data review covers one water sample listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Methods 6010C, 6020A, and 7742 for Metals. The metals analyzed were Aluminum, Antimony, Arsenic, Barium, Beryllium, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Nickel, Potassium, Selenium, Silver, Sodium, Thallium, Titanium, Vanadium, and Zinc.

This review follows the Final Surface Sediment Chemical Analyses and Benthic Invertebrate Toxicity and Bioaccumulation Testing Quality Assurance Project Plan (QAPP) for the Lower Passaic River Restoration Project, (October 8, 2009), the Caged Bivalve Study Addendum (March 2, 2011) and the USEPA Region II Validation SOP HW-2 (Revision 13, September 2006) for Metals, and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

NJ Presumptive evidence of presence of the compound at an estimated quantity.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

## I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

## II. ICPMS Tune

The mass calibration was within 0.1 AMU and the percent relative standard deviation (%RSD) was less than or equal to 5% .

## III. Calibration

An initial calibration was performed.

The frequency and analysis criteria of the initial calibration verification (ICV), continuing calibration verification (CCV), and CRDL standard were met.

## IV. Blanks

Method blanks were reviewed for each matrix as applicable. No metal contaminants were found in the initial, continuing and preparation blanks with the following exceptions:

| Method Blank ID | Analyte | Maximum Concentration | Associated Samples |
|---|---|---|---|
| PB (prep blank) | Antimony<br>Cadmium<br>Silver | 0.020 ug/L<br>0.005 ug/L<br>0.008 ug/L | All samples in SDG K1106643 |
| ICB/CCB | Antimony<br>Beryllium<br>Cadmium<br>Calcium<br>Chromium<br>Cobalt<br>Iron<br>Lead<br>Magnesium<br>Manganese<br>Silver<br>Sodium<br>Thallium | 0.035 ug/L<br>0.012 ug/L<br>0.010 ug/L<br>32.8 ug/L<br>2.4 ug/L<br>0.014 ug/L<br>16.7 ug/L<br>0.012 ug/L<br>9.5 ug/L<br>0.044 ug/L<br>0.017 ug/L<br>24 ug/L<br>0.018 ug/L | All samples in SDG K1106643 |

Data qualification by the initial, continuing and preparation blanks (ICB/CCB/PBs) was based on the maximum contaminant concentration in the ICB/CCB/PBs in the analysis of each analyte. The sample concentrations were either not detected or were significantly greater than the concentrations found in the associated method blanks with the following exceptions:

| Sample | Analyte | Reported Concentration | Modified Final Concentration |
|---|---|---|---|
| LPR-071811-RB | Beryllium<br>Calcium<br>Cobalt<br>Lead<br>Magnesium<br>Sodium | 0.007 ug/L<br>43.1 ug/L<br>0.015 ug/L<br>0.010 ug/L<br>2.3 ug/L<br>72 ug/L | 0.020U ug/L<br>50.0U ug/L<br>0.020U ug/L<br>0.020U ug/L<br>20.0U ug/L<br>200U ug/L |

Sample LPR-071811-RB was identified as a rinsate blank. No metal contaminants were found above the reporting limit in this blank with the following exceptions:

| Rinsate Blank ID | Sampling Date | Analyte | Concentration | Associated Samples |
|---|---|---|---|---|
| LPR-071811-RB | 7/18/11 | Barium<br>Chromium<br>Copper<br>Iron<br>Manganese<br>Nickel<br>Zinc | 0.107 ug/L<br>9.5 ug/L<br>1.07 ug/L<br>44.9 ug/L<br>1.670 ug/L<br>1.38 ug/L<br>1.8 ug/L | No associated samples in this SDG |

## V. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

The criteria for analysis were met.

## VI. Matrix Spike Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were not performed since the associated sample is a rinsate blank.

## VII. Duplicate Sample Analysis

Duplicate (DUP) samples were not performed since the associated sample is a rinsate blank.

## VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

## IX. Internal Standards

All internal standard percent recoveries (%R) were within QC limits.

## X. Furnace Atomic Absorption QC

All graphite furnace atomic absorption QC were within validation criteria.

## XI. ICP Serial Dilution

ICP serial dilution was not performed for this SDG.

## XII. Sample Result Verification

Raw data were not reviewed for this SDG.

## XIII. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

## XIV. Field Duplicates

No field duplicates were identified in this SDG.

**Lower Passaic River Restoration Project**
**Metals - Data Qualification Summary - SDG K1106643**

No Sample Data Qualified in this SDG

**Lower Passaic River Restoration Project**
**Metals - Laboratory Blank Data Qualification Summary - SDG K1106643**

| SDG | Sample | Analyte | Modified Final Concentration | A or P |
|---|---|---|---|---|
| K1106643 | LPR-071811-RB | Beryllium<br>Calcium<br>Cobalt<br>Lead<br>Magnesium<br>Sodium | 0.020U ug/L<br>50.0U ug/L<br>0.020U ug/L<br>0.020U ug/L<br>20.0U ug/L<br>200U ug/L | A |

**Lower Passaic River Restoration Project**
**Metals - Field Blank Data Qualification Summary - SDG K1106643**

No Sample Data Qualified in this SDG

LDC #: 26203A4

SDG #: K1106643

Laboratory: Columbia Analytical Services

# VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 9/27/11

Page: 1 of 1

Reviewer: [illegible]

2nd Reviewer: [illegible]

**METHOD:** Metals (EPA SW 846 Method 6010B/~~6020/7000~~) C/6020A/7742

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

| | Validation Area | | Comments |
|---|---|---|---|
| I. | Technical holding times | A | Sampling dates: 7/18/11 |
| II. | ICP/MS Tune | A | |
| III. | Calibration | A | |
| IV. | Blanks | SW | |
| V. | ICP Interference Check Sample (ICS) Analysis | SW | |
| VI. | Matrix Spike Analysis | N | Client specified |
| VII. | Duplicate Sample Analysis | N | |
| VIII. | Laboratory Control Samples (LCS) | A | LCS |
| IX. | Internal Standard (ICP-MS) | A | Summaries provided |
| X. | Furnace Atomic Absorption QC | ~~A~~ A | |
| XI. | ICP Serial Dilution | N | Not performed |
| XII. | Sample Result Verification | N | |
| XIII. | Overall Assessment of Data | A | |
| XIV. | Field Duplicates | N | |
| XV | Field Blanks | SW | Rinse Blk=1 |

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: water

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1 | LPR-071811-RB | 11 | | 21 | | 31 | |
| 2 | | 12 | | 22 | | 32 | |
| 3 | | 13 | | 23 | | 33 | |
| 4 | | 14 | | 24 | | 34 | |
| 5 | | 15 | | 25 | | 35 | |
| 6 | | 16 | | 26 | | 36 | |
| 7 | | 17 | | 27 | | 37 | |
| 8 | | 18 | | 28 | | 38 | |
| 9 | | 19 | | 29 | | 39 | |
| 10 | | 20 | | 30 | | 40 | |

Notes:

DC #: 4600334

# VALIDATION FINDINGS WORKSHEET
## Sample Specific Element Reference


Reviewer: CR
2nd reviewer: [illegible]

All circled elements are applicable to each sample.

| Sample ID | Matrix | Target Analyte List (TAL) |
|---|---|---|
| 1 | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, Ti |
| | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, |
| | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, |
| | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, |
| | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, |
| | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, |
| | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, |
| | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, |
| | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, |
| | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, |
| | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, |
| | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, |
| | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, |
| | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, |
| | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, |
| | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, |
| | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, |
| | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, |
| | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, |
| | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, |
| | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, |
| | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, |

| Analysis Method | | |
|---|---|---|
| ICP | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, Ti |
| ICP-MS | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, |
| GFAA | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, |

Comments: Mercury by CVAA if performed

LDC #: 26203A4

**VALIDATION FINDINGS WORKSHEET**
**PB/ICB/CCB QUALIFIED SAMPLES**

Page: 1 of 1
Reviewer:
2nd Reviewer:

**METHOD:** Trace metals (EPA SW 864 Method 6010B/6020/7000)
Sample Concentration units, unless otherwise noted: ug/L

Soil preparation factor applied: NA
Associated Samples: All

| Analyte | Maximum PB[a] (mg/Kg) | Maximum PB[a] (ug/L) | Maximum ICB/CCB[a] (ug/L) | Action Limit | 1 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sb | | 0.020 | 0.035 | | | | | | | | | | | |
| Be | | | 0.012 | | 0.007 / 0.020 | | | | | | | | | |
| Cd | | 0.005 | 0.010 | | | | | | | | | | | |
| Ca | | | 32.8 | | 43.1 / 50.0 | | | | | | | | | |
| Cr | | | 2.4 | | | | | | | | | | | |
| Co | | | 0.014 | | 0.015 / 0.020 | | | | | | | | | |
| Fe | | | 16.7 | | | | | | | | | | | |
| Pb | | | 0.012 | | 0.010 / 0.020 | | | | | | | | | |
| Mg | | | 9.5 | | 2.3 / 20.0 | | | | | | | | | |
| Mn | | | 0.044 | | | | | | | | | | | |
| Ag | | 0.008 | 0.017 | | | | | | | | | | | |
| Na | | | 24 | | 72 / 200 | | | | | | | | | |
| Tl | | | 0.018 | | | | | | | | | | | |

Samples with analyte concentrations within five times the associated ICB, CCB or PB concentration are listed above with the identifications from the Validation Completeness Worksheet. These sample results were qualified as not detected, "U".
Note : a - The listed analyte concentration is the highest ICB, CCB, or PB detected in the analysis of each element.

LDC #: 26203A4

# VALIDATION FINDINGS WORKSHEET
## Field Blanks

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

**METHOD:** Trace Metals (EPA SW846 6010B/7000)
Y N N/A Were field blanks identified in this SDG?
Y N N/A Were target analytes detected in the field blanks?
**Blank units:** ug/L **Associated sample units:** _____
**Sampling date:** 7/18/11 Soil factor applied _____
**Field blank type:** (circle one) Field Blank / Rinsate / Other: _____ Associated Samples: None

| Analyte | Blank ID | Sample Identification | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | Action Level | | | | | | | | | | |
| Ba | 0.107 | | | | | | | | | | | |
| Cr | 9.5 | | | | | | | | | | | |
| Cu | 1.07 | | | | | | | | | | | |
| Fe | 44.9 | | | | | | | | | | | |
| Mn | 1.670 | | | | | | | | | | | |
| Ni | 1.38 | | | | | | | | | | | |
| Zn | 1.8 | | | | | | | | | | | |

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Samples with analyte concentrations within five times the associated field blank concentration are listed above, these sample results were qualified as not detected, "U".

LDC #: 26203A4

# VALIDATION FINDINGS WORKSHEET
## ICP Interference Check Sample


Reviewer: CR
2nd Reviewer: [illegible]

**METHOD**: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were ICP interference check samples performed as required?
Y N N/A Were the AB solution percent recoveries (%R) within the control limits of 80-120% ?

**LEVEL IV ONLY:**

Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

| # | Date | ICS Identification | Analyte | Concentration (ug/L) | Limit (<~~MDL~~ RL) | Associated Samples | Qualifications |
|---|---|---|---|---|---|---|---|
| | 8/5/11 | ICSA (21:54) | Sb | 0.05 | 0.050 | All | No Qual (low interferents due to sample matrix) |
| | | | Cd | 0.04 | 0.020 | | |
| | | | Co | 0.66 | 0.020 | | |
| | | | Cu | 0.36 | 0.10 | | |
| | | | Pb | 0.10 | 0.020 | | |
| | 8/9/11 | ICSA (11:29) | Ba | 0.12 | 0.050 | | |
| | | | Mn | 1.67 | 0.050 | | |
| | | | Ni | 0.94 | 0.20 | | |
| | | | Tl | 0.028 | 0.020 | | |

Comments:

| | YES | NO | N/A |
|---|---|---|---|
| A.I.I **Contract Compliance Screening Report** | | | |
| Present? | [✓] | ___ | ___ |
| **ACTION**: If no, contact RSCC/PO. | | | |
| A.I.2 **Record of Communication (from RSCC)** | | | |
| Present? | [✓] | ___ | ___ |
| **ACTION**: If no, request from the RSCC. | | | |
| A.1.3 **Sampling Trip Report** | | | |
| Present and complete? | [✓] | ___ | ___ |
| **ACTION**: If no, contact RSCC/PO. | | | |
| A.I.4 **Chain of Custody/Sample Traffic Report** | | | |
| Present? | [✓] | ___ | ___ |
| Legible? | [✓] | ___ | ___ |
| Signature of sample custodian present? | [✓] | ___ | ___ |
| **ACTION**: If no, contact RSCC/WAM/PO. | | | |
| A.I.5 **Cover Page** | | | |
| Present? | [✓] | ___ | ___ |
| Is the Cover Page properly filled in and the verbatim signed by the lab manager or the manager's designee? | [✓] | ___ | ___ |
| Do the sample identification numbers on the Cover Page agree with sample Identification numbers on: | | | |
| (a) Traffic Report Sheet? | [ ] | ✓ | ___ |

| | YES | NO | N/A |
|---|---|---|---|
| (b) Form I's? | [✓] | ___ | ___ |
| Is the number of samples on the Cover Page the same as the number of samples on the Traffic Report sheet and the Regional Record of Communication (ROC) for the data Case? | [___] | ___ | ___ |

ACTION:
If no for any of the above, prepare Telephone Record Log and contact RSCC/PO for re-submittal of the corrected Cover Page from the laboratory.

A.1.6 SDG Narrative, DC-1 & DC-2 Form

| | | | |
|---|---|---|---|
| Is the SDG Narrative present? | [✓] | ___ | ___ |
| Is Sample Log-In Sheet(Form DC-1) present and complete? | [✓] | ___ | ___ |
| Is Complete SDG Inventory Sheet(Form DC-2) present and complete? | [✓] | ___ | ___ |

ACTION:
If no, write in the Contract-Problems/ Non-Compliance Section of the Data Review Narrative.

A.1.7 Form I to XV

A.1.7.1 Are all the Form I through Form XV labeled with:

| | | | |
|---|---|---|---|
| Laboratory Name? | [✓] | ___ | ___ |
| Laboratory Code? | [___] | ✓ | ___ |
| RAS/Non-RAS Case No.? | [___] | ✓ | ___ |
| SDG No.? | [✓] | ___ | ___ |

| | YES | NO | N/A |
|---|---|---|---|
| Contract No.? | [✓] | ___ | ___ |

**ACTION**:
If no for any of the above, note under Contract Problem/Non-Compliance Section of the "Data Review Narrative" and contact PO for corrected Form(s) from the laboratory.

A.1.7.2 After comparing values on Forms I-IX against the raw data, do any computation/ transcription errors exceed 10% of the reported values on the Forms for:

| | | | |
|---|---|---|---|
| (a) all analytes analyzed by ICP-AES? | ___ | [✓] | ___ |
| (b) all analytes analyzed by ICP-MS? | ___ | [✓] | ___ |
| (c) Mercury? | ___ | [ ] | ✓ |
| (d) Cyanide? | ___ | [ ] | ✓ |

**ACTION**:
If yes, prepare Telephone Record Log and contact CLP PO/TOPO for the corrected data from the laboratory.

## A.1.8 Raw Data

**Data shall not be validated without the hard/electronic copies of the associated raw data for samples and QC samples.**

### A.1.8.1 Digestion/Distillation Log

| | | | |
|---|---|---|---|
| Digestion Log for ICP-AES (Form XII)present? | [✓] | ___ | ___ |
| Digestion Log for ICP-MS (Form XII) present? | [✓] | ___ | ___ |
| Digestion Log for mercury (Form XII) present? | [ ] | ___ | ✓ |
| Distillation Log for cyanide (Form XII) present? | [ ] | ___ | ✓ |

Are pH values for metals and

| | YES | NO | N/A |
|---|---|---|---|
| cyanide reported for each aqueous sample? | ✓ | | |
| Are percent solids calculations present for soils/sediments? | | | ✓ |
| Are preparation dates present on the sample preparation logs/bench sheets? | ✓ | | |

NOTE:
Digestion/Distillation log must include weights, volumes, and dilutions used to obtain the reported results.

A.1.8.2 Is the analytical instrument real-time printouts present for:

| | YES | NO | N/A |
|---|---|---|---|
| ICP-AES? | ✓ | | |
| ICP-MS? | ✓ | | |
| Mercury? | | ✓ | |
| Cyanide? | | | ✓ |

Are all laboratory bench sheets and instrument raw data printouts necessary to support all sample analyses and QC operations:

| | YES | NO | N/A |
|---|---|---|---|
| Legible? | ✓ | | |
| Properly labeled? | ✓ | | |

Are all field samples, QC samples and field QC samples present on:

| | YES | NO | N/A |
|---|---|---|---|
| Digestion/Distillation log? | ✓ | | |
| Instrument Printouts? | ✓ | | |

ACTION:
If no for any of the above questions in Section A.1.8.1 and Section A.1.8.2, write Telephone Record Log and contact TOPO/PO for re-submittal from the laboratory.

| | YES | NO | N/A |
|---|---|---|---|
| A.1.9 **Technical Holding Times**: (Aqueous and soil samples) (Examine sample Traffic Reports and digestion/distillation logs to determine the holding time from the sample collection date to the sample preparation date.) | | | |
| A.1.9.1 Cyanide distillation(14 days)exceeded? | | | ✓ |
| Mercury analysis(28 days) exceeded? | | | ✓ |
| Other Metals analysis(180 days)exceeded? | | ✓ | |

**ACTION:**
If yes, reject (R) and red-line non-detects and flag as estimated (J)results ≥ MDL even if sample(s) was preserved properly.

**NOTE:**
In addition to qualifying the data, a list of all samples and analytes which exceeded the holding times must be prepared. Report for each sample the number of days that were exceeded. (Subtract the sample collection date from the sample preparation date). Attach this list to the data review narrative.

| | YES | NO | N/A |
|---|---|---|---|
| A.1.9.2 Is pH of aqueous samples for: | | | |
| Metals Analysis ≤ 2? | ✓ | | |
| Cyanide Analysis ≥ 12? | | | ✓ |

**ACTION:**
If no for any of the above, flag non-detects as "R" and detects as "J".

| | YES | NO | N/A |
|---|---|---|---|
| A.1.9.3 Is the cooler temperature ≤ 10 C°? | ✓ | | |

**ACTION:**
If cooler temperature is >10°C , flag non-detects as "UJ" and detects as "J".

A.1.10 **Final Data Correctness - Form I**

A.1.10.1 Are Form I's for all samples

| | YES | NO | N/A |
|---|---|---|---|
| present and complete? | [✓] | ___ | ___ |

ACTION:
If no, prepare Telephone Record Log and contact CLP PO/TOPO for submittal from the laboratory.

A.1.10.2 Verify there are no calculation and transcription errors in the results reported on Form I's. Circle on each Form I all results that are incorrect.

| | YES | NO | N/A |
|---|---|---|---|
| Is the calculation error less than 10% of the correct result? | [✓] | ___ | ___ |
| Are results on Form I's reported in correct units (ug/L for aqueous and MG/KG for soils)? | [✓] | ___ | ___ |
| Are results on Form I'S reported by correct significant figures? | [✓] | ___ | ___ |
| Are soil sample results on Form I's corrected for percent solids? | [___] | ___ | ✓ |
| Are all "less than MDL" values reported by the CRQLs and coded with "U"? | [✓] | ___ | ___ |
| Are values less than the CRQLs but greater than or equal to the MDLs flagged with "J"? | [✓] | ___ | ___ |
| Are appropriate contractual quality control and Method qualifiers used? | [✓] | ___ | ___ |

ACTION:
If no for any of the above questions, prepare Telephone Record Log, and contact CLP PO/TOPO for corrected data.

A.1.10.3 Do EPA sample identification numbers and the corresponding laboratory sample identification numbers match on the Cover Page, Form I's and in the raw data? [✓] ___ ___

Was a brief physical description

| | YES | NO | N/A |
|---|---|---|---|
| of the samples before and after digestion given on the Form I's? | [___] | ✓ | |
| Was any sample result outside the mercury/cyanide calibration range or the ICP-AES/ICP-MS linear range diluted and noted on the Form I? | [___] | ✓ AOR 9/27/11 | ✓ |

**ACTION:**
If no for any of the above, note under the Contract-Problem/Non-Compliance Section of the Data Review Narrative.

A.1.11 **Initial Calibration**

| | YES | NO | N/A |
|---|---|---|---|
| A.1.11.1 Is a record of at least 2 point (A blank and a standard)calibration present for ICP-AES analysis? | [✓] | | |
| Is a record of at least 2 point (a blank and a standard)calibration present for ICP-MS analysis? | [✓] | | |
| Is a record of at least 5 point calibration (a blank & 4 standards)present for Hg analysis? | [___] | | ✓ |
| Is a record of at least 4 point calibration (a blank & 4 standards)present for cyanide? | [___] | | ✓ |

**ACTION:**
If incomplete or no initial calibration was performed, reject (R) and red-line the associated data (detects & non-detects).

| | YES | NO | N/A |
|---|---|---|---|
| Is one initial calibration standard at the CRQL level for cyanide and mercury? | [___] | | ✓ |

**ACTION:**
If no, write in the Contract Problem/ Non-Compliance Section of the Data Review Narrative.

| | YES | NO | N/A |
|---|---|---|---|
| A.1.11.2 Is the curve correlation coefficient $\geq$ 0.995 for: | | | |

| | | YES | NO | N/A |
|---|---|---|---|---|
| | Mercury Analysis? | [ ] | | ✓ |
| | Cyanide Analysis? | [ ] | | ✓ |
| | ICP-AES (more than 2 point Calib.)? | [✓] | | |
| | ICP-MS (more than 2 point calib.)? | [✓] | | |

ACTION:
If no, qualify the associated sample results ≥ MDL as estimated "J" and non-detects as "UJ".

NOTE:
The correlation coefficient shall be calculated by the data validator using standard concentrations and the corresponding instrument response (e.g. absorbance, peak area, peak height, etc.).

A.1.12 Initial and Continuing Calibration Verification- Form IIA

| | | | | |
|---|---|---|---|---|
| A.1.12.1 | Present and complete for every metal and cyanide? | [✓] | | |
| | Present and complete for ICP-AES and ICP-MS when both these methods were used for the same analyte? | [✓] | | |

ACTION:
If no for any of the above, prepare a Telephone Record Log and contact PO/TOPO for re-submittal from the laboratory.

| | | | | |
|---|---|---|---|---|
| A.1.12.2 | Was a Continuing Calibration Verification performed every 10 samples or every 2 hours whichever is more frequent? | [✓] | | |

ACTION:
If no for any of the above, write in the Contract-Problem/Non-Compliance Section of the Data Review Narrative.

| | | | | |
|---|---|---|---|---|
| A.1.12.3 | Was an ICV or a mid-range standard distilled and analyzed with each batch of cyanide samples? | [ ] | | ✓ |

| | YES | NO | N/A |
|---|---|---|---|

ACTION:
If no for any of the above, write in the Contract-Problem/Non-Compliance Section of the Data Review Narrative and qualify results ≥ MDL as estimated (J).

A.1.12.2 Circle on each Form IIA all percent recoveries that are outside the contract windows.

Are ICV/CCVs within control limits for:

| | | | |
|---|---|---|---|
| Metals - 90-110%R? | [✓] | ___ | ___ |
| Hg - 80-120%R? | [___] | ___ | ✓ |
| Cyanide - 85-115%R? | [___] | ___ | ✓ |

ACTION:
If no, qualify all samples between a previous technically acceptable CCV standard and a subsequent technically acceptable CCV standard as follows as follows:

Qualify as estimated (J) all detects and non-detects, if the ICV/CCV %R is between 75-89%(65-79% for Hg; 70-84% for CN). Qualify only positive results(≥ MDL) as "J" if the ICV/CCV %R is between 111-125%(121-135% for Hg;116-130% for CN). Reject (R) and red-line only
detects if the recovery is greater than 125% (135% for Hg; 130% for CN). Reject (R) and red-line all associated results (hits and non-detects)if the recovery is less than 75%(65% for Hg;70% for CN).

NOTE:
For ICV that does not fall within the acceptance limits, qualify all samples reported from the analytical run.

A.1.12.3 Was the distilled ICV or mid-range standard for cyanide within acceptance limits (85-115%)? [___] ___ ✓

ACTION:
If no, Qualify all cyanide results ≥ MDL as "J".

A.1.13 CRQL Standard Analysis - Form IIB

A.1.13.1 For each ICP-AES run, was a CRI

| | YES | NO | N/A |
|---|---|---|---|
| (CRQL or MDL when MDL > CRQL) standard analyzed? (Note:CRI is not required for Al, Ba, Ca, Fe, Mg, Na and K.) | [✓] | ___ | ___ |
| For each ICP-MS run, was a CRI (CRQL or MDL when MDL > CRQL) standard analyzed for each mass/isotope used for the analysis? | [✓] | ___ | ___ |
| For each mercury run, was a CRQL standard analyzed? | [___] | ___ | ✓ |
| For each cyanide run, was a CRQL standard analyzed? | [___] | ___ | ✓ |

ACTION:
If no for any of the above, write this deficiency in the Contract Problems/ Non-Compliance Section of the Data Review Narrative, inform CLP PO and flag results in the affected ranges (detects <2xCRQL)as J and non-detects UJ.

The affected ranges are:
ICP-AES Analysis - *True Value ± CRQL
ICP-MS Analysis - *True Value ± CRQL
Mercury Analysis - *True Value ± CRQL
Cyanide Analysis - *True Value ± CRQL
* True value of the CRQL Standard

| | YES | NO | N/A |
|---|---|---|---|
| A.1.13.2 Was a CRQL standard analyzed after the ICV/ICB, before the final CCV/CCB and once every 20 analytical samples in the analytical run for each analysis? | [✓] | ___ | ___ |

ACTION:
If no, write in the Contract Problem/ Non-Compliance Section of the "Data Review Narrative".

A.1.13.3 Circle on each Form IIB all percent recoveries that are outside the acceptance windows.

| | YES | NO | N/A |
|---|---|---|---|
| Is the CRQL standard within control limits for: | | | |
| Metals(ICP-AES/ICP-MS)- 70 - 130%? | [✓] | ___ | ___ |
| Mercury- 70 - 130%? | [___] | ___ | ✓ |
| Cyanide - 70 - 130%? | [___] | ___ | ✓ |

ACTION:
If no, flag detects <2xCRQL as "J" and non-detects as "UJ" if the CRQL standard recovery is between 50-69%. Flag(J) only detects <2xCRQL if the recovery is between 131% and ≤180%. If the recovery is less than 150%, reject(R) and red-line non-detects and detects < 2xCRQL, and flag (J) detects between 2xCRQL and ICV/CCV. Reject and red-line only detects <2xCRQL and flag (J)detects ≥ 2xCRQL but < ICV/CCV if the recovery is > 180%.

NOTE:
1. Qualify all field samples analyzed between a previous technically acceptable analysis of the CRQL standard and a subsequent acceptable analysis of the CRQL standard
2. Flag (J) or reject (R) only the final sample results on Form I's when Sample raw data are within the affected ranges and the CRQL standard is outside the acceptance windows.
3. The samples and the CRQL standard must be analyzed in the same analytical run.

## A.1.14 Initial and Continuing Calibration Blanks - Form III

| | YES | NO | N/A |
|---|---|---|---|
| A.1.14.1 Present and complete for all the instruments used for the metals and cyanide analyses? | [✓] | ___ | ___ |
| Was an initial Calibration Blank analyzed after ICV? | [✓] | ___ | ___ |
| Was a continuing Calibration Blank analyzed after every CCV and every 10 samples or every 2 hours, whichever is more frequent? | [✓] | ___ | ___ |
| Were the ICB & CCB values ≥ MDL but < CRQL reported on Form III and flagged "J" by | | | |

| | | YES | NO | N/A |
|---|---|---|---|---|
| | using MDLs from direct analysis(Preparation Method "NP1")? (Check Form III against the raw data) | [✓] | ___ | ___ |
| | ACTION: If no, inform CLP PO/TOPO and make a note in the Contract-Problems/Non-Compliance Section of the "Data Review Narrative". | | | |
| A.1.14.2 | Circle with red pencil on each Form III all Calib. Blank values that are: ≥ MDL but ≤ CRQL; > CRQL | | | |
| A.1.14.2.1 | When MDL < CRQL, is any Calib. Blank value ≥ MDL but ≤ CRQL? | ✓ | [___] | ___ |
| | ACTION: If yes, change sample results ≥ MDL but ≤ CRQL to the CRQL with a "U". Do not qualify non-detects. | | | |
| A.1.14.2.2 | When MDL < CRQL, is any Calib. Blank value > CRQL? | ___ | [✓] | ___ |
| | ACTION: If yes, reject (R) and red line the associated sample results > CRQL but <ICB/CCB Blank Result. Flag as "J" detects > ICB/CCB blank value but < 10xICB/CCB value. Change the sample results ≥ MDL but ≤ the CRQL to CRQL with a "U". | | | |
| A.1.14.2.3 | Is any Calibration Blank value below the negative CRQL? | ___ | [✓] | ___ |
| | ACTION: If yes, flag (J) as estimated all associated sample results ≥ CRQL but <10xCRQL. | | | |

NOTE:

1. For ICB that does not meet the technical QC Criteria, apply the action to all samples

| | YES | NO | N/A |
|---|---|---|---|

reported from the analytical run.
2. For CCBs that do not meet the technical QC criteria, apply the action to all samples analyzed between a previous technically acceptable analysis of CCB and a subsequent technically acceptable analysis of the CCB in the analytical run.,

A.1.15 Preparation Blank - FORM III

NOTE: The Preparation Blank for mercury is the same as the calibration blank.

A.1.15.1 Was one Preparation Blank prepared with and analyzed for:

| | YES | NO | N/A |
|---|---|---|---|
| Each Sample Delivery Group (SDG)? | [✓] | ___ | ___ |
| Each batch of the SDG samples digested/distilled? | [✓] | ___ | ___ |
| Each matrix type? | [✓] | ___ | ___ |
| All instruments used for metals and cyanide analyses? | [✓] | ___ | ___ |

ACTION:
If no for any of the above, flag as estimated (J) all the associated positive data <10xMDL for which the Preparation Blank was not analyzed.

NOTE:
If only one blank was analyzed for more than 20 samples, then the first 20 samples analyzed are not estimated(J), but all additional samples must be qualified (J).

A.1.15.2 Circle with red pencil on each Form III all Prep. Blank values that are:

≥ MDL but ≤ CRQL, and

> CRQL

A.1.15.2.1 When MDL < CRQL, is any preparation blank value ≥ MDL but ≤ CRQL? ✓ [___] ___

ACTION:
If yes, change sample result ≥ MDL

| | | YES | NO | N/A |
|---|---|---|---|---|
| | but ≤ CRQL to CRQL with a "U". | | | |
| A.1.15.2.2 | When the MDL ≤ CRQL, is any Preparation Blank value greater than its CRQL? | ___ | [✓] | ___ |
| | If yes, is the Prep. Blank value greater than the value of the associated Field Blank collected and analyzed with the SDG samples? | ___ | [___] | ✓ |
| | If yes, is the lowest concentration of that analyte in the associated samples less than 10 times the Preparation Blank value? | ___ | [___] | ✓ |

ACTION:
If yes, reject (R) and red-line all associated sample results greater than the CRQL but less than the Prep.Blank value. Flag as "J" detects > Prep. Blank value but <10xPrep.Blank. If the sample result ≥ MDL but ≤ CRQL, replace it with CRQL-U.

If the Prep. Blank value is less than the same analyte value in the Field Blank, do not qualify the sample results due to the Prep. Blank criteria.

NOTE:
Convert soil sample result to mg/Kg on wet weight basis to compare with the soil Prep. Blank result on Form III.

| | | | | |
|---|---|---|---|---|
| A.1.15.2.3 | Is the Prep. Blank concentration below the negative CRQL? | ___ | [✓] | ___ |

ACTION:
If yes, flag (J) all associated sample results less than 10xCRQL. Qualify non-detects as estimated (UJ).

| | | | | |
|---|---|---|---|---|
| A.1.15.2.4 | When the MDL is greater than the CRQL, is the preparation blank concentration on Form III greater than two times the MDL? | ___ | [___] | ✓ |

ACTION:

| | | YES | NO | N/A |
|---|---|---|---|---|
| | If yes, reject (R) and red-line all positive sample results with sample raw data less than 10 times the Preparation Blank value. | | | |
| A.1.16 | ICP-AES/ICP-MS Interference Check Sample (ICS)- Form IV<br>NOTE: Not required for CN, Hg, Al, Ca, Fe and Mg. | | | |
| A.1.16.1 | Present and complete? | [✓] | ___ | ___ |
| | Was ICS analyzed at the beginning and end of each analytical run, and once for every 20 analytical samples? | [✓] | ___ | ___ |
| | Was ICS analyzed at the beginning of the ICP-MS analytical run? | [✓] | ___ | ___ |
| | ACTION:<br>If no, flag as estimated (J) all sample results. | | | |
| A.1.16.2 | ICP-AES Method | | | |
| A.1.16.2.1 | ICSA Solution:<br>For ICP-AES, are the ICSA "Found" analyte values within the control limits ± of CRQL of the true/established mean value? | [✓] | ___ | ___ |
| | If no for any of the above, is the sample concentration of Al, Ca, Fe, or Mg in the same units (ug/L or MG/KG) greater than or equal to its respective concentration in the ICSA Solution on Form IV? | [___] | ___ | ✓ |
| | ACTION:<br>If yes, apply the following action to all samples analyzed between a previous technically acceptable analysis of the ICS and a subsequent technically acceptable analysis of the ICS in the analytical run:<br>Flag (J) as estimated only sample results ≥MDL | | | |

| | YES | NO | N/A |
|---|---|---|---|
| for which the ICSA "Found" value is greater than (True value+CRQL). Do not qualify non-detects. If the ICSA "Found" value is less than (True value-CRQL), flag non-detects as "UJ" and detects as "J". | | | |
| A.1.16.2.3 ICSAB Solution<br>For ICP-AES, are all analyte results in ICSAB within the control limits of 80-120 of the true/established mean value? | [✓] | ___ | ___ |
| If no for any of the above, is the sample concentration of Al, Ca, Fe, or Mg in the same units (ug/L or MG/KG) greater than or equal to its respective concentration in the ICSAB Solution on Form IV? | [___] | ___ | ✓ |

ACTION:
If yes, apply the following action to all samples analyzed between a previous technically acceptable analysis of the ICS and a subsequent technically acceptable analysis of the ICS in the analytical run:

Flag (J) as estimated those associated sample results ≥ MDL for which the ICSAB analyte recovery is greater than 120% but ≤ 150%. If the ICSAB recovery falls within 50-79%, qualify sample results ≥ MDL as "J" and non-detects as "UJ". Reject (R) and red-line all sample results (detects & non-detects) for which the ICSAB analyte recovery is less than 50%. If the recovery is above 150%, reject (R) and red-line only positive results.

A.1.16.3 ICP-MS Method

| | YES | NO | N/A |
|---|---|---|---|
| A.1.16.3.1 ICSA Solution:<br>For ICP-MS, are the ICSA "Found" analyte values within the control limits of ±CRQL of the true/established mean value? | [___] | ✓ | ___ |

ACTION:
If no, apply the following action to all samples reported from the analytical run:

Flag (J) as estimated only sample results ≥ MDL if the ICSA "Found" value is greater than (True value+CRQL). Do not qualify non-detects. If the ICSA "Found" value is less than (True value-CRQL), flag the associated sample detects as "J" and non-detects as "UJ".

| | | YES | NO | N/A |
|---|---|---|---|---|
| A.1.16.3.3 | ICSAB Solution<br>For ICP-MS, are all analyte results in ICSAB within the control limits of 80-120% of the true/established mean value, whichever is greater? | [✓] | ___ | ___ |

ACTION:
If no, apply the following action to all samples reported from the analytical run:

Flag (J) as estimated those associated sample results ≥ MDL for which the ICSAB analyte recovery is greater than 120% but ≤ 150%. If the ICSAB recovery falls within 50-79% flag (J) as estimated the associated sample results ≥ MDL. Reject (R) and red-line those all sample detects and non-detects for which the ICSAB analyte recovery is less than 50%. If the recovery is above 150%,reject (R) and red-line only detects (≥ MDL).

A.1.17 Spiked Sample Recovery: Pre-Digestion/Pre-Distillation)-Form V A
Note:Not required for Ca,Mg,K,and Na(both matrices);Al and Fe (soil only)

A.1.17.1 Was Matrix Spike analysis performed:

| | YES | NO | N/A |
|---|---|---|---|
| For each matrix type? | [___] | ___ | ✓ |
| For each SDG? | [___] | ___ | ✓ |
| On one of the SDG samples? | [___] | ___ | ✓ |
| For each concentration range (i.e.,low, med., high)? | [___] | ___ | ✓ |
| For each analytical Method (ICP-AES,ICP-MS, Hg, CN)used? | [___] | ___ | ✓ |
| Was a spiked sample prepared and analyzed with the SDG samples? | [___] | ___ | ✓ |

ACTION:
If no for any of the above, flag as estimated(J)all the positive data for which a spiked sample was not analyzed.

NOTE:
If more than one spiked sample were analyzed for one SDG, then qualify the associated data based on the worst spiked sample analysis.

| | | YES | NO | N/A |
|---|---|---|---|---|
| A.1.17.2 | Was a field blank or PE sample used for the spiked sample analysis? | ___ | [___] | ✓ |
| | ACTION: If yes, flag (J) as estimated positive data of the associated SDG samples for which field blank or PE sample was used for the spiked sample analysis. | | | |
| A.1.17.3 | Circle on each Form VA all spike recoveries that are outside the control limits (75-125%) that have sample concentrations less than four times the added spike concentrations. | | | |
| | Are all recoveries within the control limits when sample concentrations are less than or equal to four times the spike concentrations? | [___] | ___ | ✓ |
| | NOTE: Disregard the out of control spike recoveries for analytes whose concentrations are greater than or equal to four times the spike added. | | | |
| | Are results outside the control limits (75-125%) flagged with Lab Qualifier "N" on Form I's and Form VA? | [___] | ___ | ✓ |
| | ACTION: If no for any of the above, write in the Contract - Problems/Non-Compliance Section of the Data Review Narrative. | | | |
| A.1.17.4 | Aqueous | | | |
| | Are any spike recoveries: | | | |
| | (a) less than 30%? | ___ | [___] | ✓ |
| | (b) between 30-74%? | ___ | [___] | ✓ |
| | (c) between 126-150%? | ___ | [___] | ✓ |
| | (d) greater than 150%? | ___ | [___] | ✓ |
| | ACTION: If the matrix spike recovery is less than 30%, reject (R) and red-line all associated aqueous data (detects & non-detects). If between 30-74%, qualify all associated aqueous data ≥ MDL as "J" and non-detects | | | |

| | | YES | NO | N/A |
|---|---|---|---|---|
| | as "UJ". If between 126-150%, flag (J) all data ≥ MDL as "J". If greater than 150%, reject (R) and red-line all associated data ≥ MDL. | | | |
| | (NOTE:Replace "N" with "J", "R" as appropriate.) | | | |
| A.1.17.5 | Soil/Sediment | | | |
| | Are any spike recoveries: | | | |
| | (a) less than 10%? | ___ | [___] | ___ |
| | (b) between 10-74%? | ___ | [___] | ___ |
| | (c) between 126-200%? | ___ | [___] | ___ |
| | (d) greater than 200%? | ___ | [___] | ___ |
| | ACTION: If yes for any of the above, proceed as follows: | | | |
| | If the matrix spike recovery is less than 10%,reject (R) and red-line all associated data (detects & non-detects); if between 10-74%,qualify all associated data ≥ MDL as "J" and non-detects as "UJ"; if between 126-200%, flag (J) all associated data ≥ MDL as "J" If greater than 200%, reject (R) and red-line all associated data ≥ MDL. (NOTE:Replace "N" with "J" or "R" as appropriate.) | | | |
| A.1.18 | Lab Duplicates) - Form VI | | | |
| A.1.18.1 | Was the lab duplicate analysis performed: | | | |
| | For each SDG? | [___] | ___ | ___ |
| | On one of the SDG samples? | [___] | ___ | ___ |
| | For each matrix type? | [___] | ___ | ___ |
| | For each concentration range (low or med.)? | [___] | ___ | ___ |
| | For each analytical Method (ICP-AES/ICP-MS,Hg,CN)Used? | [___] | ___ | ___ |
| | Was a lab duplicate prepared and analyzed with the SDG samples? | [___] | ___ | ___ |

| | | YES | NO | N/A |
|---|---|---|---|---|
| | ACTION: If no for any of the above, flag (J) as estimated all the SDG sample results (detects & non-detects) for which the lab duplicate analysis was not performed. | | | |
| | NOTE: If more than one lab duplicate sample were analyzed for an SDG, then qualify the associated samples based on the worst lab duplicate analysis. | | | |
| A.1.18.2 | Was a Field Blank or PE sample used for the Lab Duplicate analysis? | ___ | [___] | ✓ |
| | ACTION: If yes, flag as estimated (J) all SDG sample results (hits & non-detects) for which Field Blank or PE sample was used for duplicate analysis. | | | |
| A.1.18.3 | Circle on each Form VI all values that are: RPD > 20%, or Absolute Difference > CRQL | | | |
| | Are all values within control limits (RPD ≤ 20% or absolute difference ≤ ±CRQL)? | [___] | ___ | ✓ |
| | If no, are all results outside the control limits flagged with an "*" (Lab Qualifier) on Form VI and on all Form I's? | [___] | ___ | ✓ |
| | ACTION: If no, write in the Contract-Problems/ Non-Compliance Section of the Data Review Narrative. | | | |
| | NOTE: The laboratory is not required to report on Form VI the RPD when both values are non-detects. | | | |
| A.1.18.4 | Aqueous | | | |
| A.1.18.4.1 | When sample and duplicate values are both ≥ 5xCRQL (substitute MDL for CRQL when MDL > CRQL), | | | |

| | YES | NO | N/A |
|---|---|---|---|
| is any RPD > 20% but < 100%? | ___ | [___] | ___ |
| is any RPD ≥ 100%? | ___ | [___] | ___ |

ACTION:
If the RPD is > 20% but < 100%, flag (J) as estimated the associated sample data ≥ CRQL. If the RPD is ≥ 100%, reject (R) and red-line the associated sample data ≥ CRQL.

(NOTE:Replace "*" with "J" or "R" as appropriate.)

A.1.18.4.2 When the sample and/or duplicate value <5xCRQL (substitute MDL for CRQL when MDL >CRQL), is the absolute difference between sample and duplicate values:

| | | | |
|---|---|---|---|
| > ± CRQL? | ___ | [___] | ___ |
| > ± 2xCRQL? | ___ | [___] | ___ |

ACTION:
If the absolute difference is > CRQL, flag as estimated all the associated sample results ≥ MDL but < 5xCRQL as "J" and non-detects as "UJ". If the absolute difference is > 2xCRQL, reject (R) and red-line all the associated non-detects and detects ≥ MDL but < 5xCRQL.

NOTE:
1. Replace "*" with "J", "UJ" or "R" as appropriate.)
2. If one value is >CRQL and the other value is non-detect, calculate the absolute difference between the value > CRQL and the MDL, and use this difference to qualify sample results.

A.1.18.5 Soil/Sediment

A.1.18.5.1 When sample and duplicate values are both ≥ 5xCRQL (substitute MDL for CRQL when MDL > CRQL),

| | | | |
|---|---|---|---|
| is any RPD ≥ 35% but < 120%? | ___ | [___] | ___ |
| is any RPD ≥ 120%? | ___ | [___] | ___ |

ACTION:
If the RPD is ≥ 35% and < 120%, flag (J) as estimated the associated sample

| | | YES | NO | N/A |
|---|---|---|---|---|
| | data ≥ CRQL. If the RPD is ≥ 120%, reject (R) and red-line the associated sample data ≥ CRQL. | | | |
| A.1.18.5.2 | When the sample and/or duplicate value <5xCRQL (substitute MDL for CRQL when MDL > CRQL), is the absolute difference between sample and duplicate: | | | |
| | > ± 2 x CRQL? | ___ | [___] | ✓ |
| | > ± 4 x CRQL | ___ | [___] | ✓ |

ACTION:
If the absolute difference is > 2 x CRQL, flag all the associated sample results ≥ MDL but < 5xCRQL as "J" and non-detects as "UJ". If the absolute difference is > 4xCRQL, reject (R) and red-line all the associated non-detects and detects ≥ MDL but <5xCRQL.

NOTE:
1. Replace "*" with "J", "UJ" or "R" as appropriate.)
2. If one value is >CRQL and the other value is non-detect, calculate the absolute difference between the value > CRQL and the MDL, and use this difference to qualify sample results.

A.1.19 Field Duplicates

Aqueous Field Duplicates

| | | | | |
|---|---|---|---|---|
| A.1.19.1 | Was an aqueous Field Duplicate pair collected and analyzed? (Check Sampling Trip Report) | [___] | ✓ | ___ |

ACTION:
If yes, prepare a Form (Appendix A.4) for each aqueous Field Duplicate pair. Report the sample and Field Duplicate results on Appendix A.4 from their respective Form I's. Calculate and report RPD on Appendix A.4 when sample and its Field Duplicate values are both > 5xCRQL. Calculate and report the absolute difference on Appendix A.4 when at least one value (sample or duplicate) is <5xCRQL. Evaluate the aqueous Field Duplicate analysis in accordance with the

| | YES | NO | N/A |
|---|---|---|---|
| QC criteria stated in Sections A.1.19.2 and A.1.19.3. | | | |

NOTE:
1. Do not transfer "*" from Form I's to Appendix A.4.
2. Do not calculate RPD when both values are non-detects.
3. Substitute MDL for CRQL when MDL > CRQL.
4. If one value is >CRQL and the other value is non-detect, calculate the absolute difference between the value > CRQL and the MDL, and use this the criteria to qualify the results.

A.1.19.2 Circle all values on the Form (Appendix A.4) for Field Duplicates that have:

RPD ≥ 20% or

Difference > ± CRQL

When sample and duplicate values are both ≥5xCRQL (substitute MDL for CRQL when MDL > CRQL),

| | | | |
|---|---|---|---|
| is any RPD ≥ 20%? | ___ | [___] | ___ |
| is any RPD ≥ 100%? | ___ | [___] | ___ |

ACTION:
If the RPD is >20% but < 100%, flag (J) only the associated sample and its Field Duplicate results ≥ CRQL. If the RPD is ≥ 100%, reject(R) and red-line only the associated sample and its Field Duplicate result ≥ CRQL.

A.1.19.3 When the sample and/or duplicate value(s) <5xCRQL (substitute MDL for CRQL when MDL >CRQL), is the absolute difference between sample and duplicate:

| | | | |
|---|---|---|---|
| > ± CRQL? | ___ | [___] | ___ |
| > ± 2 x CRQL? | ___ | [___] | ___ |

ACTION:
If the absolute difference is > CRQL, flag detects ≥ MDL but < 5xCRQL as "J" and non-detects as "UJ". If the difference is > 2xCRQL, reject (R) and red-line non-detects

| | | YES | NO | N/A |
|---|---|---|---|---|
| | and results ≥ MDL but <5xCRQL of the sample and its Field Duplicate. | | | |
| | Soil/Sediment Field Duplicates | | | |
| A.1.19.4 | Was a soil field duplicate pair collected and analyzed? (Check Sampling Trip Report) | [___] | ___ | ___ |

ACTION:
If yes, for each soil Field Duplicate pair proceed as follows:

Prepare Appendix A.4 for each Field Duplicate pair. Report on Appendix A.4 all sample and its Field Duplicate results in MG/KG from their respective Form I's. Calculate and report RPD when sample and its duplicate values are both greater than 5xCRQL. Calculate and report the absolute difference when at least one value (sample or duplicate)is < 5xCRQL. Evaluate the Field Duplicate analysis in accordance with the QC Criteria stated in Sections A.1.19.5 and A.1.19.6.

NOTE:
1. Do not transfer "*" from Form I's to Appendix A.4.
2. Do not calculate RPD when both values are non-detects.
3. Substitute MDL for CRQL when MDL > CRQL.
4. If one value is >CRQL and the other value is non-detect, calculate the absolute difference between the value > CRQL and the MDL, and apply the criteria to qualify the results.

| | | | | |
|---|---|---|---|---|
| A.1.19.5 | Circle on each Appendix A.4 all values that have:<br><br>RPD ≥ 35%, or Difference > ± 2xCRQL When sample and duplicate values are both ≥ 5xCRQL (substitute MDL for CRQL when MDL > CRQL), | | | |
| | is any RPD ≥ 35% but < 120%? | ___ | [___] | ___ |
| | is any RPD ≥ 120%? | ___ | [___] | ___ |

ACTION:
If the RPD is ≥ 35% but < 120%,

| | | YES | NO | N/A |
|---|---|---|---|---|
| | flag only the associated sample and its Field Duplicate results ≥ CRQL as "J". If the RPD is ≥ 120%, reject (R) and red-line only the sample and its Field Duplicate results ≥ CRQL. | | | |
| A.1.19.6 | When the sample and/or duplicate value(s) <5xCRQL (substitute MDL for CRQL when MDL > CRQL), is the absolute difference between sample and Field Duplicate: | | | |
| | > ± 2 x CRQL? | ___ | [___] | ✓ |
| | > ± 4 x CRQL? | ___ | [___] | ✓ |
| | **ACTION**: If the absolute difference is > 2xCRQL, flag Sample and its Field Duplicate resuts ≥ MDL but <5xCRQL as "J" and non-detects as "UJ". If the difference is >4xCRQL, reject(R) and red-line non-detects and detects ≥ MDL but <5xCRQL of the sample and its Field Duplicate. | | | |
| A.1.20 | Laboratory Control Sample (LCS)- Form VII | | | |
| A.1.20.1 | Was one LCS prepared and analyzed for: | | | |
| | Each SDG? | [✓] | ___ | ___ |
| | Each matrix type? | [✓] | ___ | ___ |
| | Each batch samples digested/distilled? | [✓] | ___ | ___ |
| | For each Method(ICP-AES,ICP-MS,Hg,CN) used? | [✓] | ___ | ___ |
| | Was an LCS prepared and analyzed with the samples? | [✓] | ___ | ___ |
| | **ACTION**: If no for any of the above, prepare Telephone Record Log and contact CLP PO or TOPO for submittal of the LCS results. Flag (J) as estimated all the data for which an LCS was not analyzed. | | | |
| | **NOTE**: If only one LCS was analyzed for | | | |

| | YES | NO | N/A |
|---|---|---|---|
| more than 20 samples, then the first 20 samples analyzed are not flagged(J), but all additional samples must be qualified (J). | | | |

A.1.20.2 Aqueous LCS

Circle on each Form VII the LCS percent recoveries outside control limits 80-120%.

NOTE: 1.Use digested ICV as LCS for aqueous mercury
2.Use distilled ICV as LCS for aqueous cyanide

Is any LCS recovery:

| | YES | NO | N/A |
|---|---|---|---|
| Less than 50%? | ___ | [✓] | ___ |
| Between 50% and 79%? | ___ | [✓] | ___ |
| Between 121% and 150%? | ___ | [✓] | ___ |
| Greater than 150%? | ___ | [✓] | ___ |

ACTION:
If the LCS recovery is less than 50%, reject (R) and red-line all associated sample data (detects & non-detects); for a recovery between 50-79%, flag detects as "J" all non-detects as "UJ". if the LCS recovery is between 121-150%, flag only detects as "J". if the recovery is greater than 150%, reject (R) and red-line all detects.

A.1.20.3 Solid LCS

If an analyte's MDL is equal to or greater than the true value of LCS, disregard the "Action" below for that analyte even though the LCS is out of control limits.

| | YES | NO | N/A |
|---|---|---|---|
| Is the LCS "Found" value greater than the Upper Control Limit reported on Form VII? | ___ | [___] | ✓ |

ACTION:

| | | YES | NO | N/A |
|---|---|---|---|---|
| | If yes, flag (J) all the associated detects ≥ MDL as estimated (J). | | | |
| | Is the LCS "Found" value lower than the Lower Control Limit reported on Form VII? | ___ | [___] | ✓ |
| | ACTION: If yes, flag detects as "J" and non-dectes as "UJ". | | | |
| A.1.21 | ICP-AES/ICP-MS Serial Dilution - Form VIII<br>NOTE: Serial dilution analysis is required only when the initial concentration is equal to or greater than 50 x MDL. | | | |
| A.1.21.1 | Was a Serial Dilution analysis performed: | | | |
| | For each SDG? | [___] | ___ | ✓ |
| | On one of the SDG samples? | [___] | ___ | ✓ |
| | For each matrix type? | [___] | ___ | ✓ |
| | For each concentration range (low or med.)? | [___] | ___ | ✓ |
| | Was a Serial Dilution sample analyzed with the SDG samples? | [___] | ___ | ✓ |
| | ACTION: If no for any of the above, flag as estimated (J) detects ≥ MDL of all the SDG samples for which the ICP Serial Dilution Analysis was not performed. | | | |
| A.1.21.2 | Was a Field Blank or PE sample used for the Serial Dilution Analysis? | ___ | [___] | ✓ |
| | ACTION: If yes, flag as estimated (J) detects ≥ MDL of all the SDG samples | | | |
| A.1.21.3 | Circle on Form VIII the Percent Differences (%D) between sample results and its dilution results that are outside the control limits ± 10% | | | |

| | | YES | NO | N/A |
|---|---|---|---|---|
| | when initial concentrations ≥ 50 x MDLs. | | | |
| | Are results outside the control limits flagged with an "E"(Lab Qualifier) on Form VIII and all Form I's? | [___] | ___ | ___ |
| | ACTION: If no, write in the Contract-Problem/ Non-Compliance Section of the Data Review Narrative. | | | |
| A.1.21.4 | Are any %D values: | | | |
| | > 10%? | ___ | [___] | ___ |
| | ≥ 100%? | ___ | [___] | ___ |
| | ACTION: If the Percent Difference (%D) is greater than 10%, flag (J) as estimated all associated samples whose raw data ≥ MDL; if the %D is ≥ 100%, reject (R) and red-line all associated samples with raw data ≥ MDL. | | | |
| | (NOTE:Replace "E" with "J" or "R" as appropriate.) | | | |
| A.1.22 | Total/Dissolved or Inorganic/Total Analytes | | | |
| A.1.22.1 | Were any analyses performed for dissolved as well as total analytes on the same sample(s)? | ___ | [___] | ___ |
| | Were any analyses performed for inorganic as well as total analytes on the same sample(s)? | ___ | [___] | ___ |
| | ACTION: If yes, prepare a Form (Appendix A.5) to compare the differences between dissolved (or inorganic)and total analyte concentrations. Compute each difference on Appendix A.5 as a percent of the total analyte only when both of the following conditions are fulfilled: | | | |
| | (1) The dissolved(or inorganic)concentration is greater than total concentration, and (2) greater than or equal to 5xMDL. | | | |
| A.1.22.2 | Is any dissolved (or inorganic) concentration greater than its total concentration by more than 20%? | ___ | [___] | ___ |

| | | YES | NO | N/A |
|---|---|---|---|---|
| A.1.22.3 | Is any dissolved(or inorganic) concentration greater than its total concentration by more than 50%? | ___ | [___] | ✓ |
| | ACTION: If the percent difference is greater than 20%, flag (J) both dissolved/inorganic and total concentrations as estimated. If the difference is more than 50%, reject (R) and red-line both the values. | | | |
| A.1.23 | Field Blank - Form I<br>NOTE: Designate "Field Blank" as such on Form I | | | |
| A.1.23.1 | Was a Field/Rinsate Bank collected and analyzed with the SDG samples? | [✓] | ___ | ___ |
| | If yes, is any Field/Rinsate Blank absolute value of an analyte on Form I greater than its CRQL(or 2xMDL when MDL>CRQL)? | ✓ | [___] | ___ |
| | If yes, circle the Field Blank value on Form I that is greater than the CRQL, (or 2 x MDL when MDL > CRQL). | | | |
| | Is any Field Blank value greater than CRQL also greater than the Preparation Blank value? | ✓ | [___] | ___ |
| | If yes, is the Field Blank value (> CRQL and > the prep. blank value) already rejected due to other QC criteria? | [___] | ✓ | ___ |
| | ACTION: If the Field Blank value was not rejected, reject all associated sample data (except the Field Blank results)greater than the CRQL but less than the Field Blank value. Reject on Form I's the soil sample results whose raw values in ug/L in the instrument printout are greater than the CRQL but less than the Field Blank value in ug/L. Flag as "J" detects between the Field Blank value and 10xField Blank value. If the sample result ≥ MDL but ≤ CRQL, replace it with CRQL-U. | | | |
| | If the Field Blank value is less than the | | | |

| | YES | NO | N/A |
|---|---|---|---|
| Prep.Blank value, do not qualify the sample results due to the Field Blank criteria. | | | |

NOTE:
1. Field Blank result previously rejected due to other criteria cannot be used to qualify field samples.
2. Do not use Rinsate Blank associated with soils to qualify water samples and vice versa.

A.1.24 Verification of Instrumental Parameters - Form IX, XA, XB, XI

A.1.24.1 Is verification report present for:

| | YES | NO | N/A |
|---|---|---|---|
| Method Detection Limits (Form IX-Annually)? | [✓] | ___ | ___ |
| ICP-AES Interelement Correction Factors (Form XA & XB -Quarterly)? | [✓] | ___ | ___ |
| ICP-AES & ICP-MS Linear Ranges (Form XI-Quarterly)? | [✓] | ___ | ___ |

ACTION:
If no, contact CLP PO/TOPO for submittal from the laboratory.

A.1.24.2 Method Detection Limits - Form IX

A.1.24.2.1 Are MDLs present on Form IX for:

| | YES | NO | N/A |
|---|---|---|---|
| All the analytes? | [✓] | ___ | ___ |
| All the instruments used? | [✓] | ___ | ___ |
| Digested and undigested samples and Calib.Blanks? | [✓] | ___ | ___ |
| ICP-AES and ICP-MS when both instruments are used for the same analyte? | [___] | ___ | ___ |

ACTION:
If no for any of the above, prepare Telephone Record Log and contact CLP PO/TOPO for submittal of the MDLs from the laboratory. Report to CLP PO and write in the Contract Problems/ Non-Compliance Section of the Data Review Narrative if the MDL concentration is not less than ½ CRQL.

| | | YES | NO | N/A |
|---|---|---|---|---|
| A.1.24.2.2 | Is MDL greater than the CRQL for any analyte? | ___ | [✓] | ___ |
| | If yes, is the analyte concentration on Form I greater than 5 x MDL for the sample analyzed on the instrument whose MDL exceeds CRQL? | [___] | ___ | ___ |
| | ACTION: If no, flag as estimated (J) all values less than five times MDL for the analyte whose MDL exceeds the CRQL. | | | |
| A.1.24.3 | Linear Ranges - Form XI | | | |
| A.1.24.3.1 | Was any sample result higher than the high linear range for ICP-AES or ICP-MS? | ___ | [✓] | ___ |
| | Was any sample result higher than the highest calibration standard for mercury or cyanide? | ___ | [✓] | ___ |
| | If yes for any of the above, was the sample diluted to obtain the result reported on Form I? | [✓] | ___ | ___ |
| | ACTION: If no, flag (J) as estimated the affected detects (≥ MDL) reported on Form I. | | | |
| A.1.25 | ICP-MS Tune Analysis - Form XIV | | | |
| A.1.25.1 | Was the ICP-MS instrument tuned prior to calibration? | [✓] | ___ | ___ |
| | ACTION: If no, reject (R) and red-line all sample data for which tuning was not performed. | | | |
| A.1.25.2 | Was the tuning solution analyzed or scanned at least five times consecutively? | [✓] | ___ | ___ |
| | Were all the required isotopes spanning the analytical range present in the tuning solution? | [✓] | ___ | ___ |
| | Was the mass resolution within | | | |

| | YES | NO | N/A |
|---|---|---|---|
| 0.1 amu for each isotope in the tuning solution? | [✓] | ___ | ___ |
| Was %RSD less than 5% for each isotope of each analyte in the tuning solution? | [✓] | ___ | ___ |

ACTION:
If no for any of the above, qualify all results ≥ MDL associated with that Tune as estimated "J", and all non-detects associated with that Tune as "UJ".

A.1.26 ICP-MS Internal Standards - Form XV

| | YES | NO | N/A |
|---|---|---|---|
| A.1.26.1 Were the Internal Standards added to all the samples and all QC samples and calibration standards (except the Tuning Solution)? | [✓] | ___ | ___ |
| Were all the target analyte masses bracketed by the masses of the five internal standards? | [✓] | ___ | ___ |

ACTION:
If none of the Internal Standards was added to the samples, reject (R) and red-line all the associated sample data (detects & non-detects). If internal standards were used but did not cover all the analyte masses, reject (R) and red-line only the analyte results not bracketed by the internal standard masses.

| | YES | NO | N/A |
|---|---|---|---|
| A.1.26.2 Was the intensity of an Internal Standard in each sample within 60-125% of the intensity of the same Internal Standard in the calibration blank? | [✓] | ___ | ___ |
| If no, was the original sample diluted two fold, Internal Standard added and the sample re-analyzed? | [___] | ___ | ✓ |
| Was the %RI for the two fold diluted sample within the acceptance limits (60-125%)? | [___] | ___ | ✓ |

ACTION:
If no for any of the above, flag detects as "J" and non-detects "UJ" of all the analytes with atomic masses between the

atomic mass of the internal standard lighter

than the affected internal standard, and the atomic mass of the internal standard heavier than the affected internal standard.

A.1.27 Percent Solids of Sediments

A.1.27.1 Are percent solids in sediment(s):

< 50%? ___ [___] ✓___

ACTION:
If yes, qualify as estimated (J) all detects and non-detects of a sample that has percent solids less than 50%(i.e.,moisture content greater than 50%).

NOTE:
Flag(J) only the sample results that were not previously flagged due to other QC criteria.

## Inorganic Data Review Narrative

Case# _____ Site: _____ Matrix: Soil ____

SDG# _____ Lab: _____ Water ____

Sampling Team: _____ Reviewer: _____ Other _____

A.2.1 Data Validation Flags:
The following flags may have been applied in red by the data validator and must be considered by the data user.

J - This flag indicates the result qualified as estimated

R and Red-Line - A red-line drawn through a sample result indicates unusable value. The red-lined data are known to contain significant errors based on documented information and must not be used by the data user.

U - This data validation qualifier is applied to sample results ≥ MDL when associated blank is contaminated

Fully Usable Data - The results that do not carry "J" or "red-line" are fully usable.

A.2.2 Laboratory Qualifiers:
The CLP laboratory applies a contractual qualifier on all

**LABORATORY DATA CONSULTANTS, INC.**
7750 El Camino Real, Suite 2L Carlsbad, CA 92009 Phone: 760/634-0437 Fax: 760/634-0439

Windward Environmental, LLC
200 West Mercer Street, Suite 401
Seattle, WA 98119
ATTN: Ms. Jennifer Parker

October 6, 2011

SUBJECT: Lower Passaic River Restoration Project, Data Validation

Dear Ms. Parker,

Enclosed are the final validation reports for the fractions listed below. These SDGs were received on September 19, 2011. Attachment 1 is a summary of the samples that were reviewed for each analysis.

**LDC Project # 26278:**

| SDG # | Fraction |
|---|---|
| 1132006 | Mercury & Methyl Mercury |
| K1107026 | Metals, Percent Lipids, Butyltins |

The data validation was performed under EPA Level IV guidelines. The analyses were validated using the following documents, as applicable to each method:

- Final Surface Sediment Chemical Analyses and Benthic Invertebrate Toxicity and Bioaccumulation Testing Quality Assurance Project Plan (QAPP) for the Lower Passaic River Restoration Project, October 2009
- Caged Bivalve Study Addendum, March 2011
- USEPA Region II Validation SOP HW-2, (Revision 13, September 2006) for Metals, modified as necessary to accommodate the QAPP criteria
- USEPA, Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review, June 2008
- USEPA, Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review, January 2010

Please feel free to contact us if you have any questions.

Sincerely,

Stella Cuenco

Stella S. Cuenco
Data Validation Operations Manager/Senior Chemist

L:\Windward\Passaic\26278COV.wpd

Attachment 1

| EDD | LDC #26278 (Windward Environmental, LLC - Seattle WA / Lower Passaic River Restoration Project) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | PO# 2011-0012 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LDC | SDG# | DATE REC'D | (3) DATE DUE | Hg (1631) | | Methyl Hg (1630) | | Metals (SW846) | | Se (7742) | | Lipids (B&D) | | Butyltin (KRONE) | | | | | | | | | | | | | | | | | | | | | | |
| Matrix: Water/Tissue | | | | W | T | W | T | W | T | W | T | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S |
| A | 1132006 | 09/19/11 | 10/10/11 | 0 | 11 | 0 | 11 | - | - | - | - | - | - | - | - | | | | | | | | | | | | | | | | | | | | | |
| B | K1107026 | 09/19/11 | 10/10/11 | - | - | - | - | 0 | 10 | 0 | 10 | 0 | 10 | 0 | 10 | | | | | | | | | | | | | | | | | | | | | |
| Total | A/SC | | | 0 | 11 | 0 | 11 | 0 | 10 | 0 | 10 | 0 | 10 | 0 | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 62 |

For Internal Use Only: Shaded cells indicate Level IV validation (all other cells are Level III validation). These sample counts do not include MS/MSD, and DUPs

26278ST.wpd

# Laboratory Data Consultants, Inc.
# Data Validation Report

| | |
|---|---|
| **Project/Site Name:** | Lower Passaic River Restoration Project |
| **Collection Date:** | March 8 through June 8, 2011 |
| **LDC Report Date:** | October 10, 2011 |
| **Matrix:** | Tissue |
| **Parameters:** | Metals |
| **Validation Level:** | EPA Level IV |
| **Laboratory:** | Columbia Analytical Services, Inc. |
| **Sample Delivery Group (SDG):** | K1107026 |

**Sample Identification**

LPR6-ECST-Comp01
LPRBG-ECST-Comp01
LPR6-ECST-Comp02
LPR7-ECST-Comp03
LPR7-ECST-Comp04
LPR8-ECST-Comp05
LPR1-GDST-Comp01
LPRBG-GDST-Comp01
LPR2-GDST-Comp02
LPR3-GDST-Comp03
LPR6-ECST-Comp02MS
LPR6-ECST-Comp02DUP

## Introduction

This data review covers 12 tissue samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Methods 6010B, 6020, and 7742 for Metals. The metals analyzed were Aluminum, Antimony, Arsenic, Barium, Beryllium, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Nickel, Potassium, Selenium, Silver, Sodium, Thallium, Titanium, Vanadium, and Zinc.

This review follows the Final Surface Sediment Chemical Analyses and Benthic Invertebrate Toxicity and Bioaccumulation Testing Quality Assurance Project Plan (QAPP) for the Lower Passaic River Restoration Project, (October 8, 2009), the Caged Bivalve Study Addendum (March 2, 2011) and the USEPA Region II Validation SOP HW-2 (Revision 13, September 2006) for Metals, modified as necessary to accomodate the QAPP criteria.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

NJ Presumptive evidence of presence of the compound at an estimated quantity.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

## I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

## II. ICPMS Tune

The mass calibration was within 0.1 AMU and the percent relative standard deviation (%RSD) was less than or equal to 5% .

## III. Calibration

An initial calibration was performed.

The frequency and analysis criteria of the initial calibration verification (ICV), continuing calibration verification (CCV), and CRDL standard were met.

## IV. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks with the following exceptions:

| Method Blank ID | Analyte | Maximum Concentration | Associated Samples |
|---|---|---|---|
| PB (prep blank) | Calcium<br>Copper<br>Magnesium<br>Thallium | 0.4 mg/Kg<br>0.008 mg/Kg<br>0.09 mg/Kg<br>0.009 mg/Kg | All samples in SDG K1107026 |
| ICB/CCB | Antimony<br>Barium | 0.043 ug/L<br>1.10 ug/L | All samples in SDG K1107026 |
| PB (prep blank) | Manganese | 0.080 mg/Kg | LPR6-ECST-Comp01<br>LPRBG-ECST-Comp01<br>LPR6-ECST-Comp02<br>LPR7-ECST-Comp03<br>LPR7-ECST-Comp04<br>LPR8-ECST-Comp05<br>LPR1-GDST-Comp01<br>LPR3-GDST-Comp03 |
| ICB/CCB | Selenium | 0.2 ug/L | LPR6-ECST-Comp01<br>LPR8-ECST-Comp05<br>LPR3-GDST-Comp03 |
| ICB/CCB | Potassium | 90.5 ug/L | LPR6-ECST-Comp01<br>LPRBG-ECST-Comp01<br>LPR6-ECST-Comp02<br>LPR7-ECST-Comp03 |

| Method Blank ID | Analyte | Maximum Concentration | Associated Samples |
|---|---|---|---|
| ICB/CCB | Potassium<br>Sodium | 85.9 ug/L<br>49.4 ug/L | LPR7-ECST-Comp04<br>LPR8-ECST-Comp05<br>LPR1-GDST-Comp01<br>LPRBG-GDST-Comp01<br>LPR2-GDST-Comp02<br>LPR3-GDST-Comp03 |
| ICB/CCB | Manganese | 0.30 ug/L | LPRBG-GDST-Comp01<br>LPR2-GDST-Comp02 |
| ICB/CCB | Arsenic<br>Cobalt<br>Thallium | 0.123 ug/L<br>0.0046 ug/L<br>0.0068 ug/L | LPR6-ECST-Comp01<br>LPRBG-ECST-Comp01<br>LPR7-ECST-Comp03<br>LPR7-ECST-Comp04<br>LPR8-ECST-Comp05<br>LPR1-GDST-Comp01<br>LPRBG-GDST-Comp01<br>LPR2-GDST-Comp02<br>LPR3-GDST-Comp03 |
| ICB/CCB | Thallium | 0.0066 ug/L | LPR6-ECST-Comp02 |

Data qualification by the initial, continuing and preparation blanks (ICB/CCB/PBs) was based on the maximum contaminant concentration in the ICB/CCB/PBs in the analysis of each analyte. The sample concentrations were either not detected or were significantly greater than the concentrations found in the associated method blanks with the following exceptions:

| Sample | Analyte | Reported Concentration | Modified Final Concentration |
|---|---|---|---|
| LPRBG-ECST-Comp01 | Thallium | 0.0010 mg/Kg | 0.0021U mg/Kg |
| LPR6-ECST-Comp02 | Antimony<br>Thallium | 0.004 mg/Kg<br>0.0013 mg/Kg | 0.005U mg/Kg<br>0.0018U mg/Kg |
| LPR7-ECST-Comp03 | Antimony<br>Thallium | 0.003 mg/Kg<br>0.0008 mg/Kg | 0.005U mg/Kg<br>0.0019U mg/Kg |
| LPR7-ECST-Comp04 | Antimony<br>Thallium | 0.002 mg/Kg<br>0.0009 mg/Kg | 0.005U mg/Kg<br>0.0020U mg/Kg |
| LPR8-ECST-Comp05 | Antimony<br>Thallium | 0.004 mg/Kg<br>0.0008 mg/Kg | 0.004U mg/Kg<br>0.0017U mg/Kg |
| LPR1-GDST-Comp01 | Thallium | 0.0004 mg/Kg | 0.0010U mg/Kg |
| LPRBG-GDST-Comp01 | Thallium | 0.0004 mg/Kg | 0.0015U mg/Kg |
| LPR2-GDST-Comp02 | Antimony<br>Thallium | 0.001 mg/Kg<br>0.0004 mg/Kg | 0.002U mg/Kg<br>0.0010U mg/Kg |

| Sample | Analyte | Reported Concentration | Modified Final Concentration |
|---|---|---|---|
| LPR3-GDST-Comp03 | Antimony<br>Thallium | 0.001 mg/Kg<br>0.0006 mg/Kg | 0.003U mg/Kg<br>0.0011U mg/Kg |

Sample LPR-071811-RB (from SDG K1106643) was identified as a rinsate blank. No metal contaminants were found above the reporting limit in this blank with the following exceptions:

| Rinsate Blank ID | Sampling Date | Analyte | Concentration | Associated Samples |
|---|---|---|---|---|
| LPR-071811-RB | 7/18/11 | Barium<br>Chromium<br>Copper<br>Iron<br>Manganese<br>Nickel<br>Zinc | 0.107 ug/L<br>9.5 ug/L<br>1.07 ug/L<br>44.9 ug/L<br>1.670 ug/L<br>1.38 ug/L<br>1.8 ug/L | All samples in SDG K1107026 |

Sample concentrations were compared to concentrations detected in the field blanks. The sample concentrations were either not detected or were significantly greater than the concentrations found in the associated field blanks with the following exceptions:

| Sample | Analyte | Reported Concentration | Modified Final Concentration |
|---|---|---|---|
| LPR6-ECST-Comp01 | Chromium | 0.35 mg/Kg | 0.35J mg/Kg |
| LPRBG-ECST-Comp01 | Chromium | 0.33 mg/Kg | 0.33J mg/Kg |
| LPR6-ECST-Comp02 | Chromium | 0.90 mg/Kg | 0.90J mg/Kg |
| LPR7-ECST-Comp03 | Chromium | 0.57 mg/Kg | 0.57J mg/Kg |
| LPR7-ECST-Comp04 | Chromium | 0.40 mg/Kg | 0.40J mg/Kg |
| LPR1-GDST-Comp01 | Chromium<br>Nickel | 0.16 mg/Kg<br>0.112 mg/Kg | 0.16J mg/Kg<br>0.112J mg/Kg |
| LPRBG-GDST-Comp01 | Chromium | 0.20 mg/Kg | 0.20J mg/Kg |
| LPR2-GDST-Comp02 | Chromium<br>Nickel | 0.20 mg/Kg<br>0.131 mg/Kg | 0.20J mg/Kg<br>0.131J mg/Kg |

## V. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

The criteria for analysis were met with the following exceptions:

| ICS ID | Date (Time) | Analyte | Concentration (Limits) | Associated Samples | Flag | A or P |
|---|---|---|---|---|---|---|
| ICSA | 9/1/11 (13:48) | Antimony<br>Cadmium<br>Cobalt<br>Copper<br>Lead<br>Nickel<br>Silver | 0.1 ug/L (≤0.1)<br>0.1 ug/L (≤0.040)<br>0.8 ug/L (≤0.040)<br>0.7 ug/L (≤0.200)<br>0.1 ug/L (≤0.040)<br>1.4 ug/L (≤0.400)<br>0.1 ug/L (≤0.040) | All samples in SDG K1107026 | J (all detects)<br>J (all detects)<br>J (all detects)<br>J (all detects)<br>J (all detects)<br>J (all detects)<br>J (all detects) | A |

## VI. Matrix Spike Analysis

Matrix spike (MS) analyses were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits with the following exceptions:

| Spike ID (Associated Samples) | Analyte | %R (Limits) | Flag | A or P |
|---|---|---|---|---|
| LPR6-ECST-Comp02MS (All samples in SDG K1107026) | Cobalt | 55.1 (75-125) | J (all detects)<br>UJ (all non-detects) | A |

## VII. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Results were within QC limits with the following exceptions:

| DUP ID (Associated Samples) | Analyte | RPD (Limits) | Difference (Limits) | Flag | A or P |
|---|---|---|---|---|---|
| LPR6-ECST-Comp02DUP (All samples in SDG K1107026) | Copper | 58.5 (≤35) | - | J (all detects) | A |

## VIII. Laboratory Control Samples (LCS) and Standard Reference Material (SRM) Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

Percent recoveries (%R) of the standard reference material were within QC limits.

## IX. Internal Standards

All internal standard percent recoveries (%R) were within QC limits.

## X. Furnace Atomic Absorption QC

Graphite furnace atomic absorption was not utilized in this SDG.

## XI. ICP Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria were met with the following exceptions:

| Diluted Sample | Analyte | %D (Limits) | Associated Samples | Flag | A or P |
|---|---|---|---|---|---|
| LPR6-ECST-Comp02 | Cadmium<br>Cobalt<br>Copper<br>Nickel | 13 (≤10)<br>13 (≤10)<br>17 (≤10)<br>15 (≤10) | All samples in SDG K1107026 | J (all detects)<br>J (all detects)<br>J (all detects)<br>J (all detects) | A |

## XII. Sample Result Verification

All sample result verifications were acceptable.

## XIII. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

## XIV. Field Duplicates

No field duplicates were identified in this SDG.

## Lower Passaic River Restoration Project
## Metals - Data Qualification Summary - SDG K1107026

| SDG | Sample | Analyte | Flag | A or P | Reason |
|---|---|---|---|---|---|
| K1107026 | LPR6-ECST-Comp01<br>LPRBG-ECST-Comp01<br>LPR6-ECST-Comp02<br>LPR7-ECST-Comp03<br>LPR7-ECST-Comp04<br>LPR8-ECST-Comp05<br>LPR1-GDST-Comp01<br>LPRBG-GDST-Comp01<br>LPR2-GDST-Comp02<br>LPR3-GDST-Comp03 | Antimony<br>Cadmium<br>Cobalt<br>Copper<br>Lead<br>Nickel<br>Silver | J (all detects)<br>J (all detects)<br>J (all detects)<br>J (all detects)<br>J (all detects)<br>J (all detects)<br>J (all detects) | A | ICP interference check (Concentration) |
| K1107026 | LPR6-ECST-Comp01<br>LPRBG-ECST-Comp01<br>LPR6-ECST-Comp02<br>LPR7-ECST-Comp03<br>LPR7-ECST-Comp04<br>LPR8-ECST-Comp05<br>LPR1-GDST-Comp01<br>LPRBG-GDST-Comp01<br>LPR2-GDST-Comp02<br>LPR3-GDST-Comp03 | Cobalt | J (all detects)<br>UJ (all non-detects) | A | Matrix spike analysis (%R) |
| K1107026 | LPR6-ECST-Comp01<br>LPRBG-ECST-Comp01<br>LPR6-ECST-Comp02<br>LPR7-ECST-Comp03<br>LPR7-ECST-Comp04<br>LPR8-ECST-Comp05<br>LPR1-GDST-Comp01<br>LPRBG-GDST-Comp01<br>LPR2-GDST-Comp02<br>LPR3-GDST-Comp03 | Copper | J (all detects) | A | Duplicate samples analysis (RPD) |
| K1107026 | LPR6-ECST-Comp01<br>LPRBG-ECST-Comp01<br>LPR6-ECST-Comp02<br>LPR7-ECST-Comp03<br>LPR7-ECST-Comp04<br>LPR8-ECST-Comp05<br>LPR1-GDST-Comp01<br>LPRBG-GDST-Comp01<br>LPR2-GDST-Comp02<br>LPR3-GDST-Comp03 | Cadmium<br>Cobalt<br>Copper<br>Nickel | J (all detects)<br>J (all detects)<br>J (all detects)<br>J (all detects) | A | ICP serial dilution (%D) |

## Lower Passaic River Restoration Project
## Metals - Laboratory Blank Data Qualification Summary - SDG K1107026

| SDG | Sample | Analyte | Modified Final Concentration | A or P |
|---|---|---|---|---|
| K1107026 | LPRBG-ECST-Comp01 | Thallium | 0.0021U mg/Kg | A |
| K1107026 | LPR6-ECST-Comp02 | Antimony<br>Thallium | 0.005U mg/Kg<br>0.0018U mg/Kg | A |

| SDG | Sample | Analyte | Modified Final Concentration | A or P |
|---|---|---|---|---|
| K1107026 | LPR7-ECST-Comp03 | Antimony<br>Thallium | 0.005U mg/Kg<br>0.0019U mg/Kg | A |
| K1107026 | LPR7-ECST-Comp04 | Antimony<br>Thallium | 0.005U mg/Kg<br>0.0020U mg/Kg | A |
| K1107026 | LPR8-ECST-Comp05 | Antimony<br>Thallium | 0.004U mg/Kg<br>0.0017U mg/Kg | A |
| K1107026 | LPR1-GDST-Comp01 | Thallium | 0.0010U mg/Kg | A |
| K1107026 | LPRBG-GDST-Comp01 | Thallium | 0.0015U mg/Kg | A |
| K1107026 | LPR2-GDST-Comp02 | Antimony<br>Thallium | 0.002U mg/Kg<br>0.0010U mg/Kg | A |
| K1107026 | LPR3-GDST-Comp03 | Antimony<br>Thallium | 0.003U mg/Kg<br>0.0011U mg/Kg | A |

## Lower Passaic River Restoration Project
## Metals - Field Blank Data Qualification Summary - SDG K1107026

| SDG | Sample | Analyte | Modified Final Concentration | A or P |
|---|---|---|---|---|
| K1107026 | LPR6-ECST-Comp01 | Chromium | 0.35J mg/Kg | A |
| K1107026 | LPRBG-ECST-Comp01 | Chromium | 0.33J mg/Kg | A |
| K1107026 | LPR6-ECST-Comp02 | Chromium | 0.90J mg/Kg | A |
| K1107026 | LPR7-ECST-Comp03 | Chromium | 0.57J mg/Kg | A |
| K1107026 | LPR7-ECST-Comp04 | Chromium | 0.40J mg/Kg | A |
| K1107026 | LPR1-GDST-Comp01 | Chromium<br>Nickel | 0.16J mg/Kg<br>0.112J mg/Kg | A |
| K1107026 | LPRBG-GDST-Comp01 | Chromium | 0.20J mg/Kg | A |
| K1107026 | LPR2-GDST-Comp02 | Chromium<br>Nickel | 0.20J mg/Kg<br>0.131J mg/Kg | A |

LDC #: 26278B4 **VALIDATION COMPLETENESS WORKSHEET** Date: 9-27-11
SDG #: K1107026 Level ~~III~~ IV Page: 1 of 1
Laboratory: Columbia Analytical Services Reviewer: [illegible]
2nd Reviewer: [illegible]

**METHOD:** Metals (EPA SW 846 Method 6010B/6020/~~7000~~ 7742)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

| | Validation Area | | Comments |
|---|---|---|---|
| I. | Technical holding times | A | Sampling dates: 3/8 → 6/8/11 |
| II. | ICP/MS Tune | A | |
| III. | Calibration | A | |
| IV. | Blanks | SW | |
| V. | ICP Interference Check Sample (ICS) Analysis | SW | |
| VI. | Matrix Spike Analysis | SW | MS |
| VII. | Duplicate Sample Analysis | SW | DUP |
| VIII. | Laboratory Control Samples (LCS) | A | LCS, LCS-SRM |
| IX. | Internal Standard (ICP-MS) | A | |
| X. | Furnace Atomic Absorption QC | N | Not utilized |
| XI. | ICP Serial Dilution | SW | |
| XII. | Sample Result Verification | A | |
| XIII. | Overall Assessment of Data | A | |
| XIV. | Field Duplicates | N | |
| XV | Field Blanks | SW | Rinse Blk = LPR-071811-RB (SDG: K1106643) |

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: Tissue

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1 | LPR6-ECST-Comp01 | 11 | LPR6-ECST-Comp02MS | 21 | | 31 | |
| 2 | LPRBG-ECST-Comp01 | 12 | LPR6-ECST-Comp02DUP | 22 | | 32 | |
| 3 | LPR6-ECST-Comp02 | 13 | | 23 | | 33 | |
| 4 | LPR7-ECST-Comp03 | 14 | | 24 | | 34 | |
| 5 | LPR7-ECST-Comp04 | 15 | | 25 | | 35 | |
| 6 | LPR8-ECST-Comp05 | 16 | | 26 | | 36 | |
| 7 | LPR1-GDST-Comp01 | 17 | | 27 | | 37 | |
| 8 | LPRBG-GDST-Comp01 | 18 | | 28 | | 38 | |
| 9 | LPR2-GDST-Comp02 | 19 | | 29 | | 39 | |
| 10 | LPR3-GDST-Comp03 | 20 | | 30 | | 40 | |

Notes:

DC #: 66C0034

# VALIDATION FINDINGS WORKSHEET
## Sample Specific Element Reference

Page: 1 of 1
Reviewer: CR
2nd reviewer: [illegible]

ll circled elements are applicable to each sample.

| Sample ID | Matrix | Target Analyte List (TAL) |
|---|---|---|
| 1-10 | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, Ti |
| | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, |
| 11,12 | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, Ti |
| | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, |
| | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, |
| | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, |
| | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, |
| | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, |
| | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, |
| | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, |
| | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, |
| | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, |
| | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, |
| | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, |
| | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, |
| | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, |
| | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, |
| | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, |
| | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, |
| | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, |
| | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, |
| | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, |

| Analysis Method | | |
|---|---|---|
| ICP | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, Ti |
| ICP-MS | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, |
| FAA | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, |

Comments: Mercury by CVAA if performed

LDC #: 26278B4

# VALIDATION FINDINGS WORKSHEET
## PB/ICB/CCB QUALIFIED SAMPLES


Reviewer: CR
2nd Reviewer: [illegible]

**METHOD:** Trace metals (EPA SW 864 Method 6010B/6020/7000) Soil preparation factor applied: 10x
Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: All

| Analyte | Maximum PB[a] (mg/Kg) | Maximum PB[a] (ug/L) | Maximum ICB/CCB[a] (ug/L) | Action Limit | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sb | | | 0.043 | | | 0.004 / 0.005 | 0.003 / 0.005 | 0.002 / 0.005 | 0.004 / 0.004 | | | 0.001 / 0.002 | 0.001 / 0.003 | |
| Ba | | | 1.10 | | | | | | | | | | | |
| Ca | 0.4 | | | | | | | | | | | | | |
| Cu | 0.008 | | | | | | | | | | | | | |
| Mg | 0.09 | | | | | | | | | | | | | |
| Tl | 0.009 | | | | 0.0010 / 0.0021 | 0.0013 / 0.0018 | 0.0008 / 0.0019 | 0.0009 / 0.0020 | 0.0008 / 0.0017 | 0.0004 / 0.0010 | 0.0004 / 0.0015 | 0.0004 / 0.0010 | 0.0006 / 0.0011 | |

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 1-7, 10

| Analyte | Maximum PB[a] (mg/Kg) | Maximum PB[a] (ug/L) | Maximum ICB/CCB[a] (ug/L) | Action Limit | No Qualifiers (>10x) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mn | 0.080 | | | 0.8 | | | | | | | | | | |

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 1, 6, 10

| Analyte | Maximum PB[a] (mg/Kg) | Maximum PB[a] (ug/L) | Maximum ICB/CCB[a] (ug/L) | Action Limit | No Qualifiers (>RL) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Se | | | 0.2 | | | | | | | | | | | |

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 1-4

| Analyte | Maximum PB[a] (mg/Kg) | Maximum PB[a] (ug/L) | Maximum ICB/CCB[a] (ug/L) | Action Limit | No Qualifiers (>RL) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| K | | | 90.5 | | | | | | | | | | | |

LDC #: 26278B4

# VALIDATION FINDINGS WORKSHEET
## PB/ICB/CCB QUALIFIED SAMPLES


Reviewer: 2nd Reviewer:

**METHOD:** Trace metals (EPA SW 864 Method 6010B/6020/7000) Soil preparation factor applied: 10x

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 5-10

| Analyte | Maximum PB[a] (mg/Kg) | Maximum PB[a] (ug/L) | Maximum ICB/CCB[a] (ug/L) | Action Limit | No Qualifiers (>RL) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| K | | | 85.9 | | | | | | | | | | | |
| Na | | | 49.4 | | | | | | | | | | | |

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 8, 9

| Analyte | Maximum PB[a] (mg/Kg) | Maximum PB[a] (ug/L) | Maximum ICB/CCB[a] (ug/L) | Action Limit | No Qualifiers (>RL) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mn | | | 0.30 | | | | | | | | | | | |

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 1, 2, 4-10

| Analyte | Maximum PB[a] (mg/Kg) | Maximum PB[a] (ug/L) | Maximum ICB/CCB[a] (ug/L) | Action Limit | 2 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| As | | | 0.123 | | | | | | | | | | | |
| Co | | | 0.0046 | | | | | | | | | | | |
| Tl | | | 0.0068 | | See PB | See PB | See PB | See PB | See PB | See PB | See PB | See PB | | |

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 3

| Analyte | Maximum PB[a] (mg/Kg) | Maximum PB[a] (ug/L) | Maximum ICB/CCB[a] (ug/L) | Action Limit | 3 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Tl | | | 0.0066 | | See PB | | | | | | | | | |

Note : a - The listed analyte concentration is the highest ICB, CCB, or PB detected in the analysis of each element.

LDC #: 26278B4

# VALIDATION FINDINGS WORKSHEET
## Field Blanks


Reviewer: OR
2nd Reviewer: [illegible]

**METHOD:** Trace Metals (EPA SW846 6010B/7000)
Y N N/A Were field blanks identified in this SDG?
Y N N/A Were target analytes detected in the field blanks?
**Blank units:** ug/L **Associated sample units:** mg/Kg
**Sampling date:** 7/18/11 Soil factor applied 10x
**Field blank type:** (circle one) Field Blank / Rinsate / Other: Associated Samples: All

| Analyte | Blank ID | Sample Identification | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | LPR-071811-RB (SDG: K1106643) | Action Level | 1 | 2 | 3 | 4 | 5 | 7 | 8 | 9 | | |
| Ba | 0.107 | 0.0107 | | | | | | | | | | |
| Cr | 9.5 | 0.95 | 0.35J | 0.33J | 0.90J | 0.57J | 0.40J | 0.16J | 0.20J | 0.20J | | |
| Cu | 1.07 | 0.107 | | | | | | | | | | |
| Fe | 44.9 | 4.49 | | | | | | | | | | |
| Mn | 1.670 | 0.167 | | | | | | | | | | |
| Ni | 1.38 | 0.138 | | | | | | 0.112J | | 0.131J | | |
| Zn | 1.8 | 0.18 | | | | | | | | | | |

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Samples with analyte concentrations within five times the associated field blank concentration are listed above, these sample results were qualified as not detected, "U".

LDC #: 26218B4

# VALIDATION FINDINGS WORKSHEET
## ICP Interference Check Sample

Page: 1 of 1
Reviewer: CR
2nd Reviewer: [illegible]

**METHOD**: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were ICP interference check samples performed as required?
Y N N/A Were the AB solution percent recoveries (%R) within the control limits of 80-120% ?

**LEVEL IV ONLY:**

Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

| # | Date | ICS Identification | Analyte | Concentration (ug/L) | Limit (<~~MDL~~ RL) | Associated Samples | Qualifications |
|---|---|---|---|---|---|---|---|
| | 9/3/11 | ICSA (16:35) | Cr | 6 | 2.00 | All | No Qual (<90% ICSA) |
| | | | Mn | -5 | 1.00 | 1-7,10 | |
| | | | Zn | 2 | 2.00 | All | |
| | 9/14/11 | ICSA (09:49) | Mn | -2 | 1.00 | 8,9 | |
| | 9/1/11 | ICSA (13:48) | Sb | 0.1 | 0.1 | All | ~~J/UJ/A~~ or Jdet/A |
| | | | Cd | 0.1 | 0.040 | | |
| | | | Co | 0.8 | 0.040 | | |
| | | | Cu | 0.7 | 0.200 | | |
| | | | Pb | 0.1 | 0.040 | | |
| | | | Ni | 1.4 | 0.400 | | |
| | | | Ag | 0.1 | 0.040 | | |

Comments:

ICSA.wpd

LDC #: 26278B4

# VALIDATION FINDINGS WORKSHEET
## Matrix Spike Analysis

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

**METHOD**: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a matrix spike analyzed for each matrix in this SDG?

Y N N/A Were matrix spike percent recoveries (%R) within the control limits of 75-125? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.

Y N N/A Was a post digestion spike analyzed for ICP elements that did not meet the required criteria for matrix spike recovery?

**LEVEL IV ONLY:**

Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

| # | Date | Matrix Spike ID | Matrix | Analyte | %R | Associated Samples | Qualifications |
|---|---|---|---|---|---|---|---|
| | | 11 | T | Cu | 55.1 | All | J/UJ/A |
| | | | | | | | |
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Comments:

MS.4SW

LDC #: 26278B4

# VALIDATION FINDINGS WORKSHEET
## Duplicate Analysis

Page: 1 of 1
Reviewer: R
2nd Reviewer: L

**METHOD**: Trace Metals (EPA SW 846 Method 6010/6020/7000)
Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a duplicate sample analyzed for each matrix in this SDG?

Y N N/A Were all duplicate sample relative percent differences (RPD) ≤ 20% for water samples and ≤ 35% for soil samples? If no, see qualifications below. A control limit of ±R.L. (±2X R.L. for soil) was used for sample values that were <5X the R.L., including the case when only one of the duplicate sample values was <5X R.L.. If field blanks were used for laboratory duplicates, note in the Overall Assessment.

**LEVEL IV ONLY:**

Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

| # | Date | Duplicate ID | Matrix | Analyte | RPD (Limits) | Difference (Limits) | Associated Samples | Qualifications |
|---|---|---|---|---|---|---|---|---|
| | | 12 | T | Cu | 58.5 (≤35) | | All | J det/A |
| | | | | | | | | |
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Comments:

DUP.4SW

LDC #: 26278B4

# VALIDATION FINDINGS WORKSHEET
## ICP Serial Dilution

Page: 1 of 1
Reviewer: CR
2nd Reviewer: [illegible]

**METHOD**: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A If analyte concentrations were > 50X the MDL (ICP) ,or >100X the MDL (ICP/MS), was a serial dilution analyzed?
Y N N/A Were ICP serial dilution percent differences (%D) ≤10%?
Y N N/A Is there evidence of negative interference? If yes, professional judgement will be used to qualify the data.

**LEVEL IV ONLY:**

Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

| # | Date | Diluted Sample ID | Matrix | Analyte | %D (Limits) | Associated Samples | Qualifications |
|---|---|---|---|---|---|---|---|
| | | 3 | T | Cd | 13 | All | ~~J (UJ/A~~ or J det/A |
| | | | | Co | 13 | ↓ | ↓ |
| | | | | Cu | 17 | | |
| | | | | Ni | 15 | ✓ | ✓ |

Comments:

SDILICPMS.wpd

LDC #: 26278B4

# VALIDATION FINDINGS WORKSHEET
## Initial and Continuing Calibration Calculation Verification

Page: 1 of 1
Reviewer: CB
2nd Reviewer: ✓

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

An Initial and continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

%R = Found / True x 100

Where, Found = concentration (in ug/L) of each analyte measured in the analysis of the ICV or CCV solution
True = concentration (in ug/L) of each analyte in the ICV or CCV source

| Standard ID | Type of Analysis | Element | Found (ug/L) | True (ug/L) | Recalculated %R | Reported %R | Acceptable (Y/N) |
|---|---|---|---|---|---|---|---|
| ICV | ICP (Initial calibration) | Al | 5051 | 5000 | 101 | 101 | Y |
| ICV | ICP/MS (Initial calibration) | Be | 2.4 | 2.5 | 96 | 96 | ↓ |
| | CVAA (Initial calibration) | | | | | | ↓ |
| CCV4 | ICP (Continuing calibration) | ~~Ni~~ K | 9930 | 10000 | 99 | 99 | ↓ |
| CCV2 | ICP/MS (Continuing calibration) | Ni | 25.2 | 25 | 101 | 101 | ↓ |
| | CVAA (Continuing calibration) | | | | | | ↓ |
| ICV | GFAA (Initial calibration) | Se | 7.459 | 7.5 | 99 | 99 | ↓ |
| CCV2 | GFAA (Continuing calibation) | Se | 7.611 | ↓ | 101 | 101 | ✓ |

Comments: Refer to Calibration Verification findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

CALCLC.4SW

LDC #: 26278B4

# VALIDATION FINDINGS WORKSHEET
## Level IV Recalculation Worksheet

Page: 1 of 1
Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Percent recoveries (%R) for an ICP interference check sample, a laboratory control sample and a matrix spike sample were recalculated using the following formula:

$\%R = \frac{Found}{True} \times 100$

Where, Found = Concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result).
True = Concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

$RPD = \frac{|S-D|}{(S+D)/2} \times 100$

Where, S = Original sample concentration
D = Duplicate sample concentration

An ICP serial dilution percent difference (%D) was recalculated using the following formula:

$\%D = \frac{|I-SDR|}{I} \times 100$

Where, I = Initial Sample Result (mg/L)
SDR = Serial Dilution Result (mg/L) (Instrument Reading x 5)

| Sample ID | Type of Analysis | Element | Found / S / I (~~units~~ mg/kg) | True / D / SDR (~~units~~ mg/kg) | Recalculated %R / RPD / %D | Reported %R / RPD / %D | Acceptable (Y/N) |
|---|---|---|---|---|---|---|---|
| ICSAB | ICP interference check | As | 23.3 ug/L | 25 ug/L | 93 | 93 | Y |
| LCS | Laboratory control sample | Mg | 9430 ug/L | 10000 ug/L | 94.3 | 94.3 | |
| 11 | Matrix spike | Pb | (SSR-SR) 4.171 | 4.67 | 89.3 | 89.3 | |
| 12 | Duplicate | Ni | 0.403 | 0.408 | 1.2 | 1.2 | |
| 3 | ICP serial dilution | Cd | 1.606 ug/L | 1.42 ug/L | 13 | 13 | |

Comments: Refer to appropriate worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

TOTCLC.4SW

LDC #: 26278B4

# VALIDATION FINDINGS WORKSHEET
## Sample Calculation Verification

Page: 1 of 1
Reviewer: CR
2nd reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Have results been reported and calculated correctly?
Y N N/A Are results within the calibrated range of the instruments and within the linear range of the ICP?
Y N N/A Are all detection limits below the CRDL?

Detected analyte results for Al were recalculated and verified using the following equation:

Concentration = (RD)(FV)(Dil) / (In. Vol.)

RD = Raw data concentration
FV = Final volume (ml)
In. Vol. = Initial volume (ml) or weight (G)
Dil = Dilution factor

Recalculation:

$$\frac{30\,mL\,(2.969\,mg/L)}{3.252\,kg} = 27.4\,mg/kg$$

| # | Sample ID | Analyte | Reported Concentration (mg/kg) | Calculated Concentration (mg/kg) | Acceptable (Y/N) |
|---|---|---|---|---|---|
| | 3 | Al | 27.4 | 27.4 | Y |
| | | Sb | 0.004 | 0.004 | |
| | | As | 0.337 | 0.337 | |
| | | Ba | 300 | 300 | |
| | | Be | 0.0059 | 0.0059 | |
| | | Cd | 0.0655 | 0.0655 | |
| | | Ca | 3130 | 3130 | |
| | | Cr | 0.90 | 0.90 | |
| | | Co | 0.0755 | 0.0755 | |
| | | Cu | 1.240 | 1.240 | |
| | | Fe | 1140 | 1140 | |
| | | Pb | 0.279 | 0.279 | |
| | | Mg | 114 | 114 | |
| | | Mn | 1250 | 1250 | |
| | | Ni | 0.403 | 0.403 | |
| | | K | 190 | 190 | |
| | | Se | 0.216 | 0.216 | |
| | | Ag | 0.006 | 0.006 | |
| | | Na | 277 | 277 | |
| | | Tl | 0.0013 | 0.0013 | |
| | | Ti | 0.85 | 0.85 | |
| | | V | 5.22 | 5.22 | |
| | | Zn | 16.1 | 16.1 | |

Note:

| | YES | NO | N/A |
|---|---|---|---|
| A.I.I **Contract Compliance Screening Report** | | | |
| Present? | ✓ | | |
| **ACTION**: If no, contact RSCC/PO. | | | |
| A.I.2 **Record of Communication (from RSCC)** | | | |
| Present? | ✓ | | |
| **ACTION**: If no, request from the RSCC. | | | |
| A.1.3 **Sampling Trip Report** | | | |
| Present and complete? | ✓ | | |
| **ACTION**: If no, contact RSCC/PO. | | | |
| A.I.4 **Chain of Custody/Sample Traffic Report** | | | |
| Present? | ✓ | | |
| Legible? | ✓ | | |
| Signature of sample custodian present? | ✓ | | |
| **ACTION**: If no, contact RSCC/WAM/PO. | | | |
| A.I.5 **Cover Page** | | | |
| Present? | ✓ | | |
| Is the Cover Page properly filled in and the verbatim signed by the lab manager or the manager's designee? | ✓ | | |
| Do the sample identification numbers on the Cover Page agree with sample identification numbers on: | | | |
| (a) Traffic Report Sheet? | | ✓ | |

| | YES | NO | N/A |
|---|---|---|---|
| (b) Form I's? | [✓] | ___ | ___ |
| Is the number of samples on the Cover Page the same as the number of samples on the Traffic Report sheet and the Regional Record of Communication (ROC) for the data Case? | [___] | ___ | ✓ |

**ACTION**:
If no for any of the above, prepare Telephone Record Log and contact RSCC/PO for re-submittal of the corrected Cover Page from the laboratory.

A.1.6 **SDG Narrative, DC-1 & DC-2 Form**

| | | | |
|---|---|---|---|
| Is the SDG Narrative present? | [✓] | ___ | ___ |
| Is Sample Log-In Sheet(Form DC-1) present and complete? | [✓] | ___ | ___ |
| Is Complete SDG Inventory Sheet(Form DC-2) present and complete? | [✓] | ___ | ___ |

**ACTION**:
If no, write in the Contract-Problems/ Non-Compliance Section of the Data Review Narrative.

A.1.7 **Form I to XV**

A.1.7.1 Are all the Form I through Form XV labeled with:

| | | | |
|---|---|---|---|
| Laboratory Name? | [✓] | ___ | ___ |
| Laboratory Code? | [___] | ✓ | ___ |
| RAS/Non-RAS Case No.? | [___] | ✓ | ___ |
| SDG No.? | [✓] | ___ | ___ |

| | YES | NO | N/A |
|---|---|---|---|
| Contract No.? | [✓] | ___ | ___ |

**ACTION**:
If no for any of the above, note under Contract Problem/Non-Compliance Section of the "Data Review Narrative" and contact PO for corrected Form(s) from the laboratory.

A.1.7.2 After comparing values on Forms I-IX against the raw data, do any computation/ transcription errors exceed 10% of the reported values on the Forms for:

| | | | |
|---|---|---|---|
| (a) all analytes analyzed by ICP-AES? | ___ | [✓] | ___ |
| (b) all analytes analyzed by ICP-MS? | ___ | [✓] | ___ |
| (c) Mercury? | ___ | [ ] | ✓ |
| (d) Cyanide? | ___ | [ ] | ✓ |

**ACTION**:
If yes, prepare Telephone Record Log and contact CLP PO/TOPO for the corrected data from the laboratory.

## A.1.8 Raw Data

**Data shall not be validated without the hard/electronic copies of the associated raw data for samples and QC samples.**

### A.1.8.1 Digestion/Distillation Log

| | | | |
|---|---|---|---|
| Digestion Log for ICP-AES (Form XII)present? | [✓] | ___ | ___ |
| Digestion Log for ICP-MS (Form XII) present? | [✓] | ___ | ___ |
| Digestion Log for mercury (Form XII) present? | [ ] | ___ | ✓ |
| Distillation Log for cyanide (Form XII) present? | [ ] | ___ | ✓ |

Are pH values for metals and

| | YES | NO | N/A |
|---|---|---|---|
| cyanide reported for each aqueous sample? | [ ] | | ✓ |
| Are percent solids calculations present for soils/sediments? | [ ] | | ✓ |
| Are preparation dates present on the sample preparation logs/bench sheets? | [✓] | | |

**NOTE:**
Digestion/Distillation log must include weights, volumes, and dilutions used to obtain the reported results.

A.1.8.2 Is the analytical instrument real-time printouts present for:

| | YES | NO | N/A |
|---|---|---|---|
| ICP-AES? | [✓] | | |
| ICP-MS? | [✓] | | |
| Mercury? | [ ] | | ✓ |
| Cyanide? | [ ] | | ✓ |

Are all laboratory bench sheets and instrument raw data printouts necessary to support all sample analyses and QC operations:

| | YES | NO | N/A |
|---|---|---|---|
| Legible? | [✓] | | |
| Properly labeled? | [✓] | | |

Are all field samples, QC samples and field QC samples present on:

| | YES | NO | N/A |
|---|---|---|---|
| Digestion/Distillation log? | [✓] | | |
| Instrument Printouts? | [✓] | | |

**ACTION:**
If no for any of the above questions in Section A.1.8.1 and Section A.1.8.2, write Telephone Record Log and contact TOPO/PO for re-submittal from the laboratory.

| | YES | NO | N/A |
|---|---|---|---|
| **A.1.9 Technical Holding Times**: (Aqueous and soil samples) (Examine sample Traffic Reports and digestion/distillation logs to determine the holding time from the sample collection date to the sample preparation date.) | | | |
| A.1.9.1 Cyanide distillation(14 days)exceeded? | | [ ] | ✓ |
| Mercury analysis(28 days) exceeded? | | [ ] | ✓ |
| Other Metals analysis(180 days)exceeded? | | [✓] | |

**ACTION:**
If yes, reject (R) and red-line non-detects and flag as estimated (J)results ≥ MDL even if sample(s) was preserved properly.

**NOTE:**
In addition to qualifying the data, a list of all samples and analytes which exceeded the holding times must be prepared. Report for each sample the number of days that were exceeded. (Subtract the sample collection date from the sample preparation date). Attach this list to the data review narrative.

| | | | |
|---|---|---|---|
| A.1.9.2 Is pH of aqueous samples for: | | | |
| Metals Analysis ≤ 2? | [ ] | | ✓ |
| Cyanide Analysis ≥ 12? | [ ] | | ✓ |

**ACTION:**
If no for any of the above, flag non-detects as "R" and detects as "J".

| | | | |
|---|---|---|---|
| A.1.9.3 Is the cooler temperature ≤ 10 C°? | [✓] | | |

**ACTION:**
If cooler temperature is >10°C , flag non-detects as "UJ" and detects as "J".

A.1.10 **Final Data Correctness - Form I**

A.1.10.1 Are Form I's for all samples

| | YES | NO | N/A |
|---|---|---|---|
| present and complete? | [✓] | ___ | ___ |

**ACTION**:
If no, prepare Telephone Record Log and contact CLP PO/TOPO for submittal from the laboratory.

A.1.10.2 Verify there are no calculation and transcription errors in the results reported on Form I's. Circle on each Form I all results that are incorrect.

| | YES | NO | N/A |
|---|---|---|---|
| Is the calculation error less than 10% of the correct result? | [✓] | ___ | ___ |
| Are results on Form I's reported in correct units (ug/L for aqueous and MG/KG for soils)? | [✓] | ___ | ___ |
| Are results on Form I'S reported by correct significant figures? | [✓] | ___ | ___ |
| Are soil sample results on Form I's corrected for percent solids? | [___] | ___ | ✓ |
| Are all "less than MDL" values reported by the CRQLs and coded with "U"? | [✓] | ___ | ___ |
| Are values less than the CRQLs but greater than or equal to the MDLs flagged with "J"? | [✓] | ___ | ___ |
| Are appropriate contractual quality control and Method qualifiers used? | [✓] | ___ | ___ |

**ACTION**:
If no for any of the above questions, prepare Telephone Record Log, and contact CLP PO/TOPO for corrected data.

A.1.10.3 Do EPA sample identification numbers and the corresponding laboratory sample identification numbers match on the Cover Page, Form I's and in the raw data? [✓] ___ ___

Was a brief physical description

| | YES | NO | N/A |
|---|---|---|---|
| of the samples before and after digestion given on the Form I's? | [___] | ✓ | |
| Was any sample result outside the mercury/cyanide calibration range or the ICP-AES/ICP-MS linear range diluted and noted on the Form I? | [___] | ✓ | |

**ACTION**:
If no for any of the above, note under the Contract-Problem/Non-Compliance Section of the Data Review Narrative.

A.1.11 **Initial Calibration**

| | YES | NO | N/A |
|---|---|---|---|
| A.1.11.1 Is a record of at least 2 point (A blank and a standard)calibration present for ICP-AES analysis? | [✓] | | |
| Is a record of at least 2 point (a blank and a standard)calibration present for ICP-MS analysis? | [✓] | | |
| Is a record of at least 5 point calibration (a blank & 4 standards)present for Hg analysis? | [___] | | ✓ |
| Is a record of at least 4 point calibration (a blank & 4 standards)present for cyanide? | [___] | | ✓ |

**ACTION:**
If incomplete or no initial calibration was performed, reject (R) and red-line the associated data (detects & non-detects).

| | YES | NO | N/A |
|---|---|---|---|
| Is one initial calibration standard at the CRQL level for cyanide and mercury? | [___] | | ✓ |

**ACTION**:
If no, write in the Contract Problem/ Non-Compliance Section of the Data Review Narrative.

A.1.11.2 Is the curve correlation coefficient $\geq$ 0.995 for:

| | | YES | NO | N/A |
|---|---|---|---|---|
| | Mercury Analysis? | [ ] | | ✓ |
| | Cyanide Analysis? | [ ] | | ✓ |
| | ICP-AES (more than 2 point Calib.)? | [✓] | | |
| | ICP-MS (more than 2 point calib.)? | [✓] | | |

ACTION:
If no, qualify the associated sample results ≥ MDL as estimated "J" and non-detects as "UJ".

NOTE:
The correlation coefficient shall be calculated by the data validator using standard concentrations and the corresponding instrument response (e.g. absorbance, peak area, peak height, etc.).

A.1.12 Initial and Continuing Calibration Verification- Form IIA

| | | YES | NO | N/A |
|---|---|---|---|---|
| A.1.12.1 | Present and complete for every metal and cyanide? | [✓] | | |
| | Present and complete for ICP-AES and ICP-MS when both these methods were used for the same analyte? | [✓] | | |

ACTION:
If no for any of the above, prepare a Telephone Record Log and contact PO/TOPO for re-submittal from the laboratory.

| | | YES | NO | N/A |
|---|---|---|---|---|
| A.1.12.2 | Was a Continuing Calibration Verification performed every 10 samples or every 2 hours whichever is more frequent? | [✓] | | |

ACTION:
If no for any of the above, write in the Contract-Problem/Non-Compliance Section of the Data Review Narrative.

| | | YES | NO | N/A |
|---|---|---|---|---|
| A.1.12.3 | Was an ICV or a mid-range standard distilled and analyzed with each batch of cyanide samples? | [ ] | | ✓ |

| | YES | NO | N/A |
|---|---|---|---|

**ACTION:**
If no for any of the above, write in the Contract-Problem/Non-Compliance Section of the Data Review Narrative and qualify results ≥ MDL as estimated (J).

A.1.12.2 Circle on each Form IIA all percent recoveries that are outside the contract windows.

Are ICV/CCVs within control limits for:

| | YES | NO | N/A |
|---|---|---|---|
| Metals - 90-110%R? | [✓] | ___ | ___ |
| Hg - 80-120%R? | [___] | ___ | ✓ |
| Cyanide - 85-115%R? | [___] | ___ | ✓ |

**ACTION:**
If no, qualify all samples between a previous technically acceptable CCV standard and a subsequent technically acceptable CCV standard as follows as follows:

Qualify as estimated (J) all detects and non-detects, if the ICV/CCV %R is between 75-89%(65-79% for Hg; 70-84% for CN). Qualify only positive results(≥ MDL) as "J" if the ICV/CCV %R is between 111-125%(121-135% for Hg;116-130% for CN). Reject (R) and red-line only
detects if the recovery is greater than 125% (135% for Hg; 130% for CN). Reject (R) and red-line all associated results (hits and non-detects)if the recovery is less than 75%(65% for Hg;70% for CN).

**NOTE:**
For ICV that does not fall within the acceptance limits, qualify all samples reported from the analytical run.

A.1.12.3 Was the distilled ICV or mid-range standard for cyanide within acceptance limits (85-115%)? [___] ___ ✓

**ACTION:**
If no, Qualify all cyanide results ≥ MDL as "J".

A.1.13 **CRQL Standard Analysis - Form IIB**

A.1.13.1 For each ICP-AES run, was a CRI

| | YES | NO | N/A |
|---|---|---|---|
| (CRQL or MDL when MDL > CRQL) standard analyzed? (Note:CRI is not required for Al, Ba, Ca, Fe, Mg, Na and K.) | [✓] | ___ | ___ |
| For each ICP-MS run, was a CRI (CRQL or MDL when MDL > CRQL) standard analyzed for each mass/isotope used for the analysis? | [✓] | ___ | ___ |
| For each mercury run, was a CRQL standard analyzed? | [___] | ___ | ✓ |
| For each cyanide run, was a CRQL standard analyzed? | [___] | ___ | ✓ |

**ACTION**:
If no for any of the above, write this deficiency in the Contract Problems/ Non-Compliance Section of the Data Review Narrative, inform CLP PO and flag results in the affected ranges (detects <2xCRQL)as J and non-detects UJ.

The affected ranges are:
ICP-AES Analysis - *True Value ± CRQL
ICP-MS Analysis - *True Value ± CRQL
Mercury Analysis - *True Value ± CRQL
Cyanide Analysis - *True Value ± CRQL
* True value of the CRQL Standard

A.1.13.2 Was a CRQL standard analyzed after the ICV/ICB, before the final CCV/CCB and once every 20 analytical samples in the analytical run for each analysis? [✓] ___ ___

**ACTION**:
If no, write in the Contract Problem/ Non-Compliance Section of the "Data Review Narrative".

A.1.13.3 Circle on each Form IIB all percent recoveries that are outside the acceptance windows.

| | YES | NO | N/A |
|---|---|---|---|
| Is the CRQL standard within control limits for: | | | |
| Metals(ICP-AES/ICP-MS)- 70 - 130%? | [✓] | ___ | ___ |
| Mercury- 70 - 130%? | [___] | ___ | ✓ |
| Cyanide - 70 - 130%? | [___] | ___ | ✓ |

**ACTION**:
If no, flag detects <2xCRQL as "J" and non-detects as "UJ" if the CRQL standard recovery is between 50-69%. Flag(J) only detects <2xCRQL if the recovery is between 131% and ≤180%. If the recovery is less than 150%, reject(R) and red-line non-detects and detects < 2xCRQL, and flag (J) detects between 2xCRQL and ICV/CCV. Reject and red-line only detects <2xCRQL and flag (J)detects ≥ 2xCRQL but < ICV/CCV if the recovery is > 180%.

**NOTE**:
1. Qualify all field samples analyzed between a previous technically acceptable analysis of the CRQL standard and a subsequent acceptable analysis of the CRQL standard
2. Flag (J) or reject (R) only the final sample results on Form I's when Sample raw data are within the affected ranges and the CRQL standard is outside the acceptance windows.
3. The samples and the CRQL standard must be analyzed in the same analytical run.

## A.1.14 Initial and Continuing Calibration Blanks - Form III

| | | | |
|---|---|---|---|
| A.1.14.1 Present and complete for all the instruments used for the metals and cyanide analyses? | [✓] | ___ | ___ |
| Was an initial Calibration Blank analyzed after ICV? | [✓] | ___ | ___ |
| Was a continuing Calibration Blank analyzed after every CCV and every 10 samples or every 2 hours, whichever is more frequent? | [✓] | ___ | ___ |

Were the ICB & CCB values ≥ MDL but < CRQL reported on Form III and flagged "J" by

| | | YES | NO | N/A |
|---|---|---|---|---|
| | using MDLs from direct analysis(Preparation Method "NP1")? (Check Form III against the raw data) | [✓] | ___ | ___ |
| | **ACTION**: If no, inform CLP PO/TOPO and make a note in the Contract-Problems/Non-Compliance Section of the "Data Review Narrative". | | | |
| A.1.14.2 | Circle with red pencil on each Form III all Calib. Blank values that are: ≥ MDL but ≤ CRQL; > CRQL | | | |
| A.1.14.2.1 | When MDL < CRQL, is any Calib. Blank value ≥ MDL but ≤ CRQL? | ✓ | [___] | ___ |
| | **ACTION**: If yes, change sample results ≥ MDL but ≤ CRQL to the CRQL with a "U". Do not qualify non-detects. | | | |
| A.1.14.2.2 | When MDL < CRQL, is any Calib. Blank value > CRQL? | ✓ | [___] | ___ |
| | **ACTION**: If yes, reject (R) and red line the associated sample results > CRQL but <ICB/CCB Blank Result. Flag as "J" detects > ICB/CCB blank value but < 10xICB/CCB value. Change the sample results ≥ MDL but ≤ the CRQL to CRQL with a "U". | | | |
| A.1.14.2.3 | Is any Calibration Blank value below the negative CRQL? | ___ | [✓] | ___ |
| | **ACTION:** If yes, flag (J) as estimated all associated sample results ≥ CRQL but <10xCRQL. | | | |

**NOTE:**

1. For ICB that does not meet the technical QC Criteria, apply the action to all samples

| | YES | NO | N/A |
|---|---|---|---|

reported from the analytical run.

2. For CCBs that do not meet the technical QC criteria, apply the action to all samples analyzed between a previous technically acceptable analysis of CCB and a subsequent technically acceptable analysis of the CCB in the analytical run.,

A.1.15 Preparation Blank - FORM III

NOTE: The Preparation Blank for mercury is the same as the calibration blank.

| | YES | NO | N/A |
|---|---|---|---|
| A.1.15.1 Was one Preparation Blank prepared with and analyzed for: | | | |
| Each Sample Delivery Group (SDG)? | [✓] | ___ | ___ |
| Each batch of the SDG samples digested/distilled? | [✓] | ___ | ___ |
| Each matrix type? | [✓] | ___ | ___ |
| All instruments used for metals and cyanide analyses? | [✓] | ___ | ___ |

ACTION:
If no for any of the above, flag as estimated (J) all the associated positive data <10xMDL for which the Preparation Blank was not analyzed.

NOTE:
If only one blank was analyzed for more than 20 samples, then the first 20 samples analyzed are not estimated(J), but all additional samples must be qualified (J).

A.1.15.2 Circle with red pencil on each Form III all Prep. Blank values that are:

≥ MDL but ≤ CRQL, and

> CRQL

| | YES | NO | N/A |
|---|---|---|---|
| A.1.15.2.1 When MDL < CRQL, is any preparation blank value ≥ MDL but ≤ CRQL? | ✓ | [___] | ___ |

ACTION:
If yes, change sample result ≥ MDL

| | | YES | NO | N/A |
|---|---|---|---|---|
| | but ≤ CRQL to CRQL with a "U". | | | |
| A.1.15.2.2 | When the MDL ≤ CRQL, is any Preparation Blank value greater than its CRQL? | ___ | [___] | ___ |
| | If yes, is the Prep. Blank value greater than the value of the associated Field Blank collected and analyzed with the SDG samples? | ___ | [___] | ___ |
| | If yes, is the lowest concentration of that analyte in the associated samples less than 10 times the Preparation Blank value? | ___ | [___] | ___ |

ACTION:
If yes, reject (R) and red-line all associated sample results greater than the CRQL but less than the Prep.Blank value. Flag as "J" detects > Prep. Blank value but <10xPrep.Blank. If the sample result ≥ MDL but ≤ CRQL, replace it with CRQL-U.

If the Prep. Blank value is less than the same analyte value in the Field Blank, do not qualify the sample results due to the Prep. Blank criteria.

NOTE:
Convert soil sample result to mg/Kg on wet weight basis to compare with the soil Prep. Blank result on Form III.

| | | | | |
|---|---|---|---|---|
| A.1.15.2.3 | Is the Prep. Blank concentration below the negative CRQL? | ___ | [✓] | ___ |

ACTION:
If yes, flag (J) all associated sample results less than 10xCRQL. Qualify non-detects as estimated (UJ).

| | | | | |
|---|---|---|---|---|
| A.1.15.2.4 | When the MDL is greater than the CRQL, is the preparation blank concentration on Form III greater than two times the MDL? | ___ | [___] | ✓ |

ACTION:

| | | YES | NO | N/A |
|---|---|---|---|---|
| | If yes, reject (R) and red-line all positive sample results with sample raw data less than 10 times the Preparation Blank value. | | | |
| A.1.16 | ICP-AES/ICP-MS Interference Check Sample (ICS)- Form IV<br>NOTE: Not required for CN, Hg, Al, Ca, Fe and Mg. | | | |
| A.1.16.1 | Present and complete? | [✓] | ___ | ___ |
| | Was ICS analyzed at the beginning and end of each analytical run, and once for every 20 analytical samples? | [✓] | ___ | ___ |
| | Was ICS analyzed at the beginning of the ICP-MS analytical run? | [✓] | ___ | ___ |
| | ACTION:<br>If no, flag as estimated (J) all sample results. | | | |
| A.1.16.2 | ICP-AES Method | | | |
| A.1.16.2.1 | **ICSA Solution:**<br>For ICP-AES, are the ICSA "Found" analyte values within the control limits ± of CRQL of the true/established mean value? | [___] | ✓ | ___ |
| | If no for any of the above, is the sample concentration of Al, Ca, Fe, or Mg in the same units (ug/L or MG/KG) greater than or equal to its respective concentration in the ICSA Solution on Form IV? | [___] | ✓ | ___ |
| | ACTION:<br>If yes, apply the following action to all samples analyzed between a previous technically acceptable analysis of the ICS and a subsequent technically acceptable analysis of the ICS in the analytical run:<br>Flag (J) as estimated only sample results ≥MDL | | | |

| | YES | NO | N/A |
|---|---|---|---|
| for which the ICSA "Found" value is greater than (True value+CRQL). Do not qualify non-detects. If the ICSA "Found" value is less than (True value-CRQL), flag non-detects as "UJ" and detects as "J". | | | |
| A.1.16.2.3 **ICSAB Solution** For ICP-AES, are all analyte results in ICSAB within the control limits of 80-120 of the true/established mean value? | [✓] | ___ | ___ |
| If no for any of the above, is the sample concentration of Al, Ca, Fe, or Mg in the same units (ug/L or MG/KG) greater than or equal to its respective concentration in the ICSAB Solution on Form IV? | [___] | ___ | ✓ |

ACTION:
If yes, apply the following action to all samples analyzed between a previous technically acceptable analysis of the ICS and a subsequent technically acceptable analysis of the ICS in the analytical run:

Flag (J) as estimated those associated sample results ≥ MDL for which the ICSAB analyte recovery is greater than 120% but ≤ 150%. If the ICSAB recovery falls within 50-79%, qualify sample results ≥ MDL as "J" and non-detects as "UJ". Reject (R) and red-line all sample results (detects & non-detects) for which the ICSAB analyte recovery is less than 50%. If the recovery is above 150%, reject (R) and red-line only positive results.

A.1.16.3 ICP-MS Method

| | YES | NO | N/A |
|---|---|---|---|
| A.1.16.3.1 **ICSA Solution:** For ICP-MS, are the ICSA "Found" analyte values within the control limits of ±CRQL of the true/established mean value? | [___] | ✓ | ___ |

ACTION:
If no, apply the following action to all samples reported from the analytical run:

Flag (J) as estimated only sample results ≥ MDL if the ICSA "Found" value is greater than (True value+CRQL). Do not qualify non-detects. If the ICSA "Found" value is less than (True value-CRQL), flag the associated sample detects as "J" and non-detects as "UJ".

| | | YES | NO | N/A |
|---|---|---|---|---|
| A.1.16.3.3 | ICSAB Solution<br>For ICP-MS, are all analyte results in ICSAB within the control limits of 80-120% of the true/established mean value, whichever is greater? | [✓] | ___ | ___ |

ACTION:
If no, apply the following action to all samples reported from the analytical run:

Flag (J) as estimated those associated sample results ≥ MDL for which the ICSAB analyte recovery is greater than 120% but ≤ 150%. If the ICSAB recovery falls within 50-79% flag (J) as estimated the associated sample results ≥ MDL. Reject (R) and red-line those all sample detects and non-detects for which the ICSAB analyte recovery is less than 50%. If the recovery is above 150%, reject (R) and red-line only detects (≥ MDL).

A.1.17 Spiked Sample Recovery: Pre-Digestion/Pre-Distillation)-Form V A

Note: Not required for Ca, Mg, K, and Na (both matrices); Al and Fe (soil only)

| | | YES | NO | N/A |
|---|---|---|---|---|
| A.1.17.1 | Was Matrix Spike analysis performed: | | | |
| | For each matrix type? | [✓] | ___ | ___ |
| | For each SDG? | [✓] | ___ | ___ |
| | On one of the SDG samples? | [✓] | ___ | ___ |
| | For each concentration range (i.e., low, med., high)? | [___] | ✓ | ___ |
| | For each analytical Method (ICP-AES, ICP-MS, Hg, CN) used? | [✓] | ___ | ___ |
| | Was a spiked sample prepared and analyzed with the SDG samples? | [✓] | ___ | ___ |

ACTION:
If no for any of the above, flag as estimated (J) all the positive data for which a spiked sample was not analyzed.

NOTE:
If more than one spiked sample were analyzed for one SDG, then qualify the associated data based on the worst spiked sample analysis.

| | | YES | NO | N/A |
|---|---|---|---|---|
| A.1.17.2 | Was a field blank or PE sample used for the spiked sample analysis? | ___ | [✓] | ___ |
| | ACTION: If yes, flag (J) as estimated positive data of the associated SDG samples for which field blank or PE sample was used for the spiked sample analysis. | | | |
| A.1.17.3 | Circle on each Form VA all spike recoveries that are outside the control limits (75-125%) that have sample concentrations less than four times the added spike concentrations. | | | |
| | Are all recoveries within the control limits when sample concentrations are less than or equal to four times the spike concentrations? | [___] | ✓ | ___ |
| | NOTE: Disregard the out of control spike recoveries for analytes whose concentrations are greater than or equal to four times the spike added. | | | |
| | Are results outside the control limits (75-125%) flagged with Lab Qualifier "N" on Form I's and Form VA? | [✓] | ___ | ___ |
| | ACTION: If no for any of the above, write in the Contract - Problems/Non-Compliance Section of the Data Review Narrative. | | | |
| A.1.17.4 | Aqueous | | | |
| | Are any spike recoveries: | | | |
| | (a) less than 30%? | ___ | [___] | ✓ |
| | (b) between 30-74%? | ___ | [___] | ✓ |
| | (c) between 126-150%? | ___ | [___] | ✓ |
| | (d) greater than 150%? | ___ | [___] | ✓ |
| | ACTION: If the matrix spike recovery is less than 30%, reject (R) and red-line all associated aqueous data (detects & non-detects). If between 30-74%, qualify all associated aqueous data ≥ MDL as "J" and non-detects | | | |

| | YES | NO | N/A |
|---|---|---|---|
| as "UJ". If between 126-150%, flag (J) all data ≥ MDL as "J". If greater than 150%, reject (R) and red-line all associated data ≥ MDL. | | | |
| (NOTE:Replace "N" with "J", "R" as appropriate.) | | | |
| A.1.17.5 **Soil/Sediment** | | | |
| Are any spike recoveries: | | | |
| (a) less than 10%? | | [✓] | |
| (b) between 10-74%? | ✓ | [ ] | |
| (c) between 126-200%? | | [✓] | |
| (d) greater than 200%? | | [✓] | |
| **ACTION**: If yes for any of the above, proceed as follows: | | | |
| If the matrix spike recovery is less than 10%,reject (R) and red-line all associated data (detects & non-detects); if between 10-74%,qualify all associated data ≥ MDL as "J" and non-detects as "UJ"; if between 126-200%, flag (J) all associated data ≥ MDL as "J" If greater than 200%, reject (R) and red-line all associated data ≥ MDL. (NOTE:Replace "N" with "J" or "R" as appropriate.) | | | |
| A.1.18 **Lab Duplicates) - Form VI** | | | |
| A.1.18.1 Was the lab duplicate analysis performed: | | | |
| For each SDG? | [✓] | | |
| On one of the SDG samples? | [✓] | | |
| For each matrix type? | [✓] | | |
| For each concentration range (low or med.)? | [ ] | ✓ | |
| For each analytical Method (ICP-AES/ICP-MS,Hg,CN)Used? | [✓] | | |
| Was a lab duplicate prepared and analyzed with the SDG samples? | [✓] | | |

| | | YES | NO | N/A |
|---|---|---|---|---|
| | ACTION: If no for any of the above, flag (J) as estimated all the SDG sample results (detects & non-detects) for which the lab duplicate analysis was not performed. | | | |
| | NOTE: If more than one lab duplicate sample were analyzed for an SDG, then qualify the associated samples based on the worst lab duplicate analysis. | | | |
| A.1.18.2 | Was a Field Blank or PE sample used for the Lab Duplicate analysis? | ___ | [✓] | ___ |
| | ACTION: If yes, flag as estimated (J) all SDG sample results (hits & non-detects) for which Field Blank or PE sample was used for duplicate analysis. | | | |
| A.1.18.3 | Circle on each Form VI all values that are: | | | |
| | RPD > 20%, or | | | |
| | Absolute Difference > CRQL | | | |
| | Are all values within control limits (RPD ≤ 20% or absolute difference ≤ ±CRQL)? | [___] | ✓ | ___ |
| | If no, are all results outside the control limits flagged with an "*" (Lab Qualifier) on Form VI and on all Form I's? | [✓] | ___ | ___ |
| | ACTION: If no, write in the Contract-Problems/ Non-Compliance Section of the Data Review Narrative. | | | |
| | NOTE: The laboratory is not required to report on Form VI the RPD when both values are non-detects. | | | |
| A.1.18.4 | Aqueous | | | |
| A.1.18.4.1 | When sample and duplicate values are both ≥ 5xCRQL (substitute MDL for CRQL when MDL > CRQL), | | | |

| | YES | NO | N/A |
|---|---|---|---|
| is any RPD > 20% but < 100%? | ___ | [___] | ✓ |
| is any RPD ≥ 100%? | ___ | [___] | ✓ |

ACTION:
If the RPD is > 20% but < 100%, flag (J) as estimated the associated sample data ≥ CRQL. If the RPD is ≥ 100%, reject (R) and red-line the associated sample data ≥ CRQL.

(NOTE:Replace "*" with "J" or "R" as appropriate.)

A.1.18.4.2 When the sample and/or duplicate value <5xCRQL (substitute MDL for CRQL when MDL >CRQL), is the absolute difference between sample and duplicate values:

| | | | |
|---|---|---|---|
| > ± CRQL? | ___ | [___] | ✓ |
| > ± 2xCRQL? | ___ | [___] | ✓ |

ACTION:
If the absolute difference is > CRQL, flag as estimated all the associated sample results ≥ MDL but < 5xCRQL as "J" and non-detects as "UJ". If the absolute difference is > 2xCRQL, reject (R) and red-line all the associated non-detects and detects ≥ MDL but < 5xCRQL.

NOTE:
1. Replace "*" with "J", "UJ" or "R" as appropriate.)
2. If one value is >CRQL and the other value is non-detect, calculate the absolute difference between the value > CRQL and the MDL, and use this difference to qualify sample results.

A.1.18.5 Soil/Sediment

A.1.18.5.1 When sample and duplicate values are both ≥ 5xCRQL (substitute MDL for CRQL when MDL > CRQL),

| | | | |
|---|---|---|---|
| is any RPD ≥ 35% but < 120%? | ✓ | [___] | ___ |
| is any RPD ≥ 120%? | ___ | [✓] | ___ |

ACTION:
If the RPD is ≥ 35% and < 120%, flag (J) as estimated the associated sample

| | | YES | NO | N/A |
|---|---|---|---|---|
| | data ≥ CRQL. If the RPD is ≥ 120%, reject (R) and red-line the associated sample data ≥ CRQL. | | | |
| A.1.18.5.2 | When the sample and/or duplicate value <5xCRQL (substitute MDL for CRQL when MDL > CRQL), is the absolute difference between sample and duplicate: | | | |
| | > ± 2 x CRQL? | ___ | [___] | ✓ |
| | > ± 4 x CRQL | ___ | [___] | ✓ |

ACTION:
If the absolute difference is > 2 x CRQL, flag all the associated sample results ≥ MDL but < 5xCRQL as "J" and non-detects as "UJ". If the absolute difference is > 4xCRQL, reject (R) and red-line all the associated non-detects and detects ≥ MDL but <5xCRQL.

NOTE:
1. Replace "*" with "J", "UJ" or "R" as appropriate.)
2. If one value is >CRQL and the other value is non-detect, calculate the absolute difference between the value > CRQL and the MDL, and use this difference to qualify sample results.

A.1.19 Field Duplicates

Aqueous Field Duplicates

| | | | | |
|---|---|---|---|---|
| A.1.19.1 | Was an aqueous Field Duplicate pair collected and analyzed? (Check Sampling Trip Report) | [___] | ___ | ✓ |

ACTION:
If yes, prepare a Form (Appendix A.4) for each aqueous Field Duplicate pair. Report the sample and Field Duplicate results on Appendix A.4 from their respective Form I's. Calculate and report RPD on Appendix A.4 when sample and its Field Duplicate values are both > 5xCRQL. Calculate and report the absolute difference on Appendix A.4 when at least one value (sample or duplicate) is <5xCRQL. Evaluate the aqueous Field Duplicate analysis in accordance with the

| | YES | NO | N/A |
|---|---|---|---|

QC criteria stated in Sections A.1.19.2 and A.1.19.3.

NOTE:
1. Do not transfer "*" from Form I's to Appendix A.4.
2. Do not calculate RPD when both values are non-detects.
3. Substitute MDL for CRQL when MDL > CRQL.
4. If one value is >CRQL and the other value is non-detect, calculate the absolute difference between the value > CRQL and the MDL, and use this the criteria to qualify the results.

A.1.19.2 Circle all values on the Form (Appendix A.4) for Field Duplicates that have:

RPD ≥ 20% or

Difference > ± CRQL

When sample and duplicate values are both ≥5xCRQL (substitute MDL for CRQL when MDL > CRQL),

| | | | |
|---|---|---|---|
| is any RPD ≥ 20%? | ___ | [___] | ___ |
| is any RPD ≥ 100%? | ___ | [___] | ___ |

ACTION:
If the RPD is >20% but < 100%, flag (J) only the associated sample and its Field Duplicate results ≥ CRQL. If the RPD is ≥ 100%, reject(R) and red-line only the associated sample and its Field Duplicate result ≥ CRQL.

A.1.19.3 When the sample and/or duplicate value(s) <5xCRQL (substitute MDL for CRQL when MDL >CRQL), is the absolute difference between sample and duplicate:

| | | | |
|---|---|---|---|
| > ± CRQL? | ___ | [___] | ___ |
| > ± 2 x CRQL? | ___ | [___] | ___ |

ACTION:
If the absolute difference is > CRQL, flag detects ≥ MDL but < 5xCRQL as "J" and non-detects as "UJ". If the difference is > 2xCRQL, reject (R) and red-line non-detects

| | | YES | NO | N/A |
|---|---|---|---|---|
| | and results ≥ MDL but <5xCRQL of the sample and its Field Duplicate. | | | |
| | **Soil/Sediment Field Duplicates** | | | |
| A.1.19.4 | Was a soil field duplicate pair collected and analyzed? (Check Sampling Trip Report) | [___] | ✓ | ___ |

ACTION:
If yes, for each soil Field Duplicate pair proceed as follows:

Prepare Appendix A.4 for each Field Duplicate pair. Report on Appendix A.4 all sample and its Field Duplicate results in MG/KG from their respective Form I's. Calculate and report RPD when sample and its duplicate values are both greater than 5xCRQL. Calculate and report the absolute difference when at least one value (sample or duplicate) is < 5xCRQL. Evaluate the Field Duplicate analysis in accordance with the QC Criteria stated in Sections A.1.19.5 and A.1.19.6.

NOTE:
1. Do not transfer "*" from Form I's to Appendix A.4.
2. Do not calculate RPD when both values are non-detects.
3. Substitute MDL for CRQL when MDL > CRQL.
4. If one value is >CRQL and the other value is non-detect, calculate the absolute difference between the value > CRQL and the MDL, and apply the criteria to qualify the results.

| | | | | |
|---|---|---|---|---|
| A.1.19.5 | Circle on each Appendix A.4 all values that have:<br><br>RPD ≥ 35%, or Difference > ± 2xCRQL When sample and duplicate values are both ≥ 5xCRQL (substitute MDL for CRQL when MDL > CRQL), | | | |
| | is any RPD ≥ 35% but < 120%? | ___ | [___] | ✓ |
| | is any RPD ≥ 120%? | ___ | [___] | ✓ |

ACTION:
If the RPD is ≥ 35% but < 120%,

| | | YES | NO | N/A |
|---|---|---|---|---|
| | flag only the associated sample and its Field Duplicate results ≥ CRQL as "J". If the RPD is ≥ 120%, reject (R) and red-line only the sample and its Field Duplicate results ≥ CRQL. | | | |
| A.1.19.6 | When the sample and/or duplicate value(s) <5xCRQL (substitute MDL for CRQL when MDL > CRQL), is the absolute difference between sample and Field Duplicate: | | | |
| | > ± 2 x CRQL? | ___ | [___] | ✓ |
| | > ± 4 x CRQL? | ___ | [___] | ✓ |
| | **ACTION**: If the absolute difference is > 2xCRQL, flag Sample and its Field Duplicate resuts ≥ MDL but <5xCRQL as "J" and non-detects as "UJ". If the difference is >4xCRQL, reject(R) and red-line non-detects and detects ≥ MDL but <5xCRQL of the sample and its Field Duplicate. | | | |
| A.1.20 | Laboratory Control Sample (LCS)- Form VII | | | |
| A.1.20.1 | Was one LCS prepared and analyzed for: | | | |
| | Each SDG? | [✓] | ___ | ___ |
| | Each matrix type? | [✓] | ___ | ___ |
| | Each batch samples digested/distilled? | [✓] | ___ | ___ |
| | For each Method(ICP-AES,ICP-MS,Hg,CN) used? | [✓] | ___ | ___ |
| | Was an LCS prepared and analyzed with the samples? | [✓] | ___ | ___ |
| | **ACTION**: If no for any of the above, prepare Telephone Record Log and contact CLP PO or TOPO for submittal of the LCS results. Flag (J) as estimated all the data for which an LCS was not analyzed. | | | |
| | **NOTE**: If only one LCS was analyzed for | | | |

| | YES | NO | N/A |
|---|---|---|---|
| more than 20 samples, then the first 20 samples analyzed are not flagged(J), but all additional samples must be qualified (J). | | | |

A.1.20.2 Aqueous LCS

Circle on each Form VII the LCS percent recoveries outside control limits 80-120%.

NOTE: 1.Use digested ICV as LCS for aqueous mercury
2.Use distilled ICV as LCS for aqueous cyanide

| Is any LCS recovery: | YES | NO | N/A |
|---|---|---|---|
| Less than 50%? | ___ | [___] | ___ |
| Between 50% and 79%? | ___ | [___] | ___ |
| Between 121% and 150%? | ___ | [___] | ___ |
| Greater than 150%? | ___ | [___] | ___ |

ACTION:
If the LCS recovery is less than 50%, reject (R) and red-line all associated sample data (detects & non-detects); for a recovery between 50-79%, flag detects as "J" all non-detects as "UJ". if the LCS recovery is between 121-150%, flag only detects as "J". if the recovery is greater than 150%, reject (R) and red-line all detects.

A.1.20.3 Solid LCS

If an analyte's MDL is equal to or greater than the true value of LCS, disregard the "Action" below for that analyte even though the LCS is out of control limits.

| | YES | NO | N/A |
|---|---|---|---|
| Is the LCS "Found" value greater than the Upper Control Limit reported on Form VII? | ___ | [___] | ___ |

ACTION:

| | | YES | NO | N/A |
|---|---|---|---|---|
| | If yes, flag (J) all the associated detects ≥ MDL as estimated (J). | | | |
| | Is the LCS "Found" value lower than the Lower Control Limit reported on Form VII? | ___ | [✓] | ___ |
| | ACTION: If yes, flag detects as "J" and non-dectes as "UJ". | | | |
| A.1.21 | ICP-AES/ICP-MS Serial Dilution - Form VIII<br>NOTE: Serial dilution analysis is required only when the initial concentration is equal to or greater than 50 x MDL. | | | |
| A.1.21.1 | Was a Serial Dilution analysis performed: | | | |
| | For each SDG? | [✓] | ___ | ___ |
| | On one of the SDG samples? | [✓] | ___ | ___ |
| | For each matrix type? | [✓] | ___ | ___ |
| | For each concentration range (low or med.)? | [___] | ✓ | ___ |
| | Was a Serial Dilution sample analyzed with the SDG samples? | [✓] | ___ | ___ |
| | ACTION: If no for any of the above, flag as estimated (J) detects ≥ MDL of all the SDG samples for which the ICP Serial Dilution Analysis was not performed. | | | |
| A.1.21.2 | Was a Field Blank or PE sample used for the Serial Dilution Analysis? | ___ | [✓] | ___ |
| | ACTION: If yes, flag as estimated (J) detects ≥ MDL of all the SDG samples | | | |
| A.1.21.3 | Circle on Form VIII the Percent Differences (%D) between sample results and its dilution results that are outside the control limits ± 10% | | | |

| | | YES | NO | N/A |
|---|---|---|---|---|
| | when initial concentrations ≥ 50 x MDLs. | | | |
| | Are results outside the control limits flagged with an "E"(Lab Qualifier) on Form VIII and all Form I's? | [✓] | ___ | ___ |
| | ACTION: If no, write in the Contract-Problem/ Non-Compliance Section of the Data Review Narrative. | | | |
| A.1.21.4 | Are any %D values: | | | |
| | > 10%? | ✓ | [___] | ___ |
| | ≥ 100%? | ___ | [✓] | ___ |
| | ACTION: If the Percent Difference (%D) is greater than 10%, flag (J) as estimated all associated samples whose raw data ≥ MDL; if the %D is ≥ 100%, reject (R) and red-line all associated samples with raw data ≥ MDL. | | | |
| | (NOTE:Replace "E" with "J" or "R" as appropriate.) | | | |
| A.1.22 | Total/Dissolved or Inorganic/Total Analytes | | | |
| A.1.22.1 | Were any analyses performed for dissolved as well as total analytes on the same sample(s)? | ___ | [___] | / |
| | Were any analyses performed for inorganic as well as total analytes on the same sample(s)? | ___ | [___] | / |
| | ACTION: If yes, prepare a Form (Appendix A.5) to compare the differences between dissolved (or inorganic)and total analyte concentrations. Compute each difference on Appendix A.5 as a percent of the total analyte only when both of the following conditions are fulfilled: (1) The dissolved(or inorganic)concentration is greater than total concentration, and (2) greater than or equal to 5xMDL. | | | |
| A.1.22.2 | Is any dissolved (or inorganic) concentration greater than its total concentration by more than 20%? | ___ | [___] | / |

| | | YES | NO | N/A |
|---|---|---|---|---|
| A.1.22.3 | Is any dissolved(or inorganic) concentration greater than its total concentration by more than 50%? | ___ | [___] | ✓ |
| | ACTION: If the percent difference is greater than 20%, flag (J) both dissolved/inorganic and total concentrations as estimated. If the difference is more than 50%, reject (R) and red-line both the values. | | | |
| A.1.23 | Field Blank - Form I<br>NOTE: Designate "Field Blank" as such on Form I | | | |
| A.1.23.1 | Was a Field/Rinsate Bank collected and analyzed with the SDG samples? | [✓] | ___ | ___ |
| | If yes, is any Field/Rinsate Blank absolute value of an analyte on Form I greater than its CRQL(or 2xMDL when MDL>CRQL)? | ✓ | [___] | ___ |
| | If yes, circle the Field Blank value on Form I that is greater than the CRQL, (or 2 x MDL when MDL > CRQL). | | | |
| | Is any Field Blank value greater than CRQL also greater than the Preparation Blank value? | ✓ | [___] | ___ |
| | If yes, is the Field Blank value (> CRQL and > the prep. blank value) already rejected due to other QC criteria? | [___] | ✓ | ___ |

ACTION:
If the Field Blank value was not rejected, reject all associated sample data (except the Field Blank results)greater than the CRQL but less than the Field Blank value. Reject on Form I's the soil sample results whose raw values in ug/L in the instrument printout are greater than the CRQL but less than the Field Blank value in ug/L. Flag as "J" detects between the Field Blank value and 10xField Blank value. If the sample result ≥ MDL but ≤ CRQL, replace it with CRQL-U.

If the Field Blank value is less than the

| | YES | NO | N/A |
|---|---|---|---|
| Prep.Blank value, do not qualify the sample results due to the Field Blank criteria. | | | |

NOTE:
1. Field Blank result previously rejected due to other criteria cannot be used to qualify field samples.
2. Do not use Rinsate Blank associated with soils to qualify water samples and vice versa.

A.1.24 Verification of Instrumental Parameters - Form IX, XA, XB, XI

A.1.24.1 Is verification report present for:

| | YES | NO | N/A |
|---|---|---|---|
| Method Detection Limits (Form IX-Annually)? | [✓] | ___ | ___ |
| ICP-AES Interelement Correction Factors (Form XA & XB -Quarterly)? | [✓] | ___ | ___ |
| ICP-AES & ICP-MS Linear Ranges (Form XI-Quarterly)? | [✓] | ___ | ___ |

ACTION:
If no, contact CLP PO/TOPO for submittal from the laboratory.

A.1.24.2 Method Detection Limits - Form IX

A.1.24.2.1 Are MDLs present on Form IX for:

| | YES | NO | N/A |
|---|---|---|---|
| All the analytes? | [✓] | ___ | ___ |
| All the instruments used? | [✓] | ___ | ___ |
| Digested and undigested samples and Calib.Blanks? | [✓] | ___ | ___ |
| ICP-AES and ICP-MS when both instruments are used for the same analyte? | [✓] | ___ | ___ |

ACTION:
If no for any of the above, prepare Telephone Record Log and contact CLP PO/TOPO for submittal of the MDLs from the laboratory. Report to CLP PO and write in the Contract Problems/ Non-Compliance Section of the Data Review Narrative if the MDL concentration is not less than ½ CRQL.

| | | YES | NO | N/A |
|---|---|---|---|---|
| A.1.24.2.2 | Is MDL greater than the CRQL for any analyte? | ___ | [✓] | ___ |
| | If yes, is the analyte concentration on Form I greater than 5 x MDL for the sample analyzed on the instrument whose MDL exceeds CRQL? | [___] | ___ | ✓ |
| | **ACTION:** If no, flag as estimated (J) all values less than five times MDL for the analyte whose MDL exceeds the CRQL. | | | |
| A.1.24.3 | **Linear Ranges - Form XI** | | | |
| A.1.24.3.1 | Was any sample result higher than the high linear range for ICP-AES or ICP-MS? | ___ | [✓] | ___ |
| | Was any sample result higher than the highest calibration standard for mercury or cyanide? | ___ | [✓] | ___ |
| | If yes for any of the above, was the sample diluted to obtain the result reported on Form I? | [___] | ___ | ✓ |
| | **ACTION:** If no, flag (J) as estimated the affected detects (≥ MDL) reported on Form I. | | | |
| A.1.25 | **ICP-MS Tune Analysis - Form XIV** | | | |
| A.1.25.1 | Was the ICP-MS instrument tuned prior to calibration? | [✓] | ___ | ___ |
| | **ACTION:** If no, reject (R) and red-line all sample data for which tuning was not performed. | | | |
| A.1.25.2 | Was the tuning solution analyzed or scanned at least five times consecutively? | [✓] | ___ | ___ |
| | Were all the required isotopes spanning the analytical range present in the tuning solution? | [✓] | ___ | ___ |
| | Was the mass resolution within | | | |

| | | YES | NO | N/A |
|---|---|---|---|---|
| | 0.1 amu for each isotope in the tuning solution? | [✓] | | |
| | Was %RSD less than 5% for each isotope of each analyte in the tuning solution? | [✓] | | |
| | ACTION: If no for any of the above, qualify all results ≥ MDL associated with that Tune as estimated "J", and all non-detects associated with that Tune as "UJ". | | | |
| A.1.26 | ICP-MS Internal Standards - Form XV | | | |
| A.1.26.1 | Were the Internal Standards added to all the samples and all QC samples and calibration standards (except the Tuning Solution)? | [✓] | | |
| | Were all the target analyte masses bracketed by the masses of the five internal standards? | [✓] | | |
| | ACTION: If none of the Internal Standards was added to the samples, reject (R) and red-line all the associated sample data (detects & non-detects). If internal standards were used but did not cover all the analyte masses, reject (R) and red-line only the analyte results not bracketed by the internal standard masses. | | | |
| A.1.26.2 | Was the intensity of an Internal Standard in each sample within 60-125% of the intensity of the same Internal Standard in the calibration blank? | [✓] | | |
| | If no, was the original sample diluted two fold, Internal Standard added and the sample re-analyzed? | [✓] | | ✓ |
| | Was the %RI for the two fold diluted sample within the acceptance limits (60-125%)? | [ ] | | ✓ |
| | ACTION: If no for any of the above, flag detects as "J" and non-detects "UJ" of all the analytes with atomic masses between the atomic mass of the internal standard lighter | | | |

than the affected internal standard, and the atomic mass of the internal standard heavier than the affected internal standard.

A.1.27 Percent Solids of Sediments

A.1.27.1 Are percent solids in sediment(s):

< 50%? ___ [___] ✓

ACTION:
If yes, qualify as estimated (J) all detects and non-detects of a sample that has percent solids less than 50%(i.e.,moisture content greater than 50%).

NOTE:
Flag(J) only the sample results that were not previously flagged due to other QC criteria.

## Inorganic Data Review Narrative

Case# _____ Site: _____ Matrix: Soil ____

SDG# _____ Lab: _____ Water ____

Sampling Team: _____ Reviewer: _____ Other _____

A.2.1 Data Validation Flags:
The following flags may have been applied in red by the data validator and must be considered by the data user.

J - This flag indicates the result qualified as estimated

R and Red-Line - A red-line drawn through a sample result indicates unusable value. The red-lined data are known to contain significant errors based on documented information and must not be used by the data user.

U - This data validation qualifier is applied to sample results ≥ MDL when associated blank is contaminated

Fully Usable Data - The results that do not carry "J" or "red-line" are fully usable.

A.2.2 Laboratory Qualifiers:
The CLP laboratory applies a contractual qualifier on all

# Mercury/Methyl Mercury

**LABORATORY DATA CONSULTANTS, INC.**
7750 El Camino Real, Suite 2L Carlsbad, CA 92009 Phone: 760/634-0437 Fax: 760/634-0439

Windward Environmental, LLC
200 West Mercer Street, Suite 401
Seattle, WA 98119
ATTN: Ms. Jennifer Parker

October 6, 2011

SUBJECT: Lower Passaic River Restoration Project, Data Validation

Dear Ms. Parker,

Enclosed are the final validation reports for the fractions listed below. These SDGs were received on September 19, 2011. Attachment 1 is a summary of the samples that were reviewed for each analysis.

**LDC Project # 26278:**

| SDG # | Fraction |
|---|---|
| 1132006 | Mercury & Methyl Mercury |
| K1107026 | Metals, Percent Lipids, Butyltins |

The data validation was performed under EPA Level IV guidelines. The analyses were validated using the following documents, as applicable to each method:

- Final Surface Sediment Chemical Analyses and Benthic Invertebrate Toxicity and Bioaccumulation Testing Quality Assurance Project Plan (QAPP) for the Lower Passaic River Restoration Project, October 2009
- Caged Bivalve Study Addendum, March 2011
- USEPA Region II Validation SOP HW-2, (Revision 13, September 2006) for Metals, modified as necessary to accommodate the QAPP criteria
- USEPA, Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review, June 2008
- USEPA, Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review, January 2010

Please feel free to contact us if you have any questions.

Sincerely,

Stella Cuenco

Stella S. Cuenco
Data Validation Operations Manager/Senior Chemist

L:\Windward\Passaic\26278COV.wpd

Attachment 1

| EDD | LDC #26278 (Windward Environmental, LLC - Seattle WA / Lower Passaic River Restoration Project) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | PO# 2011-0012 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LDC | SDG# | DATE REC'D | (3) DATE DUE | Hg (1631) | | Methyl Hg (1630) | | Metals (SW846) | | Se (7742) | | Lipids (B&D) | | Butyltin (KRONE) | | | | | | | | | | | | | | | | | | | | | | |
| Matrix: Water/Tissue | | | | W | T | W | T | W | T | W | T | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S |
| A | 1132006 | 09/19/11 | 10/10/11 | 0 | 11 | 0 | 11 | - | - | - | - | - | - | - | - | | | | | | | | | | | | | | | | | | | | | |
| B | K1107026 | 09/19/11 | 10/10/11 | - | - | - | - | 0 | 10 | 0 | 10 | 0 | 10 | 0 | 10 | | | | | | | | | | | | | | | | | | | | | |
| Total | A/SC | | | 0 | 11 | 0 | 11 | 0 | 10 | 0 | 10 | 0 | 10 | 0 | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 62 |

For Internal Use Only: Shaded cells indicate Level IV validation (all other cells are Level III validation). These sample counts do not include MS/MSD, and DUPs

26278ST.wpd

# Laboratory Data Consultants, Inc.
# Data Validation Report

| | |
|---|---|
| **Project/Site Name:** | Lower Passaic River Restoration Project |
| **Collection Date:** | March 8 through July 18, 2011 |
| **LDC Report Date:** | October 10, 2011 |
| **Matrix:** | Tissue/Water |
| **Parameters:** | Mercury and Methyl Mercury |
| **Validation Level:** | EPA Level IV |
| **Laboratory:** | Brooks Rand Labs |
| **Sample Delivery Group (SDG):** | 1132006 |

**Sample Identification**

LPR6-ECST-Comp01
LPRBG-ECST-Comp01
LPR6-ECST-Comp02
LPR7-ECST-Comp03
LPR7-ECST-Comp04
LPR8-ECST-Comp05
LPR1-GDST-Comp01
LPRBG-GDST-Comp01
LPR2-GDST-Comp02
LPR3-GDST-Comp03
LPR-071811-RB
LPR2-GDST-Comp02MS
LPR2-GDST-Comp02MSD
LPR2-GDST-Comp02DUP

## Introduction

This data review covers 13 tissue samples and one water sample listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 1631 for Mercury and EPA Method 1630 modified for Methyl Mercury.

This review follows the Final Surface Sediment Chemical Analyses and Benthic Invertebrate Toxicity and Bioaccumulation Testing Quality Assurance Project Plan (QAPP) for the Lower Passaic River Restoration Project, (October 8, 2009), the Caged Bivalve Study Addendum (March 2, 2011) and the USEPA Region II Validation SOP HW-2 (Revision 13, September 2006) for Metals, modified as necessary to accomodate the QAPP criteria.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature. The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

NJ Presumptive evidence of presence of the compound at an estimated quantity.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

## I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

## II. ICPMS Tune

ICP-MS was not utilized in this SDG.

## III. Calibration

An initial calibration was performed.

The frequency and analysis criteria of the initial calibration verification (ICV) and continuing calibration verification (CCV) standard were met.

## IV. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks.

Sample LPR-071811-RB was identified as a rinsate blank. No contaminants were found above the reporting limit in this blank.

## V. ICP Interference Check Sample (ICS) Analysis

ICP interference check was not required by the methods.

## VI. Matrix Spike Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

## VII. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Results were within QC limits.

## VIII. Laboratory Control Samples (LCS) and Certified Reference Material (CRM) Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

Percent recoveries (%R) of the certified reference material were within QC limits.

## IX. Internal Standards

ICP-MS was not utilized in this SDG.

## X. Furnace Atomic Absorption QC

Graphite furnace atomic absorption was not utilized in this SDG.

## XI. ICP Serial Dilution

ICP serial dilutions were not required by the methods.

## XII. Sample Result Verification

All sample result verifications were acceptable.

## XIII. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

## XIV. Field Duplicates

No field duplicates were identified in this SDG.

**Lower Passaic River Restoration Project**
**Mercury and Methyl Mercury - Data Qualification Summary - SDG 1132006**

No Sample Data Qualified in this SDG

**Lower Passaic River Restoration Project**
**Mercury and Methyl Mercury - Laboratory Blank Data Qualification Summary - SDG 1132006**

No Sample Data Qualified in this SDG

**Lower Passaic River Restoration Project**
**Mercury and Methyl Mercury - Field Blank Data Qualification Summary - SDG 1132006**

No Sample Data Qualified in this SDG

LDC #: 26278A4
SDG #: 1132006
Laboratory: Brooks Rand Labs

# VALIDATION COMPLETENESS WORKSHEET

Level ~~III~~ IV

Date: 9-27-11
Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

**METHOD:** Mercury (EPA ~~SW846~~ Method 1631), Methyl Mercury (EPA ~~SW846~~ Method 1630)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

| | Validation Area | | Comments |
|---|---|---|---|
| I. | Technical holding times | A | Sampling dates: 3/8 - 7/18/11 |
| II. | ICP/MS Tune | N | Not utilized |
| III. | Calibration | A | |
| IV. | Blanks | A | |
| V. | ICP Interference Check Sample (ICS) Analysis | N | ~~Not utilized~~ not required |
| VI. | Matrix Spike Analysis | A | MS/D |
| VII. | Duplicate Sample Analysis | A | Dup - |
| VIII. | Laboratory Control Samples (LCS) | A | LCS - CRM |
| IX. | Internal Standard (ICP-MS) | N | Not utilized |
| X. | Furnace Atomic Absorption QC | N | ↓ |
| XI. | ICP Serial Dilution | N | Not required |
| XII. | Sample Result Verification | A | |
| XIII. | Overall Assessment of Data | A | |
| XIV. | Field Duplicates | N | |
| XV | Field Blanks | ND | Rinse Blk = 11 |

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: Tissue/water

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1 | LPR6-ECST-Comp01 | 11 | LPR-071811-RB | 21 | | 31 | |
| 2 | LPRBG-ECST-Comp01 | 12 | (~~N~~ 69) MS | 22 | | 32 | |
| 3 | LPR6-ECST-Comp02 | 13 | ↓ MSD | 23 | | 33 | |
| 4 | LPR7-ECST-Comp03 | 14 | ↓ DUP | 24 | | 34 | |
| 5 | LPR7-ECST-Comp04 | 15 | | 25 | | 35 | |
| 6 | LPR8-ECST-Comp05 | 16 | | 26 | | 36 | |
| 7 | LPR1-GDST-Comp01 | 17 | | 27 | | 37 | |
| 8 | LPRBG-GDST-Comp01 | 18 | | 28 | | 38 | |
| 9 | LPR2-GDST-Comp02 | 19 | | 29 | | 39 | |
| 10 | LPR3-GDST-Comp03 | 20 | | 30 | | 40 | |

Notes:

DC #: 26278A14

VALIDATION FINDINGS CHECKLIST


Reviewer: CR
2nd Reviewer: [illegible]

Method: Metals (EPA SW 846 Method 6010B/7000/6020)

| Validation Area | Yes | No | NA | Findings/Comments |
|---|---|---|---|---|
| *I. Technical holding times* | | | | |
| All technical holding times were met. | ✓ | | | |
| Cooler temperature criteria was met. | ✓ | | | |
| *II. ICP/MS Tune* | | | | |
| Were all isotopes in the tuning solution mass resolution within 0.1 amu? | | | ✓ | |
| Were %RSD of isotopes in the tuning solution ≤5%? | | | ✓ | |
| *III. Calibration* | | | | |
| Were all instruments calibrated daily, each set-up time? | ✓ | | | |
| Were the proper number of standards used? | ✓ | | | |
| Were all initial and continuing calibration verification %Rs within the 90-110% (80-120% for mercury) QC limits? | ✓ | | | |
| Were all initial calibration correlation coefficients > 0.995? | ✓ | | | |
| *IV. Blanks* | | | | |
| Was a method blank associated with every sample in this SDG? | ✓ | | | |
| Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet. | | ✓ | | |
| *V. ICP Interference Check Sample* | | | | |
| Were ICP interference check samples performed daily? | | | ✓ | |
| Were the AB solution percent recoveries (%R) with the 80-120% QC limits? | | | ✓ | |
| *VI. Matrix spike/Matrix spike duplicates* | | | | |
| Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water. | ✓ | | | |
| Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken. | ✓ | | | |
| Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of +/- RL(+/-2X RL for soil) was used for samples that were ≤ 5X the RL, including when only one of the duplicate sample values were < 5X the RL. | ✓ | | | |
| *VII. Laboratory control samples* | | | | |
| Was an LCS anaylzed for this SDG? | ✓ | | | |
| Was an LCS analyzed per extraction batch? | ✓ | | | |
| Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% QC limits for water samples and laboratory established QC limits for soils? | ✓ | | | |

DC #: 26278A4

VALIDATION FINDINGS CHECKLIST


Reviewer: ce
2nd Reviewer: ✓

| Validation Area | Yes | No | NA | Findings/Comments |
|---|---|---|---|---|
| *VIII. Furnace Atomic Absorption QC* | | | | |
| If MSA was performed, was the correlation coefficients > 0.995? | | | ✓ | |
| Do all applicable analysies have duplicate injections? (Level IV only) | | | ✓ | |
| For sample concentrations > RL, are applicable duplicate injection RSD values < 20%? (Level IV only) | | | ✓ | |
| Were analytical spike recoveries within the 85-115% QC limits? | | | ✓ | |
| *IX. ICP Serial Dilution* | | | | |
| Was an ICP serial dilution analyzed if analyte concentrations were > 50X the MDL (ICP)/>100X the MDL(ICP/MS)? | | | ✓ | |
| Were all percent differences (%Ds) < 10%? | | | ✓ | |
| Was there evidence of negative interference? If yes, professional judgement will be used to qualify the data. | | | ✓ | |
| *X. Internal Standards (EPA SW 846 Method 6020/EPA 200.8)* | | | | |
| Were all the percent recoveries (%R) within the 30-120% (6020)/60-125% (200.8) of the intensity of the internal standard in the associated initial calibration? | | | ✓ | |
| If the %Rs were outside the criteria, was a reanalysis performed? | | | ✓ | |
| *XI. Regional Quality Assurance and Quality Control* | | | | |
| Were performance evaluation (PE) samples performed? | | ✓ | | |
| Were the performance evaluation (PE) samples within the acceptance limits? | | | ✓ | |
| *XII. Sample Result Verification* | | | | |
| Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation? | ✓ | | | |
| *XIII. Overall assessment of data* | | | | |
| Overall assessment of data was found to be acceptable. | ✓ | | | |
| *XIV. Field duplicates* | | | | |
| Field duplicate pairs were identified in this SDG. | | ✓ | | |
| Target analytes were detected in the field duplicates. | | | ✓ | |
| *XV. Field blanks* | | | | |
| Field blanks were identified in this SDG. | ✓ | ✓ | | |
| Target analytes were detected in the field blanks. | | ✓ | | |

DC #: 26278H4

# VALIDATION FINDINGS WORKSHEET
## Sample Specific Element Reference

Page: 1 of 1
Reviewer: CR
2nd reviewer: ✓

All circled elements are applicable to each sample.

| Sample ID | Matrix | Target Analyte List (TAL) |
|---|---|---|
| 1-11 | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, Metals |
| | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, |
| QC 12-14 | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, Metals |
| | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, |
| | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, |
| | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, |
| | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, |
| | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, |
| | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, |
| | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, |
| | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, |
| | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, |
| | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, |
| | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, |
| | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, |
| | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, |
| | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, |
| | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, |
| | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, |
| | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, |
| | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, |
| | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, |
| | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, |

| Analysis Method | | |
|---|---|---|
| ICP | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, |
| ICP-MS | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, |
| FAA | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN⁻, |

Comments: Mercury by CVAA if performed

LDC #: 2627844

# VALIDATION FINDINGS WORKSHEET
## Initial and Continuing Calibration Calculation Verification

Page: 1 of 1
Reviewer: CS
2nd Reviewer: ✓

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

An Initial and continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

$$\%R = \frac{Found}{True} \times 100$$

Where, Found = concentration (in ug/L) of each analyte measured in the analysis of the ICV or CCV solution
True = concentration (in ug/L) of each analyte in the ICV or CCV source

| Standard ID | Type of Analysis | Element | Found (~~ug/L~~ PS) | True (~~ug/L~~ PS) | Recalculated %R | Reported %R | Acceptable (Y/N) |
|---|---|---|---|---|---|---|---|
| | ICP (Initial calibration) | | | | | | |
| | ICP/MS (Initial calibration) | | | | | | |
| ICV | CVA~~A~~ PS (Initial calibration) | Metals | 31.61 | 30 | 115 | 115 | Y |
| | ICP (Continuing calibration) | | | | | | |
| | ICP/MS (Continuing calibration) | | | | | | |
| CCV | CVA~~A~~ PS (Continuing calibration) | Hg | 494 | 500 | 99 | 99 | Y |
| | GFAA (Initial calibration) | | | | | | |
| | GFAA (Continuing calibation) | | | | | | |

Comments: Refer to Calibration Verification findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

CALCLC.4SW

LDC #: 26284

# VALIDATION FINDINGS WORKSHEET
## Level IV Recalculation Worksheet


Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Percent recoveries (%R) for an ICP interference check sample, a laboratory control sample and a matrix spike sample were recalculated using the following formula:

$\%R = \frac{Found}{True} \times 100$

Where, Found = Concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result).
True = Concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

$RPD = \frac{|S-D|}{(S+D)/2} \times 100$

Where, S = Original sample concentration
D = Duplicate sample concentration

An ICP serial dilution percent difference (%D) was recalculated using the following formula:

$\%D = \frac{|I-SDR|}{I} \times 100$

Where, I = Initial Sample Result (mg/L)
SDR = Serial Dilution Result (mg/L) (Instrument Reading x 5)

| Sample ID | Type of Analysis | Element | Found / S / I (units) | True / D / SDR (units) | Recalculated %R / RPD / %D | Reported %R / RPD / %D | Acceptable (Y/N) |
|---|---|---|---|---|---|---|---|
| N | ICP interference check | | | | | | |
| LCS | Laboratory control sample | Mo/Hg | 417.7 | 394.0 | 106 | 106 | Y |
| 12 | Matrix spike | Hg | (SSR-SR) 72.6 | 64.16 | 113 | 113 | ↓ |
| 14 | Duplicate | Mo/Hg | 3.3 | 4.1 | 22 | 20 | ↓ |
| N | ICP serial dilution | | | | | | |

Comments: Refer to appropriate worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 26228A4

# VALIDATION FINDINGS WORKSHEET
## Sample Calculation Verification

Page: 1 of 1
Reviewer: CR
2nd reviewer: ✓

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Have results been reported and calculated correctly?
Y N N/A Are results within the calibrated range of the instruments and within the linear range of the ICP?
Y N N/A Are all detection limits below the CRDL?

Detected analyte results for Hg/MeHg were recalculated and verified using the following equation:

Concentration = (RD)(FV)(Dil) / (In. Vol.)

RD = Raw data concentration
FV = Final volume (ml)
In. Vol. = Initial volume (ml) or weight (G)
Dil = Dilution factor

Recalculation:

7: Hg $= \left(\frac{2.97\,pg\,(40\,mL)}{1\,mL} - \frac{4.7725\,pg\,(40\,mL)}{10\,mL}\right) / 1000(1.107\,g) = 10.7\,ng/g$

1: MeHg $= \left(\frac{17.7\,pg\,(2.5\,mL)}{0.03\,mL} - \frac{0.2108\,pg\,(0.1\,mL)}{20\,mL}\right) / 1000(0.118) = 12.499\,mg/g$

| # | Sample ID | Analyte | Reported Concentration (ng/g) | Calculated Concentration (ng/g) | Acceptable (Y/N) |
|---|---|---|---|---|---|
| | 7 | Hg | 10.7 | 10.7 | Y |
| | | MeHg | 4.7 | 4.9 | |
| | | | | | |
| | 1 | Hg | 27.9 | 27.9 | |
| | | MeHg | 12.4 | 12.5 | ✓ |

Note:

RECALC.4SW

# PAHs

**Laboratory Data Consultants, Inc.**

**7750 El Camino Real, Ste. 2L Carlsbad, CA 92009**

**Phone** 760.634.0437 **Web** www.lab-data.com **Fax** 760.634.0439

Windward Environmental, LLC
200 West Mercer Street, Suite 401
Seattle, WA 98119
ATTN: Ms. Jennifer Parker

October 13, 2011

SUBJECT: Lower Passaic River Restoration Project, Data Validation

Dear Ms. Parker,

Enclosed are the final validation reports for the fractions listed below. This SDG was received on September 28, 2011. Attachment 1 is a summary of the samples that were reviewed for each analysis.

**LDC Project # 26311:**

| SDG # | Fraction |
|---|---|
| L1110328 | Semivolatiles, Polynuclear Aromatic Hydrocarbons, Polychlorinated Biphenyls, Percent Moisture |

The data validation was performed under EPA Level IV guidelines. The analyses were validated using the following documents, as applicable to each method:

- Final Surface Sediment Chemical Analyses and Benthic Invertebrate Toxicity and Bioaccumulation Testing Quality Assurance Project Plan (QAPP) for the Lower Passaic River Restoration Project, October 2009
- Caged Bivalve Study Addendum, March 2011
- USEPA Region II Validation SOP HW-22, (Revision 2, June 2001) for Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry SW-846 method 8270C, modified as necessary to accommodate the QAPP criteria
- USEPA Region II Validation SOP HW-45, (Revision 1, October 2006) for Polychlorinated Biphenyls by Gas Chromatography SW-846 method 8082, modified as necessary to accommodate the QAPP criteria
- USEPA, Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review, June 2008
- USEPA, Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review, January 2010

Please feel free to contact us if you have any questions.

Sincerely,

Stella Cuenco

Stella S. Cuenco
Data Validation Operations Manager/Senior Chemist

V:\LOGIN\Windward\Passaic\26311COV.wpd

Attachment 1

| EDD | LDC #26311 (Windward Environmental, LLC - Seattle WA / Lower Passaic River Restoration Project) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | PO# 2011-0012 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LDC | SDG# | DATE REC'D | (3) DATE DUE | SVOA (8270C | | PAHs (8270C -SIM) | | PCBs (8082) | | % Moist. (2540G) | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Matrix: Water/Tissue | | | | W | T | W | T | W | T | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S |
| A | L1110328 | 09/28/11 | 10/19/11 | 1 | 10 | 1 | 10 | 1 | 10 | 0 | 10 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total | T/SC | | | 1 | 10 | 1 | 10 | 1 | 10 | 0 | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 43 |

For Internal Use Only: Shaded cells indicate Level IV validation (all other cells are Level III validation). These sample counts do not include MS/MSD, and DUPs

26311ST.wpd

# Laboratory Data Consultants, Inc.
# Data Validation Report

| | |
|---|---|
| **Project/Site Name:** | Lower Passaic River Restoration Project |
| **Collection Date:** | March 8 through July 18, 2011 |
| **LDC Report Date:** | October 14, 2011 |
| **Matrix:** | Tissue/Water |
| **Parameters:** | Polynuclear Aromatic Hydrocarbons |
| **Validation Level:** | EPA Level IV |
| **Laboratory:** | Alpha Analytical, Inc. |
| **Sample Delivery Group (SDG):** | L1110328 |

**Sample Identification**

LPR6-ECST-Comp01
LPRBG-ECST-Comp01
LPR6-ECST-Comp02
LPR7-ECST-Comp03
LPR7-ECST-Comp04
LPR8-ECST-Comp05
LPR1-GDST-Comp01
LPRBG-GDST-Comp01
LPR2-GDST-Comp02
LPR3-GDST-Comp03
LPR-071811-RB
LPR6-ECST-Comp01MS
LPR6-ECST-Comp01MSD
LPR6-ECST-Comp01DUP

## Introduction

This data review covers 13 tissue samples and one water sample listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8270C using Selected Ion Monitoring (SIM) for Polynuclear Aromatic Hydrocarbons.

This review follows the Final Surface Sediment Chemical Analyses and Benthic Invertebrate Toxicity and Bioaccumulation Testing Quality Assurance Project Plan (QAPP) for the Lower Passaic River Restoration Project, (October 8, 2009), the Caged Bivalve Study Addendum (March 2, 2011), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (January 2008).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

NJ Presumptive evidence of presence of the compound at an estimated quantity.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

## I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

## II. GC/MS Instrument Performance Check

Instrument performance was checked as applicable.

## III. Initial Calibration

Initial calibration was performed using required standard concentrations.

Percent relative standard deviations (%RSD) were less than or equal to 25.0% for all compounds.

Average relative response factors (RRF) for all compounds were within method and validation criteria.

## IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

All of the continuing calibration percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were less than or equal to 25.0% for all compounds with the following exceptions:

| Date | Compound | %D | Associated Samples | Flag | A or P |
|---|---|---|---|---|---|
| 8/5/11 | Dibenz(a,c+a,h)anthracene | 31.5 | WG481307-1BLANK | J (all detects)<br>UJ (all non-detects) | A |

The percent difference (%D) of the second source calibration standard were less than or equal to 20.0% for all compounds.

All of the continuing calibration relative response factors (RRF) for were within method and validation criteria.

## V. Blanks

Method blanks were reviewed for each matrix as applicable. No polynuclear aromatic hydrocarbon contaminants were found in the method blanks with the following exceptions:

| Method Blank ID | Extraction Date | Compound TIC (RT in minutes) | Concentration | Associated Samples |
|---|---|---|---|---|
| WG481307-1BLANK | 7/28/11 | Phenanthrene<br>Fluoranthene<br>Pyrene | 0.760 ug/Kg<br>2.52 ug/Kg<br>11.1 ug/Kg | LPR6-ECST-Comp02<br>LPR7-ECST-Comp03<br>LPR7-ECST-Comp04<br>LPR8-ECST-Comp05<br>LPR1-GDST-Comp01 |

Sample concentrations were compared to concentrations detected in the method blanks. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated method blanks.

Sample LPR-071811-RB was identified as a rinsate blank. No polynuclear aromatic hydrocarbon contaminants were found in this blank with the following exceptions:

| Rinsate Blank ID | Sampling Date | Compound | Concentration | Associated Samples |
|---|---|---|---|---|
| LPR-071811-RB | 7/18/11 | Phenanthrene<br>Fluoranthene<br>Pyrene | 5.11 ng/L<br>6.78 ng/L<br>7.70 ng/L | All tissue samples in SDG L1110328 |

Sample concentrations were compared to concentrations detected in the field blanks. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated field blanks.

## VI. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

## VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Results were within QC limits.

## VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC.

## IX. Regional Quality Assurance and Quality Control

Not applicable.

## X. Internal Standards

All internal standard areas and retention times (RTs) were within QC limits.

## XI. Target Compound Identifications

All target compound identifications were within validation criteria.

## XII. Compound Quantitation and RLs

All compound quantitation and RLs were within validation criteria with the following exceptions:

| Sample | Compound | Finding | Flag | A or P |
|---|---|---|---|---|
| LPR6-ECST-Comp01<br>LPR7-ECST-Comp04<br>LPR8-ECST-Comp05<br>LPR1-GDST-Comp01<br>LPR2-GDST-Comp02<br>LPR6-ECST-Comp01DUP | 2,3,5-Trimethylnaphthalene | Not adequately resolved from co-eluting interference. | J (all detects) | A |

## XIII. Tentatively Identified Compounds (TICs)

Tentatively identified compounds were not reported by the laboratory.

## XIV. System Performance

Raw data were not reviewed for this SDG.

## XV. Overall Assessment

Data flags are summarized at the end of this report if data has been qualified.

## XVI. Field Duplicates

No field duplicates were identified in this SDG.

**Lower Passaic River Restoration Project**
**Polynuclear Aromatic Hydrocarbons - Data Qualification Summary - SDG L1110328**

| SDG | Sample | Compound | Flag | A or P | Reason |
|---|---|---|---|---|---|
| L1110328 | LPR6-ECST-Comp01<br>LPR7-ECST-Comp04<br>LPR8-ECST-Comp05<br>LPR1-GDST-Comp01<br>LPR2-GDST-Comp02<br>LPR6-ECST-Comp01DUP | 2,3,5-Trimethylnaphthalene | J (all detects) | A | Compound quantitation and RLs |

**Lower Passaic River Restoration Project**
**Polynuclear Aromatic Hydrocarbons - Laboratory Blank Data Qualification Summary - SDG L1110328**

No Sample Data Qualified in this SDG

**Lower Passaic River Restoration Project**
**Polynuclear Aromatic Hydrocarbons - Field Blank Data Qualification Summary - SDG L1110328**

No Sample Data Qualified in this SDG

LDC #: 26311A2b **VALIDATION COMPLETENESS WORKSHEET** Date: 10/5/11
SDG #: L1110328 Level IV Page: 1 of 1
Laboratory: Alpha Analytical, Inc. Reviewer: [illegible]
2nd Reviewer: [illegible]

**METHOD:** GC/MS Polynuclear Aromatic Hydrocarbons (EPA SW 846 Method 8270C-SIM)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

| | Validation Area | | Comments |
|---|---|---|---|
| I. | Technical holding times | A | Sampling dates: 3/8-7/18/11 |
| II. | GC/MS Instrument performance check | N | |
| III. | Initial calibration | A | 25% |
| IV. | Continuing calibration/ICV | SW | CCV ≤ 25% ICV ≤ 20% |
| V. | Blanks | SW | |
| VI. | Surrogate spikes | A | |
| VII. | Matrix spike/Matrix spike duplicates /DUP | A | |
| VIII. | Laboratory control samples | A ~~SW~~ | LCS/D |
| IX. | Regional Quality Assurance and Quality Control | N | |
| X. | Internal standards | A | |
| XI. | Target compound identification | A | |
| XII. | Compound quantitation/RL/L~~OQ/LO~~Ds | SW | |
| XIII. | Tentatively identified compounds (TICs) | N | |
| XIV. | System performance | A | |
| XV. | Overall assessment of data | A | |
| XVI. | Field duplicates | N | |
| XVII. | Field blanks | SW | RB = 11 |

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: tissue + AQ

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1 4 | LPR6-ECST-COMP01 | 11 | LPR-071811RB W | | 21 1 | WG479975-1 | | 31 | |
| 2 3 | LPRBG-ECST-COMP01 | 12 4 | LPR6-ECST-COMP01MS | | 22 2 | WG481307-1 | | 32 | |
| 3 2 | LPR6ECST-COMP02 | 13 4 | LPR6-ECST-COMP01MSD | | 23 3 | WG489480-1 | | 33 | |
| 4 2 | LPR7-ECST-COMP03 | 14 4 | LPR6-ECST-COMP01DUP | | 24 4 | WG491520-1 | | 34 | |
| 5 2 | LPR7-ECST-COMP04 | 15 | | | 25 | | | 35 | |
| 6 2 | LPR8-ECST-COMP05 | 16 | | | 26 | | | 36 | |
| 7 2 | LPR1-GDST-COMP01 | 17 | | | 27 | | | 37 | |
| 8 3 | LPRBG-GDST-COMP01 | 18 | | | 28 | | | 38 | |
| 9 3 | LPR2-GDST-COMP02 | 19 | | | 29 | | | 39 | |
| 10 3 | LPR3-GDST-COMP03 | 20 | | | 30 | | | 40 | |

LDC #: 26311A26

# VALIDATION FINDINGS CHECKLIST


Reviewer: A
2nd Reviewer: V

**Method:** Semivolatiles (EPA SW 846 Method 8270C)

| Validation Area | Yes | No | NA | Findings/Comments |
|---|---|---|---|---|
| I. Technical holding times | | | | |
| All technical holding times were met. | ✓ | | | |
| Cooler temperature criteria was met. | ✓ | | | |
| II. GC/MS Instrument performance check | | | | |
| Were the DFTPP performance results reviewed and found to be within the specified criteria? | | ✓ | | |
| Were all samples analyzed within the 12 hour clock criteria? | | | ✓ | |
| III. Initial calibration | | | | |
| Did the laboratory perform a 5 point calibration prior to sample analysis? | ✓ | | | |
| Were all percent relative standard deviations (%RSD) and relative response factors (RRF) within method criteria for all CCCs and SPCCs? | ✓ | | | |
| Was a curve fit used for evaluation? | | ✓ | | |
| Did the initial calibration meet the curve fit acceptance criteria of ≥ 0.990? | | | ✓ | |
| Were all percent relative standard deviations (%RSD) ≤ ~~30~~ 25% and relative response factors (RRF) ≥ 0.05? | ✓ | | | |
| IV. Continuing calibration | | | | |
| Was a continuing calibration standard analyzed at least once every 12 hours for each instrument? | ✓ | | | |
| Were all percent differences (%D) and relative response factors (RRF) within method criteria for all CCCs and SPCCs? | ✓ | | | |
| Were all percent differences (%D) ≤ 25% and relative response factors (RRF) ≥ 0.05? | | ✓ | | |
| V. Blanks | | | | |
| Was a method blank associated with every sample in this SDG? | ✓ | | | |
| Was a method blank analyzed for each matrix and concentration? | ✓ | | | |
| Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet. | ✓ | | | |
| VI. Surrogate spikes | | | | |
| Were all surrogate %R within QC limits? | ✓ | | | |
| If 2 or more base neutral or acid surrogates were outside QC limits, was a reanalysis performed to confirm %R? | | | ✓ | |
| If any %R was less than 10 percent, was a reanalysis performed to confirm %R? | | | ✓ | |
| VII. Matrix spike/Matrix spike duplicates | | | | |
| Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water. | ✓ | | | |
| Was a MS/MSD analyzed every 20 samples of each matrix? | ✓ | | | |
| Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits? | ✓ | | | |
| VIII. Laboratory control samples | | | | |
| Was an LCS analyzed for this SDG? | ✓ | | | |

LDC #: 26311A2B

# VALIDATION FINDINGS CHECKLIST


Reviewer: X
2nd Reviewer: V

| Validation Area | Yes | No | NA | Findings/Comments |
|---|---|---|---|---|
| Was an LCS analyzed per extraction batch? | ✓ | | | |
| Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits? | ✓ | | | |
| IX. Regional Quality Assurance and Quality Control | | | | |
| Were performance evaluation (PE) samples performed? | | | ✓ | |
| Were the performance evaluation (PE) samples within the acceptance limits? | | | ✓ | |
| X. Internal standards | | | | |
| Were internal standard area counts within -50% or +100% of the associated calibration standard? | ✓ | | | |
| Were retention times within ± 30 seconds from the associated calibration standard? | ✓ | | | |
| XI. Target compound identification | | | | |
| Were relative retention times (RRT's) within ± 0.06 RRT units of the standard? | ✓ | | | |
| Did compound spectra meet specified EPA "Functional Guidelines" criteria? | ✓ | | | |
| Were chromatogram peaks verified and accounted for? | ✓ | | | |
| XII. Compound quantitation/CRQLs | | | | |
| Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound? | ✓ | | | |
| Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation? | ✓ | | | |
| XIII. Tentatively identified compounds (TICs) | | | | |
| Were the major ions (> 10 percent relative intensity) in the reference spectrum evaluated in sample spectrum? | | | ✓ | |
| Were relative intensities of the major ions within ± 20% between the sample and the reference spectra? | | | ✓ | |
| Did the raw data indicate that the laboratory performed a library search for all required peaks in the chromatograms (samples and blanks)? | | | ✓ | |
| XIV. System performance | | | | |
| System performance was found to be acceptable. | ✓ | | | |
| XV. Overall assessment of data | | | | |
| Overall assessment of data was found to be acceptable. | ✓ | | | |
| XVI. Field duplicates | | | | |
| Field duplicate pairs were identified in this SDG. | | ✓ | | |
| Target compounds were detected in the field duplicates. | | | ✓ | |
| XVII. Field blanks | | | | |
| Field blanks were identified in this SDG. | ✓ | | | |
| Target compounds were detected in the field blanks. | ✓ | | | |

# VALIDATION FINDINGS WORKSHEET

**cMETHOD:** GC/MS BNA (EPA Method 8270)

| | | | | |
|---|---|---|---|---|
| A. Phenol | S. Naphthalene | KK. 2,4-Dinitrotoluene | CCC. Benzo(a)anthracene | UUU.Benzo(b)thiophene |
| B. Bis (2-chloroethyl) ether | T. 4-Chloroaniline | LL. Diethylphthalate | DDD. Chrysene | VVV.Naphthobenzothiophene |
| C. 2-Chlorophenol | U. Hexachlorobutadiene | MM. 4-Chlorophenyl-phenyl ether | EEE. Bis(2-ethylhexyl)phthalate | WWW.Benzo(e)pyrene |
| D. 1,3-Dichlorobenzene | V. 4-Chloro-3-methylphenol | NN. Fluorene | FFF. Di-n-octylphthalate | XXX. 2,6-Dimethylnaphthalene |
| E. 1,4-Dichlorobenzene | W. 2-Methylnaphthalene | OO. 4-Nitroaniline | GGG. Benzo(b)fluoranthene | YYY. 2,3,5-Trimethylnaphthalene |
| F. 1,2-Dichlorobenzene | X. Hexachlorocyclopentadiene | PP. 4,6-Dinitro-2-methylphenol | HHH. Benzo(k)fluoranthene | ZZZ. Perylene |
| G. 2-Methylphenol | Y. 2,4,6-Trichlorophenol | QQ. N-Nitrosodiphenylamine (1) | III. Benzo(a)pyrene | AAAA. Dibenzothiophene |
| H. 2,2'-Oxybis(1-chloropropane) | Z. 2,4,5-Trichlorophenol | RR. 4-Bromophenyl-phenylether | JJJ. Indeno(1,2,3-cd)pyrene | BBBB. Benzo(a)fluoranthene |
| I. 4-Methylphenol | AA. 2-Chloronaphthalene | SS. Hexachlorobenzene | KKK. Dibenz(a,h)anthracene | CCCC. Benzo(b)fluorene |
| J. N-Nitroso-di-n-propylamine | BB. 2-Nitroaniline | TT. Pentachlorophenol | LLL. Benzo(g,h,i)perylene | DDDD. cis/trans-Decalin |
| K. Hexachloroethane | CC. Dimethylphthalate | UU. Phenanthrene | MMM. Bis(2-Chloroisopropyl)ether | EEEE. Biphenyl |
| L. Nitrobenzene | DD. Acenaphthylene | VV. Anthracene | NNN. Aniline | FFFF. Retene |
| M. Isophorone | EE. 2,6-Dinitrotoluene | WW. Carbazole | OOO. N-Nitrosodimethylamine | GGGG. C30-Hopane |
| N. 2-Nitrophenol | FF. 3-Nitroaniline | XX. Di-n-butylphthalate | PPP. Benzoic Acid | |
| O. 2,4-Dimethylphenol | GG. Acenaphthene | YY. Fluoranthene | QQQ. Benzyl alcohol | |
| P. Bis(2-chloroethoxy)methane | HH. 2,4-Dinitrophenol | ZZ. Pyrene | RRR. Pyridine | |
| Q. 2,4-Dichlorophenol | II. 4-Nitrophenol | AAA. Butylbenzylphthalate | SSS. Benzidine | |
| R. 1,2,4-Trichlorobenzene | JJ. Dibenzofuran | BBB. 3,3'-Dichlorobenzidine | TTT. 1-Methylnaphthalene | |

LDC #: 26311A2b

# VALIDATION FINDINGS WORKSHEET
## Continuing Calibration



Reviewer: 8C

2nd Reviewer: L

**METHOD:** GC/MS BNA (EPA SW 846 Method 8270)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

(Y) N N/A Was a continuing calibration standard analyzed at least once every 12 hours of sample analysis for each instrument?

Y N N/A Were percent differences (%D) and relative response factors (RRF) within method criteria for all CCC's and SPCC's ?

Y (N) N/A Were all %D and RRFs within the validation criteria of ≤25 %D and ≥0.05 RRF ?

| # | Date | Standard ID | Compound | Finding %D (Limit: ≤25.0%) | Finding RRF (Limit: ≥0.05) | Associated Samples | Qualifications |
|---|---|---|---|---|---|---|---|
| | 8/5/11 | A807508 | Dibenz(a,c+a,h) anthracene | 31.5 | | WG481307-1 BLANK | J/UJ/A |

CONCAL.2S

LDC #: 26311A26

# VALIDATION FINDINGS WORKSHEET
## Blanks


Reviewer: K
2nd Reviewer: L

**METHOD:** GC/MS BNA (EPA SW 846 Method 8270C)
Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a method blank analyzed for each matrix?
Y N N/A Was a method blank analyzed for each concentration preparation level?
Y N N/A Was a method blank associated with every sample?
Y N N/A Was the blank contaminated? If yes, please see qualification below.

**Blank extraction date:** 7/28/11 **Blank analysis date:** 8/6/11
**Conc. units:** ug/kg Associated Samples: 3-7 (>5x)

| Compound | Blank ID | Sample Identification | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| WG481207-1 BLANK | | | | | | | | | | |
| UU | 0.760 | | | | | | | | | |
| YY | 2.52 | | | | | | | | | |
| ZZ | 11.1 | | | | | | | | | |
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**Blank extraction date:**_____ **Blank analysis date:**_____
**Conc. units:**_____ Associated Samples:_____

| Compound | Blank ID | Sample Identification | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
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CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Common contaminants such as the phthalates and TICs noted above that were detected in samples within ten times the associated method blank concentration were qualified as not detected, "U". Other contaminants within five times the method blank concentration were also qualified as not detected, "U".

LDC #: 26311A26

# VALIDATION FINDINGS WORKSHEET
## Field Blanks


Reviewer: [illegible]
2nd Reviewer: [illegible]

**METHOD:** GC/MS BNA (EPA SW 846 Method 8270)
Y N N/A Were field blanks identified in this SDG?
Y N N/A Were target compounds detected in the field blanks?
**Blank units:** ug/L **Associated sample units:** ug/kg
**Sampling date:** 7/18/11
**Field blank type:** (circle one) Field Blank / Rinsate / Other: PB Associated Samples: All tissue (>5x)

| Compound | Blank ID | Sample Identification | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 11 | | | | | | | | | |
| UU | 5.11 | | | | | | | | | |
| YY | 6.78 | | | | | | | | | |
| ZZ | 7.70 | | | | | | | | | |
| | | | | | | | | | | |
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| | | | | | | | | | | |
| CRQL | | | | | | | | | | |

**Blank units:**_____ **Associated sample units:**_____
**Sampling date:**_____
**Field blank type:** (circle one) Field Blank / Rinsate / Other:_____ Associated Samples:_____

| Compound | Blank ID | Sample Identification | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
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| CRQL | | | | | | | | | | |

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Common contaminants such as the phthalates and TICs noted above that were detected in samples within ten times the associated field blank concentration were qualified as not detected, "U". Other contaminants within five times the field blank concentration were also qualified as not detected, "U".

LDC #: 26631LA26

# VALIDATION FINDINGS WORKSHEET
## Compound Quantitation and Reported CRQLs


Reviewer: [illegible]
2nd Reviewer: [illegible]

**METHOD:** GC/MS BNA (EPA SW 846 Method 8270)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound?

Y N N/A Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?

| # | Date | Compound | Finding | Associated Samples | Qualifications |
|---|---|---|---|---|---|
| | | 1,5-7, 9, 14 | YYY not adequately resolved from coeluting interference | | J detts /A |
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Comments: See sample calculation verification worksheet for recalculations

LDC #: 26311A26

# VALIDATION FINDINGS WORKSHEET
## Initial Calibration Calculation Verification


Reviewer: [illegible]
2nd Reviewer: [illegible]

**METHOD:** GC/MS BNA (EPA SW 846 Method 8270C)

The Relative Response Factor (RRF), average RRF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

$RRF = (A_x)(C_{is})/(A_{is})(C_x)$
average RRF = sum of the RRFs/number of standards
%RSD = 100 * (S/X)

$A_x$ = Area of compound,
$C_x$ = Concentration of compound,
S = Standard deviation of the RRFs,

$A_{is}$ = Area of associated internal standard
$C_{is}$ = Concentration of internal standard
X = Mean of the RRFs

| # | Standard ID | Calibration Date | Compound (Reference Internal Standard) | Reported RRF (500 std) | Recalculated RRF (500std) | Reported Average RRF (initial) | Recalculated Average RRF (initial) | Reported %RSD | Recalculated %RSD |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1QL | 7/18/11 | Naphthalene (1st internal standard) | 2.380 | 2.380 | 2.058 | 2.058 | 10.77 | 10.76 |
| | | | Chrysene (2nd internal standard) | 1.216 | 1.216 | 1.203 | 1.203 | 18.06 | 18.05 |
| | | | | | | | | | |
| | 1QL | 6/28/11 | Naphthalene (1st internal standard) | 2.460 | 2.460 | 2.142 | 2.142 | 8.55 | 8.56 |
| | | | Chrysene (2nd internal standard) | 1.367 | 1.367 | 1.201 | 1.201 | 7.85 | 7.84 |
| | | | | | | | | | |
| 2 | 1QL | 8/24/11 | Naphthalene (1st internal standard) | 2.586 | 2.586 | 2.631 | 2.631 | 7.08 | 7.08 |
| | | | Chrysene (2nd internal standard) | 1.279 | 1.279 | 1.243 | 1.243 | 2.77 | 2.77 |
| | | | | | | | | | |
| | | | Naphthalene (1st internal standard) | | | | | | |
| | | | Chrysene, (2nd internal standard) | | | | | | |
| | | | | | | | | | |
| 3 | | | Naphthalene (1st internal standard) | | | | | | |
| | | | Chrysene (2nd internal standard) | | | | | | |
| | | | | | | | | | |
| | | | Naphthalene (1st internal standard) | | | | | | |
| | | | Chrysene (2nd internal standard) | | | | | | |
| | | | | | | | | | |

Comments: Refer to Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 26311A2b

# VALIDATION FINDINGS WORKSHEET
## Continuing Calibration Results Verification


Reviewer: [illegible]
2nd Reviewer: [illegible]

**METHOD:** GC/MS BNA (EPA SW 846 Method 8270C)

The percent difference (%D) of the initial calibration average Relative Response Factors (RRFs) and the continuing calibration RRFs were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. RRF - RRF)/ave. RRF
RRF = $(A_x)(C_{is})/(A_{is})(C_x)$

Where: ave. RRF = initial calibration average RRF
RRF = continuing calibration RRF
$A_x$ = Area of compound, $A_{is}$ = Area of associated internal standard
$C_x$ = Concentration of compound, $C_{is}$ = Concentration of internal standard

| # | Standard ID | Calibration Date | Compound (Reference Internal Standard) | | Average RRF (initial) | Reported RRF (CC) | Recalculated RRF (CC) | Reported %D | Recalculated %D |
|---|---|---|---|---|---|---|---|---|---|
| 1 | D222266 | 7/20/11 | Naphthalene | (1st internal standard) | 2.058 | 2.180 | 2.180 | 5.9 | 5.9 |
| | | | Chrysene | (2nd internal standard) | 1.202 | 1.196 | 1.196 | 0.6 | 0.6 |
| | | | | | | | | | |
| | A807518 | 8/5/11 | Naphthalene | (1st internal standard) | 2.142 | 2.505 | 2.505 | 16.9 | 16.9 |
| | | | Chrysene | (2nd internal standard) | 1.201 | 1.370 | 1.370 | 14.1 | 14.0 |
| | | | | | | | | | |
| 2 | A807520 | 8/6/11 | Naphthalene | (1st internal standard) | 2.142 | 2.550 | 2.550 | 19.0 | 19.0 |
| | | | Chrysene | (2nd internal standard) | 1.201 | 1.396 | 1.396 | 16.2 | 16.2 |
| | | | | | | | | | |
| | A808025 | 9/16/11 | Naphthalene | (1st internal standard) | 2.631 | 2.703 | 2.703 | 2.7 | 2.7 |
| | | | Chrysene | (2nd internal standard) | 1.243 | 1.295 | 1.295 | 4.2 | 4.2 |
| | | | | | | | | | |
| 3 | A808118 | 9/23/11 | Naphthalene | (1st internal standard) | 2.631 | 2.282 | 2.282 | 13.3 | 13.3 |
| | | | Chrysene | (2nd internal standard) | 1.243 | 1.215 | 1.215 | 2.3 | 2.2 |
| | | | | | | | | | |
| | | | Naphthalene | (1st internal standard) | | | | | |
| | | | Chrysene | (2nd internal standard) | | | | | |
| | | | | | | | | | |

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 26311A26

# VALIDATION FINDINGS WORKSHEET
## Surrogate Results Verification


Reviewer: [illegible]
2nd reviewer: [illegible]

**METHOD:** GC/MS Semivolatiles (EPA SW 846 Method 8270C)

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
SS = Surrogate Spiked

**Sample ID:** 1

| | Surrogate Spiked | Surrogate Found | Percent Recovery Reported | Percent Recovery Recalculated | Percent Difference |
|---|---|---|---|---|---|
| ~~Nitrobenzene-d5~~ S-d8 | 2000 | 1479.847 | 74 | 74 | 0 |
| ~~2-Fluorobiphenyl~~ UU-d10 | ↓ | 1801.333 | 90 | 90 | ↓ |
| ~~Terphenyl-d14~~ III-d12 | ↓ | 1634.406 | 82 | 82 | ↓ |
| Phenol-d5 | | | | | |
| 2-Fluorophenol | | | | | |
| 2,4,6-Tribromophenol | | | | | |
| 2-Chlorophenol-d4 | | | | | |
| 1,2-Dichlorobenzene-d4 | | | | | |

**Sample ID:**

| | Surrogate Spiked | Surrogate Found | Percent Recovery Reported | Percent Recovery Recalculated | Percent Difference |
|---|---|---|---|---|---|
| Nitrobenzene-d5 | | | | | |
| 2-Fluorobiphenyl | | | | | |
| Terphenyl-d14 | | | | | |
| Phenol-d5 | | | | | |
| 2-Fluorophenol | | | | | |
| 2,4,6-Tribromophenol | | | | | |
| 2-Chlorophenol-d4 | | | | | |
| 1,2-Dichlorobenzene-d4 | | | | | |

**Sample ID:**

| | Surrogate Spiked | Surrogate Found | Percent Recovery Reported | Percent Recovery Recalculated | Percent Difference |
|---|---|---|---|---|---|
| Nitrobenzene-d5 | | | | | |
| 2-Fluorobiphenyl | | | | | |
| Terphenyl-d14 | | | | | |
| Phenol-d5 | | | | | |
| 2-Fluorophenol | | | | | |
| 2,4,6-Tribromophenol | | | | | |
| 2-Chlorophenol-d4 | | | | | |
| 1,2-Dichlorobenzene-d4 | | | | | |

LDC #: 28311A26

# VALIDATION FINDINGS WORKSHEET
## Matrix Spike/Matrix Spike Duplicates Results Verification


Reviewer: [illegible]
2nd Reviewer: [illegible]

**METHOD:** GC/MS BNA (EPA SW 846 Method 8270C)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the matrix spike and matrix spike duplicate were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 * (SSC - SC)/SA  Where: SSC = Spiked sample concentration; SA = Spike added; SC = Sample concentation

RPD = I MSC - MSC I * 2/(MSC + MSDC)  MSC = Matrix spike concentration  MSDC = Matrix spike duplicate concentration

MS/MSD samples: 12/13

| Compound | Spike Added (ug/kg) | | Sample Concentration (ug/kg) | Spiked Sample Concentration (ug/kg) | | Matrix Spike Percent Recovery | | Matrix Spike Duplicate Percent Recovery | | MS/MSD RPD | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | MS | MSD | ----- | MS | MSD | Reported | Recalc | Reported | Recalc | Reported | Recalculated |
| Phenol | | | | | | | | | | | |
| N-Nitroso-di-n-propylamine | | | | | | | | | | | |
| 4-Chloro-3-methylphenol | | | | | | | | | | | |
| Acenaphthene | 188 | 188 | 1.40 | 152 | 156 | 80 | 80 | 82 | 82 | 3 | 2 |
| Pentachlorophenol | | | | | | | | | | | |
| Pyrene | 188 | 188 | 63.8 | 218 | 228 | 82 | 82 | 88 | 87 | 4 | 4 |
| | | | | | | | | | | | |
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| | | | | | | | | | | | |

Comments: Refer to Matrix Spike/Matrix Spike Duplicates findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 26311A26

# VALIDATION FINDINGS WORKSHEET
## Laboratory Control Sample/Laboratory Control Sample Duplicates Results Verification


Reviewer: K
2nd Reviewer: L

**METHOD:** GC/MS BNA (EPA SW 846 Method 8270C)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the laboratory control sample and laboratory control sample duplicate were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 * (SC/SA  Where: SSC = Spike concentration
SA = Spike added

RPD = I LCSC - LCSDC I * 2/(LCSC + LCSDC)  LCSC = Laboraotry control sample concentration  LCSDC = Laboratory control sample duplicate concentration

LCS/LCSD samples: WG479975-2 LCS/3 LCSD

| Compound | Spike Added (ng/L) | | Spike Concentration (ng/L) | | LCS Percent Recovery | | LCSD Percent Recovery | | LCS/LCSD RPD | |
|---|---|---|---|---|---|---|---|---|---|---|
| | LCS | LCSD | LCS | LCSD | Reported | Recalc. | Reported | Recalc. | Reported | Recalculated |
| Phenol | | | | | | | | | | |
| N-Nitroso-di-n-propylamine | | | | | | | | | | |
| 4-Chloro-3-methylphenol | | | | | | | | | | |
| Acenaphthene | 1000 | 1000 | 866 | 902 | 86 | 86 | 90 | 90 | 5 | 4 |
| Pentachlorophenol | | | | | | | | | | |
| Pyrene | 1000 | 1000 | 820 | 857 | 82 | 82 | 86 | 86 | 5 | 4 |
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Comments: Refer to Laboratory Control Sample/Laboratory Control Sample Duplicates findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 26311A25

# VALIDATION FINDINGS WORKSHEET
## Sample Calculation Verification


Reviewer: A
2nd reviewer: [illegible]

**METHOD:** GC/MS BNA (EPA SW 846 Method 8270C)

Y N N/A Were all reported results recalculated and verified for all level IV samples?
Y N N/A Were all recalculated results for detected target compounds agree within 10.0% of the reported results?

Concentration = $\frac{(A_x)(I_s)(V_t)(DF)(2.0)}{(A_{is})(RRF)(V_o)(V_i)(\%S)}$

| | | |
|---|---|---|
| $A_x$ | = | Area of the characteristic ion (EICP) for the compound to be measured |
| $A_{is}$ | = | Area of the characteristic ion (EICP) for the specific internal standard |
| $I_s$ | = | Amount of internal standard added in nanograms (ng) |
| $V_o$ | = | Volume or weight of sample extract in milliliters (ml) or grams (g). |
| $V_i$ | = | Volume of extract injected in microliters (ul) |
| $V_t$ | = | Volume of the concentrated extract in microliters (ul) |
| Df | = | Dilution Factor. |
| %S | = | Percent solids, applicable to soil and solid matrices only. |
| 2.0 | = | Factor of 2 to account for GPC cleanup |

Example:

Sample I.D. 3 , _____:

Conc. = $\frac{(783)(500)(0.25)(2)(\quad)}{(1868)(2.142)(5.32)(\quad)(\quad)}$

= 0.910 ug/kg

| # | Sample ID | Compound | Reported Concentration ( ) | Calculated Concentration ( ) | Qualification |
|---|---|---|---|---|---|
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# SVOCs

**Laboratory Data Consultants, Inc.**

**7750 El Camino Real, Ste. 2L Carlsbad, CA 92009**

**Phone** 760.634.0437 **Web** www.lab-data.com **Fax** 760.634.0439

Windward Environmental, LLC
200 West Mercer Street, Suite 401
Seattle, WA 98119
ATTN: Ms. Jennifer Parker

October 13, 2011

SUBJECT: Lower Passaic River Restoration Project, Data Validation

Dear Ms. Parker,

Enclosed are the final validation reports for the fractions listed below. This SDG was received on September 28, 2011. Attachment 1 is a summary of the samples that were reviewed for each analysis.

**LDC Project # 26311:**

| SDG # | Fraction |
|---|---|
| L1110328 | Semivolatiles, Polynuclear Aromatic Hydrocarbons, Polychlorinated Biphenyls, Percent Moisture |

The data validation was performed under EPA Level IV guidelines. The analyses were validated using the following documents, as applicable to each method:

- Final Surface Sediment Chemical Analyses and Benthic Invertebrate Toxicity and Bioaccumulation Testing Quality Assurance Project Plan (QAPP) for the Lower Passaic River Restoration Project, October 2009
- Caged Bivalve Study Addendum, March 2011
- USEPA Region II Validation SOP HW-22, (Revision 2, June 2001) for Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry SW-846 method 8270C, modified as necessary to accommodate the QAPP criteria
- USEPA Region II Validation SOP HW-45, (Revision 1, October 2006) for Polychlorinated Biphenyls by Gas Chromatography SW-846 method 8082, modified as necessary to accommodate the QAPP criteria
- USEPA, Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review, June 2008
- USEPA, Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review, January 2010

Please feel free to contact us if you have any questions.

Sincerely,

Stella Cuenco

Stella S. Cuenco
Data Validation Operations Manager/Senior Chemist

V:\LOGIN\Windward\Passaic\26311COV.wpd

Attachment 1

| EDD | LDC #26311 (Windward Environmental, LLC - Seattle WA / Lower Passaic River Restoration Project) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | PO# 2011-0012 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LDC | SDG# | DATE REC'D | (3) DATE DUE | SVOA (8270C | | PAHs (8270C -SIM) | | PCBs (8082) | | % Moist. (2540G) | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Matrix: Water/Tissue | | | | W | T | W | T | W | T | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S |
| A | L1110328 | 09/28/11 | 10/19/11 | 1 | 10 | 1 | 10 | 1 | 10 | 0 | 10 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total | T/SC | | | 1 | 10 | 1 | 10 | 1 | 10 | 0 | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 43 |

For Internal Use Only: Shaded cells indicate Level IV validation (all other cells are Level III validation). These sample counts do not include MS/MSD, and DUPs

26311ST.wpd

# Laboratory Data Consultants, Inc.
# Data Validation Report

| | |
|---|---|
| **Project/Site Name:** | Lower Passaic River Restoration Project |
| **Collection Date:** | March 8 through July 18, 2011 |
| **LDC Report Date:** | October 14, 2011 |
| **Matrix:** | Tissue/Water |
| **Parameters:** | Semivolatiles |
| **Validation Level:** | EPA Level IV |
| **Laboratory:** | Alpha Analytical, Inc. |
| **Sample Delivery Group (SDG):** | L1110328 |

**Sample Identification**

LPR6-ECST-Comp01
LPRBG-ECST-Comp01
LPR6-ECST-Comp02
LPR7-ECST-Comp03
LPR7-ECST-Comp04
LPR8-ECST-Comp05
LPR1-GDST-Comp01
LPRBG-GDST-Comp01
LPR2-GDST-Comp02
LPR3-GDST-Comp03
LPR-071811-RB
LPR6-ECST-Comp01MS
LPR6-ECST-Comp01MSD
LPR6-ECST-Comp01DUP

## Introduction

This data review covers 13 tissue samples and one water sample listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8270C for Semivolatiles.

This review follows the Final Surface Sediment Chemical Analyses and Benthic Invertebrate Toxicity and Bioaccumulation Testing Quality Assurance Project Plan (QAPP) for the Lower Passaic River Restoration Project, (October 8, 2009), the Caged Bivalve Study Addendum (March 2, 2011), and USEPA Region II Validation SOP HW-22 (Revision 2, June 2001) for Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry SW-846 Method 8270C, modified as necessary to accommodate the QAPP criteria.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

The following are definitions of the data qualifiers:

U Indicates the Compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

NJ Presumptive evidence of presence of the Compound at an estimated quantity.

UJ Indicates the Compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

## I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

## II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

## III. Initial Calibration

Initial calibration was performed using required standard concentrations.

Percent relative standard deviations (%RSD) were less than or equal to 30.0% for all calibration check Compounds (CCCs) and less than or equal to 15.0% for all other Compounds with the following exceptions:

| Date | Compound | %RSD | Associated Samples | Flag | A or P |
|---|---|---|---|---|---|
| 7/27/11 | 2,6-Dinitrotoluene | 17.00 | All water samples in SDG L1110328 | J (all detects) | A |
| | 2,4-Dinitrophenol | 34.28 | | J (all detects) | |
| | 2,4-Dinitrotoluene | 17.73 | | J (all detects) | |
| | 4-Nitrophenol | 15.56 | | J (all detects) | |
| | 4,6-Dinitro-2-methylphenol | 18.69 | | J (all detects) | |
| | Bis(2-ethylhexyl)phthalate | 16.27 | | J (all detects) | |
| 8/11/11 | Caprolactam | 20.47 | All tissue samples in SDG L1110328 | J (all detects) | A |
| | 2-Nitroaniline | 22.16 | | J (all detects) | |
| | 2,6-Dinitrotoluene | 16.50 | | J (all detects) | |
| | 3-Nitroaniline | 19.88 | | J (all detects) | |
| | 2,4-Dinitrophenol | 34.01 | | J (all detects) | |
| | 2,4-Dinitrotoluene | 21.09 | | J (all detects) | |
| | 4-Nitrophenol | 33.43 | | J (all detects) | |
| | 4-Nitroaniline | 22.14 | | J (all detects) | |
| | 4,6-Dinitro-2-methylphenol | 19.77 | | J (all detects) | |
| | Butylbenzylphthalate | 17.26 | | J (all detects) | |

Average relative response factors (RRF) for all system performance check Compounds (SPCCs) were within method criteria.

## IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

Percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were within the method criteria of less than or equal to 20.0% for calibration check Compounds (CCCs) and 30.0% for all other Compounds with the following exceptions:

| Date | Compound | %D | Associated Samples | Flag | A or P |
|---|---|---|---|---|---|
| 8/15/11 | Di-n-octylphthalate | 21.6 | LPR6-ECST-Comp01<br>LPR6-ECST-Comp02<br>LPR7-ECST-Comp03<br>LPR7-ECST-Comp04<br>LPR8-ECST-Comp05<br>LPR1-GDST-Comp01<br>LPRBG-GDST-Comp01<br>LPR2-GDST-Comp02<br>LPR3-GDST-Comp03<br>LPR6-ECST-Comp01MS<br>LPR6-ECST-Comp01MSD<br>LPR6-ECST-Comp01DUP | J (all detects)<br>UJ (all non-detects) | P |
| 8/16/11 | Di-n-octylphthalate | 31.4 | LPRBG-ECST-Comp01 | J (all detects)<br>UJ (all non-detects) | P |

The percent difference (%D) of the second source calibration standard were less than or equal to 20.0% for all Compounds with the following exceptions:

| Date | Compound | %D | Associated Samples | Flag | A or P |
|---|---|---|---|---|---|
| 7/28/11 | Benzaldehyde<br>N-Nitrosodiphenylamine<br>Pentachlorophenol | 82.6<br>22.0<br>28.6 | All water samples in SDG L1110328 | J (all detects)<br>UJ (all non-detects) | A |
| 8/11/11 | Chrysene | 20.9 | All tissue samples in SDG L1110328 | J (all detects)<br>UJ (all non-detects) | A |

All of the continuing calibration RRF values for all system performance check Compounds (SPCCs) were within method criteria.

## V. Blanks

Method blanks were reviewed for each matrix as applicable. No semivolatile contaminants were found in the method blanks with the following exceptions:

| Method Blank ID | Extraction Date | Compound TIC (RT in minutes) | Concentration | Associated Samples |
|---|---|---|---|---|
| WG481282-1BLANK | 7/28/11 | Acetophenone | 210 ug/Kg | All tissue samples in SDG L1110328 |

Sample concentrations were compared to concentrations detected in the method blanks. The sample concentrations were either not detected or were significantly greater (>10X for common contaminants, >5X for other contaminants) than the concentrations found in the associated method blanks.

Sample LPR-071811-RB was identified as a rinsate blank. No semivolatile contaminants were found in this blank with the following exceptions:

| Rinsate Blank ID | Sampling Date | Compound | Concentration | Associated Samples |
|---|---|---|---|---|
| LPR-071811-RB | 7/18/11 | Bis(2-ethylhexyl)phthalate | 0.634 ug/L | All tissue samples in SDG L1110328 |

Sample concentrations were Compared to concentrations detected in the field blanks. The sample concentrations were either not detected or were significantly greater (>10X for common contaminants, >5X for other contaminants) than the concentrations found in the associated field blanks.

## VI. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

## VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were not within the QC limits. Since the samples were diluted out, no data were qualified.

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Results were within QC limits.

## VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits with the following exceptions:

| LCS ID (Associated Samples) | Compound | LCS %R (Limits) | LCSD %R (Limits) | RPD (Limits) | Flag | A or P |
|---|---|---|---|---|---|---|
| WG479960-2LCS/3LCSD (All water samples in SDG L1110328) | Benzaldehyde | 186 (40-140) | 181 (40-140) | - | J (all detects) | P |
| WG479960-2LCS/3LCSD (All water samples in SDG L1110328) | Caprolactam | 32 (40-140) | 32 (40-140) | - | J (all detects)<br>UJ (all non-detects) | P |
| WG481282-2LCS/3LCSD (All tissue samples in SDG L1110328) | 2,4-Dinitrophenol | 22 (30-130) | 20 (30-130) | - | J (all detects)<br>UJ (all non-detects) | P |

## IX. Regional Quality Assurance and Quality Control

Not applicable.

## X. Internal Standards

All internal standard areas and retention times were within QC limits.

## XI. Target Compound Identifications

All target Compound identifications were within validation criteria.

## XII. Compound Quantitation and RLs

All Compound quantitation and RLs were within validation criteria.

## XIII. Tentatively Identified Compounds (TICs)

Tentatively identified Compounds were not reported by the laboratory.

## XIV. System Performance

The system performance was acceptable.

## XV. Overall Assessment

Data flags are summarized at the end of this report if data has been qualified.

## XVI. Field Duplicates

No field duplicates were identified in this SDG.

## Lower Passaic River Restoration Project
## Semivolatiles - Data Qualification Summary - SDG L1110328

| SDG | Sample | Compound | Flag | A or P | Reason |
|---|---|---|---|---|---|
| L1110328 | LPR-071811-RB | 2,6-Dinitrotoluene<br>2,4-Dinitrophenol<br>2,4-Dinitrotoluene<br>4-Nitrophenol<br>4,6-Dinitro-2-methylphenol<br>Bis(2-ethylhexyl)phthalate | J (all detects)<br>J (all detects)<br>J (all detects)<br>J (all detects)<br>J (all detects)<br>J (all detects) | A | Initial calibration (%RSD) |
| L1110328 | LPR6-ECST-Comp01<br>LPRBG-ECST-Comp01<br>LPR6-ECST-Comp02<br>LPR7-ECST-Comp03<br>LPR7-ECST-Comp04<br>LPR8-ECST-Comp05<br>LPR1-GDST-Comp01<br>LPRBG-GDST-Comp01<br>LPR2-GDST-Comp02<br>LPR3-GDST-Comp03<br>LPR6-ECST-Comp01DUP | Caprolactam<br>2-Nitroaniline<br>2,6-Dinitrotoluene<br>3-Nitroaniline<br>2,4-Dinitrophenol<br>2,4-Dinitrotoluene<br>4-Nitrophenol<br>4-Nitroaniline<br>4,6-Dinitro-2-methylphenol<br>Butylbenzylphthalate | J (all detects)<br>J (all detects)<br>J (all detects)<br>J (all detects)<br>J (all detects)<br>J (all detects)<br>J (all detects)<br>J (all detects)<br>J (all detects)<br>J (all detects) | A | Initial calibration (%RSD) |
| L1110328 | LPR6-ECST-Comp01<br>LPR6-ECST-Comp02<br>LPR7-ECST-Comp03<br>LPR7-ECST-Comp04<br>LPR8-ECST-Comp05<br>LPR1-GDST-Comp01<br>LPRBG-GDST-Comp01<br>LPR2-GDST-Comp02<br>LPR3-GDST-Comp03<br>LPRBG-ECST-Comp01<br>LPR6-ECST-Comp01DUP | Di-n-octylphthalate | J (all detects)<br>UJ (all non-detects) | P | Continuing calibration (%D) |
| L1110328 | LPR-071811-RB | Benzaldehyde<br>N-Nitrosodiphenylamine<br>Pentachlorophenol | J (all detects)<br>UJ (all non-detects) | A | Continuing calibration (ICV %D) |
| L1110328 | LPR6-ECST-Comp01<br>LPRBG-ECST-Comp01<br>LPR6-ECST-Comp02<br>LPR7-ECST-Comp03<br>LPR7-ECST-Comp04<br>LPR8-ECST-Comp05<br>LPR1-GDST-Comp01<br>LPRBG-GDST-Comp01<br>LPR2-GDST-Comp02<br>LPR3-GDST-Comp03<br>LPR6-ECST-Comp01DUP | Chrysene | J (all detects)<br>UJ (all non-detects) | A | Continuing calibration (ICV %D) |
| L1110328 | LPR-071811-RB | Benzaldehyde | J (all detects) | P | Laboratory control samples (%R) |
| L1110328 | LPR-071811-RB | Caprolactam | J (all detects)<br>UJ (all non-detects) | P | Laboratory control samples (%R) |

| SDG | Sample | Compound | Flag | A or P | Reason |
|---|---|---|---|---|---|
| L1110328 | LPR6-ECST-Comp01<br>LPRBG-ECST-Comp01<br>LPR6-ECST-Comp02<br>LPR7-ECST-Comp03<br>LPR7-ECST-Comp04<br>LPR8-ECST-Comp05<br>LPR1-GDST-Comp01<br>LPRBG-GDST-Comp01<br>LPR2-GDST-Comp02<br>LPR3-GDST-Comp03<br>LPR6-ECST-Comp01DUP | 2,4-Dinitrophenol | J (all detects)<br>UJ (all non-detects) | P | Laboratory control samples (%R) |

**Lower Passaic River Restoration Project**
**Semivolatiles - Laboratory Blank Data Qualification Summary - SDG L1110328**

No Sample Data Qualified in this SDG

**Lower Passaic River Restoration Project**
**Semivolatiles - Field Blank Data Qualification Summary - SDG L1110328**

No Sample Data Qualified in this SDG

LDC #: 26311A2a/2a **VALIDATION COMPLETENESS WORKSHEET** Date: 10/5/11
SDG #: L1110328 Level IV Page: 1 of 1
Laboratory: Alpha Analytical, Inc. Reviewer:
2nd Reviewer:

**METHOD:** GC/MS Semivolatiles (EPA SW 846 Method 8270C)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

| | Validation Area | | Comments |
|---|---|---|---|
| I. | Technical holding times | A | Sampling dates: 3/8 - 7/18/11 |
| II. | GC/MS Instrument performance check | A | |
| III. | Initial calibration | SW | 30/15 % SPCCs |
| IV. | Continuing calibration/ICV | SW | CCV ≤ 20/30% ICV ≤ 20% ↓ |
| V. | Blanks | SW | |
| VI. | Surrogate spikes | A | |
| VII. | Matrix spike/Matrix spike duplicates /DUP | SW/A | |
| VIII. | Laboratory control samples | SW | LCS/D |
| IX. | Regional Quality Assurance and Quality Control | N | |
| X. | Internal standards | A | |
| XI. | Target compound identification | A | |
| XII. | Compound quantitation/RL/LOQ/LODs | A | |
| XIII. | Tentatively identified compounds (TICs) | N | |
| XIV. | System performance | A | |
| XV. | Overall assessment of data | A | |
| XVI. | Field duplicates | N | |
| XVII. | Field blanks | SW | RB = 11 |

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: tissue & DQ

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1 | LPR6-ECST-COMP01 | 11 | LPR-071811RB W | 21 | WG479960-1 | 31 | |
| 2 | LPRBG-ECST-COMP01 | 12 | LPR6-ECST-COMP01MS | 22 | WG489245-1 | 32 | |
| 3 | LPR6ECST-COMP02 | 13 | LPR6-ECST-COMP01~~DUP~~ MSD | 23 | WG481282-1 | 33 | |
| 4 | LPR7-ECST-COMP03 | 14 | ↓ DUP | 24 | | 34 | |
| 5 | LPR7-ECST-COMP04 | 15 | | 25 | | 35 | |
| 6 | LPR8-ECST-COMP05 | 16 | | 26 | | 36 | |
| 7 | LPR1-GDST-COMP01 | 17 | | 27 | | 37 | |
| 8 | LPRBG-GDST-COMP01 | 18 | | 28 | | 38 | |
| 9 | LPR2-GDST-COMP02 | 19 | | 29 | | 39 | |
| 10 | LPR3-GDST-COMP03 | 20 | | 30 | | 40 | |

# VALIDATION FINDINGS WORKSHEET

**cMETHOD:** GC/MS BNA (EPA Method 8270)

| | | | | |
|---|---|---|---|---|
| A. Phenol | S. Naphthalene | KK. 2,4-Dinitrotoluene | CCC. Benzo(a)anthracene | UUU.Benzo(b)thiophene |
| B. Bis (2-chloroethyl) ether | T. 4-Chloroaniline | LL. Diethylphthalate | DDD. Chrysene | VVV.Naphthobenzothiophene |
| C. 2-Chlorophenol | U. Hexachlorobutadiene | MM. 4-Chlorophenyl-phenyl ether | EEE. Bis(2-ethylhexyl)phthalate | WWW.Benzo(e)pyrene |
| D. 1,3-Dichlorobenzene | V. 4-Chloro-3-methylphenol | NN. Fluorene | FFF. Di-n-octylphthalate | XXX. 2,6-Dimethylnaphthalene |
| E. 1,4-Dichlorobenzene | W. 2-Methylnaphthalene | OO. 4-Nitroaniline | GGG. Benzo(b)fluoranthene | YYY. 2,3,5-Trimethylnaphthalene |
| F. 1,2-Dichlorobenzene | X. Hexachlorocyclopentadiene | PP. 4,6-Dinitro-2-methylphenol | HHH. Benzo(k)fluoranthene | ZZZ. Perylene |
| G. 2-Methylphenol | Y. 2,4,6-Trichlorophenol | QQ. N-Nitrosodiphenylamine (1) | III. Benzo(a)pyrene | AAAA. Dibenzothiophene |
| H. 2,2'-Oxybis(1-chloropropane) | Z. 2,4,5-Trichlorophenol | RR. 4-Bromophenyl-phenylether | JJJ. Indeno(1,2,3-cd)pyrene | BBBB. Benzo(a)fluoranthene |
| I. 4-Methylphenol | AA. 2-Chloronaphthalene | SS. Hexachlorobenzene | KKK. Dibenz(a,h)anthracene | CCCC. Benzo(b)fluorene |
| J. N-Nitroso-di-n-propylamine | BB. 2-Nitroaniline | TT. Pentachlorophenol | LLL. Benzo(g,h,i)perylene | DDDD. cis/trans-Decalin |
| K. Hexachloroethane | CC. Dimethylphthalate | UU. Phenanthrene | MMM. Bis(2-Chloroisopropyl)ether | EEEE. Biphenyl |
| L. Nitrobenzene | DD. Acenaphthylene | VV. Anthracene | NNN. Aniline | FFFF. Retene |
| M. Isophorone | EE. 2,6-Dinitrotoluene | WW. Carbazole | OOO. N-Nitrosodimethylamine | GGGG. C30-Hopane |
| N. 2-Nitrophenol | FF. 3-Nitroaniline | XX. Di-n-butylphthalate | PPP. Benzoic Acid | HHHH. Benzaldehyde |
| O. 2,4-Dimethylphenol | GG. Acenaphthene | YY. Fluoranthene | QQQ. Benzyl alcohol | IIII. Caprolactam |
| P. Bis(2-chloroethoxy)methane | HH. 2,4-Dinitrophenol | ZZ. Pyrene | RRR. Pyridine | |
| Q. 2,4-Dichlorophenol | II. 4-Nitrophenol | AAA. Butylbenzylphthalate | SSS. Benzidine | |
| R. 1,2,4-Trichlorobenzene | JJ. Dibenzofuran | BBB. 3,3'-Dichlorobenzidine | TTT. 1-Methylnaphthalene | |

LDC #260311A2a

# VALIDATION FINDINGS WORKSHEET
## Initial Calibration

Page: 1 of 1
Reviewer: R
2nd Reviewer: N

**METHOD:** GC/MS BNA (EPA SW 846 Method 8270)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Did the laboratory conduct an acceptable 5 point calibration prior to sample analysis?
Y N N/A Were percent relative standard deviations (%RSD) and relative response factors (RRF) within method criteria for all CCC's and SPCC's?
Y N N/A Was a curve fit used for evaluation? If yes, what was the acceptance criteria used for evaluation?_____
Y N N/A Did the initial calibration meet the acceptance criteria?
Y N N/A Were all %RSDs and RRFs within the validation criteria of ≤30 /15 %RSD and ≥0.05 RRF ?

| # | Date | Standard ID | Compound | Finding %RSD (Limit: ≤30.0% /15 | Finding RRF (Limit: ≥0.05) | Associated Samples | Qualifications |
|---|---|---|---|---|---|---|---|
| | 7/27/11 | ICAL | EE | 17.00 | | All A2, blk | Jdets/A |
| | | | HH | 34.28 | | | |
| | | | KK | 17.73 | | | |
| | | | II | 15.56 | | | |
| | | | PP | 18.69 | | | |
| | | | EEE | 16.27 | | | |
| | | | | | | | |
| | 8/11/11 | ICAL | IIII | 20.47 | | All tissue | |
| | | | BB | 22.16 | | WG481282-1BLANK | |
| | | | EE | 16.50 | | | |
| | | | FF | 19.88 | | | |
| | | | HH | 34.01 | | | |
| | | | KK | 21.09 | | | |
| | | | II | 33.43 | | | |
| | | | OO | 22.14 | | | |
| | | | PP | 19.77 | | | |
| | | | AAA | 17.26 | | | |

INICAL.2S

LDC #: 26031A2a

# VALIDATION FINDINGS WORKSHEET
## Continuing Calibration

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

**METHOD:** GC/MS BNA (EPA SW 846 Method 8270)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a continuing calibration standard analyzed at least once every 12 hours of sample analysis for each instrument?
Y N N/A Were percent differences (%D) and relative response factors (RRF) within method criteria for all CCC's and SPCC's ?
Y N N/A Were all %D and RRFs within the validation criteria of ≤~~25~~%D and ≥0.05 RRF ? 20%/30%

| # | Date | Standard ID | Compound | Finding %D (Limit: ≤~~25.0~~%) | Finding RRF (Limit: ≥0.05) | Associated Samples | Qualifications |
|---|---|---|---|---|---|---|---|
| | 8/15/11 | F408151111 | FFF* | 21.6 | | 1,3-10, 12-14 | J/UJ/P |
| | 8/16/11 | F408161103 | FFF* | 31.4 | | 2 | |
| | 7/28/11 | F407281103 (ICV) | Benzaldehyde | 82.6 | | All AQ, MK | J/UJ/A |
| | | | 8Q | 22.0 | | | |
| | | | TT | 28.6 | | | |
| | 8/11/11 | F408111113 (ICV) | DDD | 20.9 | | All tissue, ~~blk~~ WG481282-1 BLANK | |

CONCAL.2S

LDC #: 260311 A2a

# VALIDATION FINDINGS WORKSHEET
## Blanks


Reviewer: M
2nd Reviewer: [illegible]

**METHOD:** GC/MS BNA (EPA SW 846 Method 8270C)
Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a method blank analyzed for each matrix?
Y N N/A Was a method blank analyzed for each concentration preparation level?
Y N N/A Was a method blank associated with every sample?
Y N N/A Was the blank contaminated? If yes, please see qualification below.

**Blank extraction date:** 7/28/11 **Blank analysis date:** 8/15/11
**Conc. units:** ug/kg Associated Samples: fish tissue (NB)

| Compound | Blank ID | Sample Identification | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | WG481282-1BLANK | | | | | | | | | |
| Acetophenone | 210 | | | | | | | | | |
| | | | | | | | | | | |
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**Blank extraction date:**_____ **Blank analysis date:**_____
**Conc. units:**_____ Associated Samples:_____

| Compound | Blank ID | Sample Identification | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | |
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CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Common contaminants such as the phthalates and TICs noted above that were detected in samples within ten times the associated method blank concentration were qualified as not detected, "U". Other contaminants within five times the method blank concentration were also qualified as not detected, "U".

LDC #: 26031 A2a

# VALIDATION FINDINGS WORKSHEET
## Field Blanks

Page: 1 of 1
Reviewer:
2nd Reviewer:

**METHOD:** GC/MS BNA (EPA SW 846 Method 8270)
Y N N/A Were field blanks identified in this SDG?
Y N N/A Were target compounds detected in the field blanks?
**Blank units:** ug/L **Associated sample units:**
**Sampling date:** 7/18/11
**Field blank type:** (circle one) Field Blank / Rinsate / Other: FB Associated Samples: All tissue (ND or >5x)

| Compound | Blank ID | Sample Identification | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 11 | | | | | | | | | |
| Diethylphthalate | | | | | | | | | | |
| Di-n-butylphthalate | | | | | | | | | | |
| Bis(2-ethylhexyl)phthalate | 0.634 | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| CRQL | | | | | | | | | | |

**Blank units:** **Associated sample units:**
**Sampling date:**
**Field blank type:** (circle one) Field Blank / Rinsate / Other: Associated Samples:

| Compound | Blank ID | Sample Identification | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | |
| Diethylphthalate | | | | | | | | | | |
| Di-n-butylphthalate | | | | | | | | | | |
| Bis(2-ethylhexyl)phthalate | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| CRQL | | | | | | | | | | |

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Common contaminants such as the phthalates and TICs noted above that were detected in samples within ten times the associated field blank concentration were qualified as not detected, "U". Other contaminants within five times the field blank concentration were also qualified as not detected, "U".

LDC #: 26031A2a

# VALIDATION FINDINGS WORKSHEET
## Matrix Spike/Matrix Spike Duplicates


Reviewer: [illegible]
2nd Reviewer: [illegible]

**METHOD:** GC/MS BNA (EPA SW 846 Method 8270)
Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.

Y N N/A Was a MS/MSD analyzed every 20 samples of each matrix?

Y N N/A Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?

| # | Date | MS/MSD ID | Compound | MS %R (Limits) | MSD %R (Limits) | RPD (Limits) | Associated Samples | Qualifications |
|---|---|---|---|---|---|---|---|---|
| | (5x) | 12/13 | O | 13 (30-130) | 12 (30-130) | ( ) | 1 | ~~J/UJ/A~~ no qual |
| | | | X | 0 (40-140) | 0 (40-140) | ( ) | | ↓ |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
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| | | | | ( ) | ( ) | ( ) | | |

LDC #: 26031LA2a

# VALIDATION FINDINGS WORKSHEET
## Laboratory Control Samples (LCS)


Reviewer: [illegible]
2nd Reviewer: [illegible]

**METHOD:** GC/MS BNA (EPA SW 846 Method 8270)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".
Y N N/A Was a LCS required?
Y N N/A Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?

| # | Date | LCS/LCSD ID | Compound | LCS %R (Limits) | LCSD %R (Limits) | RPD (Limits) | Associated Samples | Qualifications |
|---|---|---|---|---|---|---|---|---|
| | WG479960-2LCS/ | | HHHHH | 186 (40-140) | 181 (40-140) | ( ) | All Aq | J/UJ/P |
| | | 3LCSD | HHH | 32 (↓) | 32 (↓) | ( ) | | J/UJ/P |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
| | WG481283-2LCS/ | | HH | 22 (30-130) | 20 (30-130) | ( ) | All tissue | J/UJ/P |
| | | 3LCSD | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
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| | | | | ( ) | ( ) | ( ) | | |

LDC #: 26031A29

# VALIDATION FINDINGS WORKSHEET
## Initial Calibration Calculation Verification


Reviewer: A
2nd Reviewer: K

**METHOD:** GC/MS BNA (EPA SW 846 Method 8270C)

The Relative Response Factor (RRF), average RRF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

$RRF = (A_x)(C_{is})/(A_{is})(C_x)$
average RRF = sum of the RRFs/number of standards
%RSD = 100 * (S/X)

$A_x$ = Area of compound,
$C_x$ = Concentration of compound,
S = Standard deviation of the RRFs,

$A_{is}$ = Area of associated internal standard
$C_{is}$ = Concentration of internal standard
X = Mean of the RRFs

| # | Standard ID | Calibration Date | Compound (Reference Internal Standard) | Reported RRF (5 std) | Recalculated RRF (5 std) | Reported Average RRF (initial) | Recalculated Average RRF (initial) | Reported %RSD | Recalculated %RSD |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1CAL | 7/27/11 | Phenol (1st internal standard) | 1.440 | 1.440 | 1.376 | 1.376 | 2.78 | 2.78 |
| | | | Naphthalene (2nd internal standard) | 0.860 | 0.860 | 0.827 | 0.827 | 2.82 | 2.80 |
| | | | Fluorene (3rd internal standard) | 1.108 | 1.108 | 1.052 | 1.052 | 3.15 | 3.17 |
| | | | Pentachlorophenol (4th internal standard) | 0.084 | 0.084 | 0.091 | 0.091 | 21.49 | 21.12 |
| | | | Bis(2-ethylhexyl)phthalate (5th internal standard) | 0.492 | 0.492 | 0.449 | 0.449 | 16.27 | 16.25 |
| | | | Benzo(a)pyrene (6th internal standard) | 0.795 | 0.795 | 0.735 | 0.735 | 11.31 | 11.30 |
| 2 | 1CAL | 8/11/11 | Phenol (1st internal standard) | 2.228 | 2.228 | 2.110 | 2.110 | 5.14 | 5.14 |
| | | | Naphthalene (2nd internal standard) | 1.182 | 1.182 | 1.138 | 1.138 | 9.37 | 9.36 |
| | | | Fluorene (3rd internal standard) | 1.468 | 1.468 | 1.442 | 1.442 | 7.74 | 7.73 |
| | | | Pentachlorophenol (4th internal standard) | 0.132 | 0.132 | 0.134 | 0.135 | 12.74 | 12.69 |
| | | | Bis(2-ethylhexyl)phthalate (5th internal standard) | 0.678 | 0.678 | 0.629 | 0.629 | 14.32 | 14.33 |
| | | | Benzo(a)pyrene (6th internal standard) | 1.127 | 1.127 | 1.072 | 1.072 | 7.32 | 7.31 |
| 3 | 1CAL | 8/15/11 | ~~Phenol~~ (1st internal standard) Benzaldehyde | 1.279 | 1.279 | 1.265 | 1.265 | 12.68 | 12.67 |
| | | | Naphthalene (2nd internal standard) | | | | | | |
| | | | Fluorene (3rd internal standard) | | | | | | |
| | | | Pentachlorophenol (4th internal standard) | | | | | | |
| | | | Bis(2-ethylhexyl)phthalate (5th internal standard) | | | | | | |
| | | | Benzo(a)pyrene (6th internal standard) | | | | | | |

Comments: Refer to Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 26031 1A29

# VALIDATION FINDINGS WORKSHEET
## Continuing Calibration Results Verification


Reviewer: R
2nd Reviewer: [illegible]

**METHOD:** GC/MS BNA (EPA SW 846 Method 8270C)

The percent difference (%D) of the initial calibration average Relative Response Factors (RRFs) and the continuing calibration RRFs were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. RRF - RRF)/ave. RRF
RRF = $(A_x)(C_{is})/(A_{is})(C_x)$

Where: ave. RRF = initial calibration average RRF
RRF = continuing calibration RRF
$A_x$ = Area of compound, $A_{is}$ = Area of associated internal standard
$C_x$ = Concentration of compound, $C_{is}$ = Concentration of internal standard

| # | Standard ID | Calibration Date | Compound (Reference Internal Standard) | Average RRF (initial) | Reported RRF (CC) | Recalculated RRF (CC) | Reported %D | Recalculated %D |
|---|---|---|---|---|---|---|---|---|
| 1 | F407281104 | 7/28/11 | Phenol (1st internal standard) | 1.376 | 1.347 | 1.347 | 2.1 | 2.1 |
| | | | Naphthalene (2nd internal standard) | 0.827 | 0.815 | 0.815 | 1.5 | 1.5 |
| | | | Fluorene (3rd internal standard) | 1.052 | 1.041 | 1.041 | 1.0 | 1.1 |
| | | | Pentachlorophenol (4th internal standard) | 0.091 | 0.099 | 0.099 | 8.8 | 8.5 |
| | | | Bis(2-ethylhexyl)phthalate (5th internal standard) | 0.449 | 0.492 | 0.492 | 9.6 | 9.5 |
| | | | Benzo(a)pyrene (6th internal standard) | 0.735 | 0.782 | 0.782 | 6.4 | 6.4 |
| 2 | F408151102 | 8/15/11 | Phenol (1st internal standard) | 2.110 | 2.121 | 2.121 | 0.5 | 0.5 |
| | | | Naphthalene (2nd internal standard) | 1.138 | 1.065 | 1.065 | 6.4 | 6.4 |
| | | | Fluorene (3rd internal standard) | 1.442 | 1.350 | 1.350 | 6.4 | 6.4 |
| | | | Pentachlorophenol (4th internal standard) | 0.134 | 0.138 | 0.138 | 3.0 | 3.3 |
| | | | Bis(2-ethylhexyl)phthalate (5th internal standard) | 0.629 | 0.705 | 0.705 | 12.1 | 12.1 |
| | | | Benzo(a)pyrene (6th internal standard) | 1.072 | 1.149 | 1.149 | 7.2 | 7.2 |
| 3 | F408151111 | 8/15/11 | Phenol (1st internal standard) | 2.110 | 2.116 | 2.116 | 0.3 | 0.3 |
| | | | Naphthalene (2nd internal standard) | 1.138 | 1.068 | 1.068 | 6.2 | 6.2 |
| | | | Fluorene (3rd internal standard) | 1.442 | 1.357 | 1.357 | 5.9 | 5.9 |
| | | | Pentachlorophenol (4th internal standard) | 0.134 | 0.145 | 0.145 | 8.2 | 7.9 |
| | | | Bis(2-ethylhexyl)phthalate (5th internal standard) | 0.629 | 0.705 | 0.705 | 12.1 | 12.1 |
| | | | Benzo(a)pyrene (6th internal standard) | 1.072 | 1.147 | 1.147 | 7.0 | 7.0 |

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 26031 1A29

# VALIDATION FINDINGS WORKSHEET
## Continuing Calibration Results Verification


Reviewer: K
2nd Reviewer: L

**METHOD:** GC/MS BNA (EPA SW 846 Method 8270C)

The percent difference (%D) of the initial calibration average Relative Response Factors (RRFs) and the continuing calibration RRFs were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. RRF - RRF)/ave. RRF
RRF = $(A_x)(C_{is})/(A_{is})(C_x)$

Where: ave. RRF = initial calibration average RRF
RRF = continuing calibration RRF
$A_x$ = Area of compound, $A_{is}$ = Area of associated internal standard
$C_x$ = Concentration of compound, $C_{is}$ = Concentration of internal standard

| # | Standard ID | Calibration Date | Compound (Reference Internal Standard) | Average RRF (initial) | Reported RRF (CC) | Recalculated RRF (CC) | Reported %D | Recalculated %D |
|---|---|---|---|---|---|---|---|---|
| 1 | F408161103 | 8/16/11 | Phenol (1st internal standard) | 2.110 | 2.151 | 2.151 | 1.9 | 1.9 |
| | | | Naphthalene (2nd internal standard) | 1.138 | 1.060 | 1.060 | 6.9 | 6.8 |
| | | | Fluorene (3rd internal standard) | 1.442 | 1.365 | 1.365 | 5.3 | 5.3 |
| | | | Pentachlorophenol (4th internal standard) | 0.134 | 0.137 | 0.137 | 2.2 | 2.0 |
| | | | Bis(2-ethylhexyl)phthalate (5th internal standard) | 0.629 | 0.747 | 0.747 | 18.8 | 18.7 |
| | | | Benzo(a)pyrene (6th internal standard) | 1.072 | 1.151 | 1.151 | 7.4 | 7.3 |
| 2 | F409151102 | 9/15/11 | ~~Phenol~~ (1st internal standard) Benzaldehyde | 1.265 | 1.345 | 1.345 | 6.3 | 6.3 |
| | | | Naphthalene (2nd internal standard) | | | | | |
| | | | Fluorene (3rd internal standard) | | | | | |
| | | | Pentachlorophenol (4th internal standard) | | | | | |
| | | | Bis(2-ethylhexyl)phthalate (5th internal standard) | | | | | |
| | | | Benzo(a)pyrene (6th internal standard) | | | | | |
| 3 | F409151117 | 9/15/11 | Phenol (1st internal standard) Benzaldehyde | 1.265 | 1.364 | 1.364 | 7.8 | 7.8 |
| | | | Naphthalene (2nd internal standard) | | | | | |
| | | | Fluorene (3rd internal standard) | | | | | |
| | | | Pentachlorophenol (4th internal standard) | | | | | |
| | | | Bis(2-ethylhexyl)phthalate (5th internal standard) | | | | | |
| | | | Benzo(a)pyrene (6th internal standard) | | | | | |

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 26031|A29

# VALIDATION FINDINGS WORKSHEET
## Surrogate Results Verification


Reviewer: 2
2nd reviewer: V

**METHOD:** GC/MS Semivolatiles (EPA SW 846 Method 8270C)

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
SS = Surrogate Spiked

**Sample ID:** 1

| | Surrogate Spiked | Surrogate Found | Percent Recovery Reported | Percent Recovery Recalculated | Percent Difference |
|---|---|---|---|---|---|
| Nitrobenzene-d5 | 20 | 17.436 | 87 | 87 | 0 |
| 2-Fluorobiphenyl | ↓ | 15.536 | 78 | 78 | ↓ |
| Terphenyl-d14 | ↓ | 16.313 | 82 | 82 | ↓ |
| Phenol-d5 | ↓ | 17.193 | 86 | 86 | ↓ |
| 2-Fluorophenol | ↓ | 16.917 | 85 | 85 | ↓ |
| 2,4,6-Tribromophenol | ↓ | 16.384 | 82 | 82 | ↓ |
| 2-Chlorophenol-d4 | | | | | |
| 1,2-Dichlorobenzene-d4 | | | | | |

**Sample ID:**

| | Surrogate Spiked | Surrogate Found | Percent Recovery Reported | Percent Recovery Recalculated | Percent Difference |
|---|---|---|---|---|---|
| Nitrobenzene-d5 | | | | | |
| 2-Fluorobiphenyl | | | | | |
| Terphenyl-d14 | | | | | |
| Phenol-d5 | | | | | |
| 2-Fluorophenol | | | | | |
| 2,4,6-Tribromophenol | | | | | |
| 2-Chlorophenol-d4 | | | | | |
| 1,2-Dichlorobenzene-d4 | | | | | |

**Sample ID:**

| | Surrogate Spiked | Surrogate Found | Percent Recovery Reported | Percent Recovery Recalculated | Percent Difference |
|---|---|---|---|---|---|
| Nitrobenzene-d5 | | | | | |
| 2-Fluorobiphenyl | | | | | |
| Terphenyl-d14 | | | | | |
| Phenol-d5 | | | | | |
| 2-Fluorophenol | | | | | |
| 2,4,6-Tribromophenol | | | | | |
| 2-Chlorophenol-d4 | | | | | |
| 1,2-Dichlorobenzene-d4 | | | | | |

LDC #: 26031A2a

# VALIDATION FINDINGS WORKSHEET
## Matrix Spike/Matrix Spike Duplicates Results Verification

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

**METHOD:** GC/MS BNA (EPA SW 846 Method 8270C)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the matrix spike and matrix spike duplicate were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 * (SSC - SC)/SA

Where: SSC = Spiked sample concentration; SA = Spike added; SC = Sample concentation

RPD = I MSC - MSC I * 2/(MSC + MSDC)

MSC = Matrix spike concentration; MSDC = Matrix spike duplicate concentration

MS/MSD samples: 12/13

| Compound | Spike Added (ug/kg) | | Sample Concentration (ug/kg) | Spiked Sample Concentration (ug/kg) | | Matrix Spike Percent Recovery | | Matrix Spike Duplicate Percent Recovery | | MS/MSD RPD | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | MS | MSD | ------ | MS | MSD | Reported | Recalc | Reported | Recalc | Reported | Recalculated |
| Phenol | 37700 | 36900 | ND | 29600 | 27400 | 78 | 78 | 74 | 74 | 8 | 8 |
| N-Nitroso-di-n-propylamine | ↓ | ↓ | ↓ | 29600 | 27600 | 78 | 78 | 75 | 75 | 7 | 7 |
| 4-Chloro-3-methylphenol | | | | 30800 | 29200 | 82 | 82 | 79 | 79 | 5 | 5 |
| Acenaphthene | | | | 28500 | 27400 | 76 | 76 | 74 | 74 | 4 | 4 |
| Pentachlorophenol | | | | 27200 | 26400 | 72 | 72 | 72 | 72 | 3 | 3 |
| Pyrene | | | | 29400 | 28800 | 78 | 78 | 78 | 78 | 2 | 2 |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

Comments: Refer to Matrix Spike/Matrix Spike Duplicates findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 26031A2a

# VALIDATION FINDINGS WORKSHEET
## Laboratory Control Sample/Laboratory Control Sample Duplicates Results Verification


Reviewer: A
2nd Reviewer: V

**METHOD:** GC/MS BNA (EPA SW 846 Method 8270C)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the laboratory control sample and laboratory control sample duplicate were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 * (SC/SA  Where: SSC = Spike concentration
SA = Spike added

RPD = I LCSC - LCSDC I * 2/(LCSC + LCSDC)  LCSC = Laboraotry control sample concentration  LCSDC = Laboratory control sample duplicate concentration

LCS/LCSD samples: WG479960-2LCS/3LCSD

| Compound | Spike Added (ug/L) | | Spike Concentration (ug/L) | | LCS Percent Recovery | | LCSD Percent Recovery | | LCS/LCSD RPD | |
|---|---|---|---|---|---|---|---|---|---|---|
| | LCS | LCSD | LCS | LCSD | Reported | Recalc. | Reported | Recalc. | Reported | Recalculated |
| Phenol | 20 | 20 | 8.87 | 8.66 | 44 | 44 | 43 | 43 | 2 | 2 |
| N-Nitroso-di-n-propylamine | ↓ | ↓ | 17.5 | 17.3 | 88 | 88 | 86 | 86 | 2 | 2 |
| 4-Chloro-3-methylphenol | | | 18.4 | 18.3 | 92 | 92 | 91 | 91 | 1 | 1 |
| Acenaphthene | | | 17.7 | 17.6 | 88 | 88 | 88 | 88 | 0 | 0 |
| Pentachlorophenol | | | 22.2 | 21.7 | 111 | 111 | 108 | 108 | 3 | 3 |
| Pyrene | | | 18.1 | 18.2 | 90 | 90 | 91 | 91 | 1 | 1 |
| | | | | | | | | | | |
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Comments: Refer to Laboratory Control Sample/Laboratory Control Sample Duplicates findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 26031 1A29

# VALIDATION FINDINGS WORKSHEET
## Sample Calculation Verification

Page: 1 of 1
Reviewer: N
2nd reviewer: [illegible]

**METHOD:** GC/MS BNA (EPA SW 846 Method 8270C)

Y N N/A Were all reported results recalculated and verified for all level IV samples?
Y N N/A Were all recalculated results for detected target compounds agree within 10.0% of the reported results?

Concentration = $\frac{(A_x)(I_s)(V_t)(DF)(2.0)}{(A_{is})(RRF)(V_o)(V_i)(\%S)}$

| | | |
|---|---|---|
| $A_x$ | = | Area of the characteristic ion (EICP) for the compound to be measured |
| $A_{is}$ | = | Area of the characteristic ion (EICP) for the specific internal standard |
| $I_s$ | = | Amount of internal standard added in nanograms (ng) |
| $V_o$ | = | Volume or weight of sample extract in milliliters (ml) or grams (g). |
| $V_i$ | = | Volume of extract injected in microliters (ul) |
| $V_t$ | = | Volume of the concentrated extract in microliters (ul) |
| Df | = | Dilution Factor. |
| %S | = | Percent solids, applicable to soil and solid matrices only. |
| 2.0 | = | Factor of 2 to account for GPC cleanup |

Example:

Sample I.D. 1, ~~EEE~~:

Conc. = $\frac{(103135)(5)(5)(4000)(\cancel{2})}{(969824)(0.629)(5.38)(2)(\quad)}$

= 1570 ug/kg

| # | Sample ID | Compound | Reported Concentration ( ) | Calculated Concentration ( ) | Qualification |
|---|---|---|---|---|---|
| | | | | | |
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YES NO N/A

A - Indicates a Tentatively Identified Compound (TIC) is a suspected adol-condensation product.

X,Y,Z- Laboratory defined flags. The data reviewer must change these qualifiers during validation so that the data user may understand their impact on the data.

## I. PACKAGE COMPLETENESS AND DELIVERABLES

CASE NUMBER: L1110328 LAB: Alpha Analytical

SITE NAME: Lower Passaic River

1.0 Data Completeness and Deliverables

1.1 Has all data been submitted in CLP deliverable format? ☑ ___ ___

ACTION: If not, note the effect on review of the data in the data assessment narrative.

2.0 Cover Letter, SDG Narrative

2.1 Is a laboratory narrative or cover letter present? ☑ ___ ___

2.2 Are case number and SDG number(s) contained in the narrative or cover letter? ☑ ___ ___

## II. SEMIVOLATILE ANALYSES

| | YES | NO | N/A |
|---|---|---|---|
| **1.0 Traffic Reports and Laboratory Narrative** | | | |
| 1.1 Are the Traffic Report Forms present for all samples? | ✓ | ___ | ___ |
| ACTION: If no, contact lab for replacement of missing or illegible copies. | | | |
| 1.2 Do the Traffic Reports or Lab Narrative indicate any problems with sample receipt, condition of samples, analytical problems or special notations affecting the quality of the data? | ___ | ✓ | ___ |

YES NO N/A

ACTION: If any sample analyzed as a soil, other than TCLP, contains 50%-90% water, all data should be flagged as estimated ("J"). If a soil sample, other than TCLP, contains more than 90% water, all data should be qualified as unusable (R).

ACTION: If samples were not iced, or if the ice was melted upon arrival at the laboratory and the cooler temperature was elevated (10°C), flag all positive results "J" and all non-detects "UJ".

## 2.0 Holding Times

2.1 Have any semi volatile technical holding times, determined from date of collection to date of extraction, been exceeded? ___ N/A ___

Continuous extraction of water samples for semi volatile analysis must be started within **7** days of the date of collection. Soil/sediment samples must be extracted within **14** days of collection. Extracts must be analyzed within **40** days of the date of extraction.

Table of Holding Time Violations

(See Traffic Report)

| Sample ID | Sample Matrix | Date Sampled | Date Lab Received | Date Extracted | Date Analyzed |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

| | | | | | YES | NO | N/A |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
| | | | | | | | |

YES NO N/A

ACTION: If technical holding times are exceeded, flag all positive results as estimated ("J") and sample quantitation limits as estimated ("UJ"), and document in the narrative that holding times were exceeded.

If analyses were done more than 14 days beyond holding time, either on the first analysis or upon re analysis, the reviewer must use professional judgement to determine the reliability of the data and the effects of additional storage on the sample results. At a minimum, all results should be qualified "J", but the reviewer may determine that non-detect data are unusable ("R"). If holding times are exceeded by more than 28 days, all non-detect data are unusable (R).

3.0 Surrogate Recovery (Form II)

3.1 Have the semi volatile surrogate recoveries been listed on CLP Surrogate Recovery forms (Form II) for each of the following matrices:

a. Low Water [✓] ___ ___

b. Low/Med Soil/Tissue [✓] ___ ___

3.2 If so, are all the samples listed on the appropriate Surrogate Recovery Summary forms for each matrix:

a. Low Water [✓] ___ ___

b. Low/Med Soil/Tissue [✓] ___ ___

ACTION: If CLP deliverables or equivalent are unavailable, document the effect(s) in data

| | YES | NO | N/A |
|---|---|---|---|
| assessments. In some cases the lab may have to be contacted to obtain the data necessary to complete the validation. | | | |
| 3.3 Were outliers marked correctly with an asterisk? ACTION: Circle all outliers in red. | [ ] | | ✓ |
| 3.4 Were two or more base neutral OR acid surrogate recoveries out of specification for any sample or method blank | | [✓] | ~~✓~~ |
| If yes, were samples re-analyzed? | [ ] | | ✓ |
| Were method blanks re-analyzed? | [ ] | | ✓ |

ACTION: If all surrogate recoveries are > 10% but two within the base-neutral or acid fraction do not meet method specifications, for the affected fraction only (i.e. either base-neutral or acid compounds):

1. Flag all positive results as estimated ("J").

2. Flag all non-detects as estimated detection limits ("UJ") when recoveries are less than the lower acceptance limit.

3. If recoveries are greater than the upper acceptance limit, do not qualify non-detects.

If any base-neutral or acid surrogate has a recovery of < 10%:

1. Positive results for the fraction with < 10% surrogate recovery are qualified with "J".

2. Non-detects for that fraction should be qualified as unusable ("R").

| | YES | NO | N/A |
|---|---|---|---|
| NOTE: Professional judgement should be used to qualify data that have method blank surrogate recoveries out of specification in both original and reanalyses. | | | |
| 3.5 Are there any transcription/calculation errors between raw data and Form II? | ___ | [/] | ___ |

ACTION: If large errors exist, call lab for explanation/resubmittal, make any necessary corrections and document effect in data assessments.

4.0 Matrix Spikes (Form III)

| | YES | NO | N/A |
|---|---|---|---|
| 4.1 Have the semivolatile Matrix Spike and Matrix Spike Duplicate or duplicate unspiked Sample recoveries been listed on the CLP Recovery Form (Form III)? | [/] | ___ | ___ |

NOTE: This method may not require a Matrix Spike Duplicate. Lab should submit MS/MSD or MS and Duplicate unspiked sample. (see section 8.4.2, page 8270C-22)

4.2 Were matrix spikes analyzed at the required frequency for each of the following matrices:

| | | | |
|---|---|---|---|
| a. Low Water | [ ] | ___ | / |
| b. Low Solid / Tissue | [/] | ___ | ___ |
| c. Med Solid | [ ] | ___ | / |

ACTION: If any matrix spike data are missing, take the action specified in 3.2 above. It may be necessary to contact the lab to obtain the required data.

| | YES | NO | N/A |
|---|---|---|---|

NOTE: If the data has not been reported on CLP forms, then the laboratory must provide the information necessary to evaluate the spike recoveries in the MS and MSD. The required data which should have been provided by the lab include the analytes and concentrations used for spiking, background concentrations of the spiked analytes (i.e., concentrations in unspiked sample), methods and equations used to calculate the QC acceptance criteria for the spiked analytes, percent recovery data for all spiked analytes.

The data reviewer must verify that all reported equations and percent recoveries are correct before proceeding to the next section.

| | | | |
|---|---|---|---|
| 4.3 Were matrix spikes performed at concentration > 100ug/L ? | [/] | ___ | ___ |
| 4.4 Were any semivolatile spike recoveries outside QC limits (compare to the values in Table 6, page 8270C-39 and 40) or Lab's in-house generated criteria? | [/] | ___ | ___ |
| 4.5 Were any RPD's for matrix spike and matrix spike duplicate recoveries outside QC limits? | [ ] | / | ___ |

ACTION: Circle all outliers with red pencil.

ACTION: No action is taken on MS/MSD data <u>alone</u>. However, using professional judgement, the data reviewer may use the matrix spike / matrix spike duplicate and duplicate unspiked results in conjunction with other QC criteria to determine the need for some qualification of the data.

| | | | |
|---|---|---|---|
| 4.6 Was a LCS analyzed with each analytical batch? (See section 8.4.3, page 8270C-22) | [/] | ___ | ___ |

| | YES | NO | N/A |
|---|---|---|---|

NOTE: When the results of the matrix spike analysis indicate a potential problem due to the sample matrix itself, the LCS results are used to verify that the laboratory can perform the analysis in a clean matrix.

4.7 Were any LCS recovery outside the interim acceptance criteria of 70 - 130% or outside lab's in-house generated limits? [✓] ___ ___

5.0 Blanks (Form IV)

5.1 Is the Method Blank Summary (Form IV) present? [✓] ___ ___

5.2 Frequency of Analysis:

Has a reagent/method blank analysis been reported per 20 samples of similar matrix, or concentration level, and for each extraction batch? [✓] ___ ___

5.3 Has a method blank been analyzed for each GC/MS system used ? [✓] ___ ___

ACTION: If any method blank data are missing, call lab for explanation/resubmittal. If not available, use professional judgement to determine if the associated sample data should be qualified.

5.4 Chromatography: review the blank raw data - chromatograms (RICs), quant reports or data system printouts and spectra.

Is the chromatographic performance (baseline stability) for each instrument acceptable for the semivolatiles? [✓] ___ ___

YES NO N/A

ACTION: Use professional judgement to determine the effect on the data.

6.0 Contamination

NOTE: "Water blanks", "drill blanks" and "distilled water blanks" are validated like any other sample and are not used to qualify the data. Do not confuse them with the other QC blanks discussed below.

6.1 Do any method/instrument/reagent blanks have positive results for target analytes and/or TICs? When applied as described below, the contaminant concentration in these blanks are multiplied by the sample dilution factor and corrected for percent moisture where necessary. ✓ [ ] ___

6.2 Do any field/rinse/ blanks have positive results for target analytes and/or TICs (if required, see paragraph 10 below)? ✓ [ ] ___

ACTION: Prepare a list of the samples associated with each of the contaminated blanks. (Attach a separate sheet.)

NOTE: All field blank results associated to a particular group of samples (may exceed one per case) must be used to qualify data. Blanks may not be qualified because of contamination in another blank. Field blanks must be qualified for outlying surrogates, poor spectra, instrument performance or calibration QC problems.

ACTION: Follow the directions in the table below to qualify sample results due to contamination. Use the largest value from all the associated blanks. If gross contamination exists, all data

YES NO N/A

in the associated samples should be qualified as unusable (R).

| **For Common Phthalate Esters:** | **For Other Contaminants:** | **Action:** |
|---|---|---|
| Sample conc. > CRDL, but < 10x blank result | Sample conc. > CRDL, but < 5x blank result | Flag sample result with a "U" |
| Sample conc. is < CRDL & < 10x blank result | Sample conc. < CRDL & < 5x blank result | Report CRDL and qualify with a "U" |
| Sample conc. > CRDL & > 10x blank result | Sample conc. > CRDL & > 5x blank result | No qualification is necessary |

NOTE: Analytes qualified "U" for blank contamination are still considered as hits when qualifying for calibration criteria.

NOTE: If the laboratory did not report TIC analyses, check the project plans to verify whether or not it was required. (see section 7.6.2, page 8270C-19)

6.3 Are there field/rinse/equipment blanks associated with every sample? [/] ___ ___

ACTION: For low level samples, note in data assessment that there is no associated field/rinse/equipment blank. Exception: samples taken from a drinking water tap do not have associated field blanks.

## 7.0 GC/MS Apparatus and Materials

YES NO N/A

7.1 Did the lab use the proper gas chromatographic column for analysis of semivolatiles by Method 8270C? Check raw data, instrument logs or contact the lab to determine what type of column was used. The method requires the use of 30 m x 0.25 mm ID (or 0.32 mm ID), silicone-coated, fused silica, capillary column. [✓] ___ ___

ACTION: If the specified column, or equivalent, was not used, document the effects in the data assessment. Use professional judgement to determine the acceptability of the data.

8.0 GC/MS Instrument Performance Check

8.1 Are the GC/MS Instrument Performance Check Forms (Form V) present for decafluorotriphenylphosphine (DFTPP)? [✓] ___ ___

NOTE: The performance solution should also contain 4,4-DDT, pentachlorophenol, and benzidine to verify injection port inertness and column performance. The degradation of DDT to DDE and DDD must be less than 20% total and the response of pentachlorophenol and benzidine should be within normal ranges for these compounds (based upon lab experience) and show no peak degradation or tailing before samples are analyzed. (see section 5.5 page 8270C-11).

8.2 Are the enhanced bar graph spectrum and mass/charge (m/z) listing for the DFTPP provided for each twelve hour shift? [✓] ___ ___

8.3 Has an instrument performance check solution been analyzed for every twelve hours of sample analysis per instrument? [✓] ___ ___

ACTION: List date, time, instrument ID, and sample

YES NO N/A

analyses for which no associated GC/MS tuning data are available.

| DATE | TIME | INSTRUMENT | SAMPLE NUMBERS |
|---|---|---|---|
| | | | |
| | | | |
| | | | |

ACTION: If the lab cannot provide missing data, reject ("R") all data generated outside an acceptable twelve hour calibration interval.

ACTION: If mass assignment is in error, flag all associated sample data as unusable (R).

8.4 Have the ion abundances been normalized to m/z 198? [/] ___ ___

8.5 Have the ion abundance criteria been met for each instrument used? [/] ___ ___

ACTION: List all data which do not meet ion abundance criteria (attach a separate sheet).

ACTION: If ion abundance criteria are not met, the Region II TOPO must be notified.

8.6 Are there any transcription/calculation errors between mass lists and Form Vs? (Check at least two values but if errors are found, check more.) ___ [/] ___

8.7 Have the appropriate number of significant

| | YES | NO | N/A |
|---|---|---|---|
| figures (two) been reported? | [ ✓ ] | ___ | ___ |

ACTION: If large errors exist, call lab for explanation/resubmittal, make necessary corrections and document effect in data assessments.

| | | | |
|---|---|---|---|
| 8.8 Are the spectra of the mass calibration compound acceptable? | [ ✓ ] | ___ | ___ |

ACTION: Use professional judgement to determine whether associated data should be accepted, qualified, or rejected.

9.0 Target Analytes

9.1 Are the Organic Analysis Data Sheets (Form I) present with required header information on each page, for each of the following:

| | | | |
|---|---|---|---|
| a. Samples and/or fractions as appropriate | [ ✓ ] | ___ | ___ |
| b. Matrix spikes and matrix spike duplicates | [ ✓ ] | ___ | ___ |
| c. Blanks | [ ✓ ] | ___ | ___ |
| D. Lab control samples | [ ✓ ] | ___ | ___ |

| | | | |
|---|---|---|---|
| 9.2 Has any special cleanup, such as GPC, been performed on all soil/sediment sample extracts (see section 7.2, page 8270C-13)? | [ ✓ ] | ___ | ___ |

ACTION: If data suggests that extract cleanup was not performed, use professional judgement. Make note in the data assessment narrative.

9.3 Are the Reconstructed Ion Chromatograms, mass spectra for the identified compounds, and the data system printouts (Quant Reports) included in the sample package for each of the following?

| | YES | NO | N/A |
|---|---|---|---|
| a. Samples and/or fractions as appropriate | [✓] | ___ | ___ |
| b. Matrix spikes and matrix spike duplicates (Mass spectra not required) | [✓] | ___ | ___ |
| c. Blanks | [✓] | ___ | ___ |
| D Lab control samples | [✓] | ___ | ___ |

ACTION: If any data are missing, take action specified in 3.2 above.

9.4 Is chromatographic performance acceptable with respect to:

| | | | |
|---|---|---|---|
| Baseline stability? | [✓] | ___ | ___ |
| Resolution? | [✓] | ___ | ___ |
| Peak shape? | [✓] | ___ | ___ |
| Full-scale graph (attenuation)? | [✓] | ___ | ___ |
| Other:_____ | [ ] | ___ | ___ |

ACTION: Use professional judgement to determine the acceptability of the data.

9.5 Are the lab-generated standard mass spectra of identified semivolatile compounds present for each sample? [✓] ___ ___

ACTION: If any mass spectra are missing, take action specified in 3.2 above. If the lab does not generate their own standard spectra, make a note in the data assessment narrative. If spectra are missing, reject all positive data.

9.6 Is the RRT of each reported compound within ± 0.06 RRT units of the standard RRT in the continuing

| | YES | NO | N/A |
|---|---|---|---|
| calibration? | [ ✓ ] | ___ | ___ |
| 9.7 Are all ions present in the standard mass spectrum at a relative intensity greater than 10% (of the most abundant ion) also present in the sample mass spectrum? | [ ✓ ] | ___ | ___ |
| 9.8 Do the relative intensities of the characteristic ions in the sample agree within ± 30% of the corresponding relative intensities in the reference spectrum? | [ ✓ ] | ___ | ___ |

ACTION: Use professional judgement to determine acceptability of data. If it is determined that incorrect identifications were made, all such data should be rejected ("R"), flagged "N" (Presumptive evidence of the presence of the compound) or changed to not detected ("U") at the calculated detection limit. In order to be positively identified, the data must comply with the criteria listed in 9.6, 9.7, and 9.8.

ACTION: When sample carry-over is a possibility, professional judgement should be used to determine if instrument cross-contamination has affected any positive compound identification.

10.0 Tentatively Identified Compounds (TIC)

| | | | |
|---|---|---|---|
| 10.1 If Tentatively Identified Compounds were required for this project, are all Form I's, Part B present; and do listed TICs include scan number or retention time, estimated concentration and "JN" qualifier? | [ ] | ___ | ✓ |
| 10.2 Are the mass spectra for the tentatively identified compounds and associated "best match" spectra included in the sample package for each of the following: | [ ] | ___ | ✓ |

| | YES | NO | N/A |
|---|---|---|---|
| a. Samples and/or fractions as appropriate | [ ] | ___ | ✓ |
| b. Blanks | [ ] | ___ | ✓ |

ACTION: If any TIC data are missing, take action specified in 3.2 above.

ACTION: Add "JN" qualifier only to analytes identified by CAS #.

| | | | |
|---|---|---|---|
| 10.3 Are any target compounds from one fraction listed as TIC compounds in another (e.g., an acid compound listed as a base neutral TIC)? | ___ | [ ] | ✓ |

ACTION: i. Flag with "R" any target compound listed as a TIC.

ii. Make sure all rejected compounds are properly reported in the other fraction.

| | | | |
|---|---|---|---|
| 10.4 Are all ions present in the reference mass spectrum with a relative intensity greater than 10% (of the most abundant ion) also present in the sample mass spectrum? | [ ] | ___ | ✓ |
| 10.5 Do TIC and "best match" standard relative ion intensities agree within ± 20%? | [ ] | ___ | ✓ |

ACTION: Use professional judgement to determine acceptability of TIC identifications. If it is determined that an incorrect identification was made, change the identification to "unknown" or to some less specific identification (example: "C3 substituted benzene") as appropriate and remove "JN". Also, when a compound is not found in any blank, but is a suspected artifact of a common laboratory contaminant, the result should be qualified as unusable, "R".

YES NO N/A

11.0 Compound Quantitation and Reported Detection Limits

**NOTE: Average Response Factor from the initial calibration is used for quantitation.**

11.1 Are there any transcription/calculation errors in Form I results? Check at least two positive values. Verify that the correct internal standard, quantitation ion, and RRF were used to calculate Form I result. Were any errors found? ___ [/] ___

NOTE: Structural isomers with similar mass spectra, but insufficient GC resolution (i.e. percent valley between the two peaks > 25%) should be reported as isomeric pairs. The reviewer should check the raw data to ensure that all such isomers were included in the quantitation (i.e., add the areas of the two co-eluting peaks to calculate the total concentration).

11.2 Are the method detection limits adjusted to reflect sample dilutions and % moisture in case of soil samples? [/] ___ ___

ACTION: If errors are large, call lab for explanation/resubmittal, make any necessary corrections and document effect in data assessments.

ACTION: When a sample is analyzed at more than one dilution, the lowest detection limits are used (unless a QC exceedance dictates the use of the higher detection limit from the diluted sample data). Replace concentrations that exceed the calibration range in the original analysis by crossing out the "E" and it's associated value on the original Form I (if present) and substituting the data from the analysis of the diluted sample. Specify which Form I is to be used, then draw a red

YES NO N/A

" X" across the entire page of all Form I's that should not be used, including any in the summary package.

12.0 Standards Data (GC/MS)

12.1 Are the Reconstructed Ion Chromatograms, and data system printouts (Quant, Reports) present for initial and continuing calibration? [/] ___ ___

ACTION: If any calibration standard data are missing, take action specified in 3.2 above.

13.0 GC/MS Initial Calibration (Form VI)

13.1 Are the Initial Calibration Forms (Form VI) present and complete for the semivolatile fraction? [/] ___ ___

ACTION: If any calibration forms or standard raw data are missing, take action specified in 3.2 above.

13.2 Are all **average RRF's** of the four System Performance Check Compounds **(SPCCs)**: N-nitroso-di-n-propylamine, hexachlorocyclopentadiene, 2,4-dinitrophenol and 4-nitrophenol > 0.050? [/] ___ ___

ACTION: If no:
CONTRACTUAL - Circle all outliers in red. Document in the Data Assessment under contract non compliance.

ACTION: TECHNICAL - For any target analyte, CCC or SPCC with average **RRF <0.05**

1. "R" all non-detects;

2. "J" all positive results.

| | YES | NO | N/A |
|---|---|---|---|
| 13.3 Is the % RSD for each individual Calibration Check Compound (CCC) - Acenaphthene, 1,4-Dichlorobenzene, Hexachlorobutadiene, Diphenylamine, Di-n-octyl phthalate, Fluoranthene, Benzo(a)pyrene, 4-Chloro-3-methylphenol, 2,4-Dichlorophenol, 2-Nitrophenol, Phenol, Pentachlorophenol and 2,4,6-Trichlorophenol less than 30%? | [/] | ___ | ___ |

ACTION: If no:
CONTRACTUAL - Circle all outliers in red. Document in the Data Assessment under contract non compliance.

TECHNICAL - All positive hits for that particular CCC must be qualified "J". If % RSD > 90%, flag all positive results for that analyte "J" and non-detect results for that analyte "R" unusable.

| | | | |
|---|---|---|---|
| 13.4 If % RSD for one or more target analytes exceeds 15%, is the MEAN of the % RSD values for ALL analytes in the calibration less than or equal to 15%? | [/] | ___ | ___ |

ACTION: If yes:
CONTRACTUAL - The initial calibration is valid and the average RF from the initial calibration is used to quantitate sample results.

TECHNICAL - If the % RSD is ≥ 15.0% for any Individual target analyte, qualify positive results for that analyte "J". If % RSD > 90%, flag all positive results for that analyte "J" and non-detect results for that analyte "R" unusable.

| | | | |
|---|---|---|---|
| 13.5 If the MEAN % RSD is greater than 15%, Did the laboratory calculate first or second order regression fit of the calibration curve ? | [ ] | ___ | / |

ACTION: If no:
CONTRACTUAL - The initial calibration is

| | YES | NO | N/A |
|---|---|---|---|
| not valid, Document in the Data Assessment under contract non compliance.<br><br>TECHNICAL - If % RSD is > 15.0% for any individual target analyte, qualify positive results for that analyte "J". When % RSD > 90%, flag all positive results for that analyte "J" and non-detect results for that analyte "R" unusable. | | | |
| NOTE: Analytes previously qualified "U" due to blank contamination are still considered as "hits" when qualifying for calibration criteria. | | | |
| 13.6 Are there any transcription/calculation errors in the reporting of average response factors (RRF) or % RSD? (Check at least two values but if errors are found, check more.) | ___ | [/] | ___ |
| ACTION: Circle errors in red. | | | |
| ACTION: If errors are large, call lab for explanation/resubmittal, make any necessary corrections and note errors in data assessments. | | | |
| 13.7 Do the target compounds for this SDG include Pesticides? | [ ] | / | ___ |
| 13.8 If the pesticide compounds include DDT, was the percent breakdown of DDT to DDD and DDE greater than 20%? | ___ | [ ] | / |

ACTION: If DDT percent breakdown exceeds 20%:

i. Qualify all positive results for DDT with "J". If DDT was not detected, but DDD and DDE results are positive, qualify the

YES NO N/A

quantitation limit for DDT as unusable, "R".

ii. Qualify all positive results for DDD and DDE as presumptively present at an approximate concentration "JN".

14.0 GC/MS Calibration Verification (Form VII)

14.1 Are the Calibration verification Forms (Form VII) present and complete for all compounds of interest? [✓] ___ ___

14.2 Has a calibration verification standard been analyzed for every twelve hours of sample analysis per instrument? [✓] ___ ___

ACTION: List below all sample analyses that were not within twelve hours of a calibration verification analysis for each instrument used.

_____

_____

_____

ACTION: If any forms are missing or no calibration verification standard has been analyzed within twelve hours of every sample analysis, call lab for explanation/resubmittal. If calibration verification data is not available, flag all associated sample data as unusable ("R").

14.3 Do any of the SPCCs have an **RRF <0.05**? ___ [✓] ___

If YES, did the lab take corrective action as in section 7.4.4.2, page 8270C-17. [ ] ___ [✓]

ACTION: If no:

YES NO N/A

CONTRACTUAL - Circle all outliers in red. Document in the Data Assessment under contract non compliance.

ACTION: TECHNICAL - For any target analyte, SPCC or CCC with **RRF <0.05**

1. "R" all non-detects;

2. "J" all positive results.

14.4 Do any of the CCCs have a %D between the initial and verification RRF which exceeds 20.0%? ✓ [ ] ___

ACTION: If Yes:
CONTRACTUAL - Circle all outliers in red. Document in the Data Assessment under contract non compliance.

TECHNICAL - All positive hits for that particular CCC must be qualified "J" and all non-detects "UJ". When %D > 90%, flag all positive results for that analyte "J"and non-detect results for that analyte "R" unusable.

14.5 Do any target compounds have a % D between the initial and verification RRF which exceeds 30.0 ~~20.0%~~? ___ [✓] ___

ACTION: If yes:
CONTRACTUAL - Circle all outliers in red.

TECHNICAL - All positive hits for that particular target compound must be qualified "J" and all non-detects "UJ". When %D > 90%, flag all positive results for that analyte "J" and non-detect results for that analyte "R" unusable.

14.6 If %D for one or more target analytes exceeds 20%, Is the MEAN of the %D values for all analytes in

| | YES | NO | N/A |
|---|---|---|---|
| The calibration less than or equal to 20%? | [✓] | ___ | ___ |

ACTION: If yes:
CONTRACTUAL - The initial calibration is valid and the average RF from the initial calibration is used to quantitate sample results.

If no:
The initial calibration is invalid. Document in the Data Assessment under contract non compliance.

| | | | |
|---|---|---|---|
| 14.7 Are there any transcription/calculation errors in the reporting of average response factors (RRF) or percent difference (%D) between initial and continuing RRFs? (Check at least two values but if errors are found, check more). | ___ | [✓] | ___ |

ACTION: Circle errors in red.

ACTION: If errors are large, call lab for explanation/resubmittal, make any necessary corrections and document effect(s) in the data assessments.

15.0 Internal Standards (Form VIII)

| | | | |
|---|---|---|---|
| 15.1 Are the internal standard areas (Form VIII) of every sample and blank within the upper and lower limits (-50% to + 100%) for each continuing calibration? | [✓] | ___ | ___ |

ACTION: List each outlying internal standard below.

| Sample ID | IS # | Area | LowerLimit | Upper Limit |
|---|---|---|---|---|
| _____ | _____ | _____ | _____ | _____ |
| _____ | _____ | _____ | _____ | _____ |

| | | | YES | NO | N/A |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |

(Attach additional sheets if necessary.)

ACTION: i. If the internal standard area count is outside the upper or lower limit, flag with "J" all positive results and non-detects (U values) quantitated with this internal standard.

ii. Non-detects associated with IS > 100% should not be qualified.

iii. If the IS area is below the lower limit (<50%), qualify all associated non-detects (U-values) "J". If extremely low area counts are reported (<25%) or if performance exhibits a major abrupt drop off, flag all associated non-detects as unusable (R).

15.2 Are the retention times of all internal standards within 30 seconds of the associated calibration standard? [✓] ___ ___

ACTION: Professional judgement should be used to qualify data if the retention times differ by more than 30 seconds.

16.0 Field Duplicates

16.1 Were any field duplicates submitted for semivolatile analysis? [ ] ✓ ___

ACTION: Compare the reported results for field duplicates and calculate the relative percent difference.

YES NO N/A

ACTION: Any gross variation between field duplicate results must be addressed in the reviewer narrative. However, if large differences exist, identification of field duplicates should be confirmed by contacting the sampler.

# PCB Congeners

**LABORATORY DATA CONSULTANTS, INC.**
7750 El Camino Real, Suite 2L Carlsbad, CA 92009 Phone: 760/634-0437 Fax: 760/634-0439

Windward Environmental, LLC
200 West Mercer Street, Suite 401
Seattle, WA 98119
ATTN: Ms. Jennifer Parker

September 28, 2011

SUBJECT: Lower Passaic River Restoration Project, Data Validation

Dear Ms. Parker,

Enclosed are the final validation reports for the fractions listed below. These SDGs were received on September 12, 2011. Attachment 1 is a summary of the samples that were reviewed for each analysis.

**LDC Project # 26203:**

| SDG # | Fraction |
|---|---|
| K1106643 | Metals, Butyltins |
| A3380 | Polychlorinated Biphenyls as Congeners Dioxins/Dibenzofurans |

The data validation was performed under EPA Level III/IV guidelines. The analyses were validated using the following documents, as applicable to each method:

- Final Surface Sediment Chemical Analyses and Benthic Invertebrate Toxicity and Bioaccumulation Testing Quality Assurance Project Plan (QAPP) for the Lower Passaic River Restoration Project, October 2009
- Caged Bivalve Study Addendum, March 2011
- USEPA Region II Validation SOP HW-2, (Revision 13, September 2006) for Metals
- USEPA, Contract Laboratory Program National Functional Guidelines for Inorganic Data Review, October 2004
- USEPA, Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review, June 2008
- USEPA Region II Validation SOP HW-25, (Revision 3, September 2006) forTetra-through Octochlorinated Dioxins and Furans by Isotope Dilution, modified as necessary to accommodate the QAPP criteria
- USEPA Region II Validation SOP HW-46, (Revision 1, September 2008) for Chlorinated Biphenyls Congeners in Water, Soil, Sediment, and Tissue, modified as necessary to accommodate the QAPP criteria

Please feel free to contact us if you have any questions.

Sincerely,

Stella S. Cuenco
Data Validation Operations Manager/Senior Chemist

L:\Windward\Passaic\26203COV.wpd

DL/CD 1555 Pages

Attachment 1

EDD

# LDC #26203 (Windward Environmental, LLC - Seattle WA / Lower Passaic River Restoration Project)

PO# 2011-0012

| LDC | SDG# | DATE REC'D | (3) DATE DUE | Pest. (1699M) | | PCB Cong (1668B) | | Dioxin (1613B) | | Butyltin (Krone) | | Metals (6010B) | | Metals (6020) | | Se (7742) | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Matrix: | Water/Tissue | | | W | T | W | T | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S |
| A | K1106643 | 09/12/11 | 10/03/11 | - | - | - | - | - | - | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | | | | | | | | | | | | | | | | | | |
| B | A3380 | 09/12/11 | 10/03/11 | - | - | 1 | 0 | 1 | 0 | - | - | - | - | - | - | - | - | | | | | | | | | | | | | | | | | | |
| C | B1A8699 | 09/12/11 | 10/03/11 | 1 | 10 | - | - | - | - | - | - | - | - | - | - | - | - | | | | | | | | | | | | | | | | | | |
| Total | A/SC | | | 1 | 10 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 17 |

For Internal Use Only: Shaded cells indicate Level IV validation (all other cells are Level III validation). These sample counts do not include MS/MSD

26203ST.wpd

# Laboratory Data Consultants, Inc.
# Data Validation Report

| | |
|---|---|
| **Project/Site Name:** | Lower Passaic River Restoration Project |
| **Collection Date** | July 18, 2010 |
| **LDC Report Date:** | September 22, 2011 |
| **Matrix:** | Water |
| **Parameters:** | Polychlorinated Biphenyls as Congeners |
| **Validation Level:** | EPA Level IV |
| **Laboratory:** | Analytical Perspectives |
| **Sample Delivery Group (SDG):** | A3380 |

**Sample Identification**

LPR5-071811-RB

## Introduction

This data review covers one water sample listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 1668B for Polychlorinated Biphenyl as Congeners.

This review follows the Final Surface Sediment Chemical Analyses and Benthic Invertebrate Toxicity and Bioaccumulation Testing Quality Assurance Project Plan (QAPP) for the Lower Passaic River Restoration Project, (October 8, 2009), the Caged Bivalve Study Addendum (March 2, 2011), and USEPA Region II Validation SOP HW-46 (Revision 1, September 2008) for Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue, modified as necessary to accommodate the QAPP criteria.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

NJ Presumptive evidence of presence of the compound at an estimated quantity.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

## I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

## II. HRGC/HRMS Instrument Performance Check

Instrument performance was checked at the required daily frequency.

Retention time windows were established for all congeners. The chromatographic resolution between the congeners PCB-23 and PCB-34 and congeners PCB-182 and PCB-187 was resolved with a valley of less than or equal to 40%.

The static resolving power was at least 10,000 (10% valley definition).

## III. Initial Calibration

A five point initial calibration was performed as required by the method.

Percent relative standard deviations (%RSD) were less than or equal to 20.0% for all compounds.

The ion abundance ratios for all PCBs were within validation criteria.

The minimum S/N ratio was greater than or equal to 10 for each unlabeled compound and labeled compound.

## IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

All of the continuing calibration percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were less than or equal to 20.0% for unlabeled compounds and less than or equal to 50.0% for labeled compounds with the following exceptions:

| Date | Compound | %D | Associated Samples | Affected Compound | Flag | A or P |
|---|---|---|---|---|---|---|
| 8/1/11 (BCS3_8878_PCB_VA) | PCB-37 | 22.6 | All samples in SDG A3380 | PCB-37<br>Total Tri-CBs | J (all detects)<br>UJ (all non-detects)<br>J (all detects)<br>UJ (all non-detects) | P |
| 8/1/11 (BCS3_8878_PCB_VB) | PCB-37 | 22.1 | All samples in SDG A3380 | PCB-37<br>Total Tri-CBs | J (all detects)<br>UJ (all non-detects)<br>J (all detects)<br>UJ (all non-detects) | P |

The ion abundance ratios for all PCBs were within validation criteria.

## V. Blanks

Method blanks were reviewed for each matrix as applicable. No polychlorinated biphenyls as congeners contaminants were found in the method blanks with the following exceptions:

| Method Blank ID | Extraction Date | Compound | Concentration | Associated Samples |
|---|---|---|---|---|
| MB1-8878 | 7/27/11 | Total Di-CBs | 16.8 pg/L | All samples in SDG A3380 |
| | | Total Tri-CBs | 17.7 pg/L | |
| | | Total Tetra-CBs | 4.87 pg/L | |
| | | PCB-4 | 8.15 pg/L | |
| | | PCB-11 | 8.65 pg/L | |
| | | PCB-30/18 | 2.45 pg/L | |
| | | PCB-17 | 2.94 pg/L | |
| | | PCB-32 | 3.89 pg/L | |
| | | PCB-31 | 2.12 pg/L | |
| | | PCB-28/20 | 6.34 pg/L | |
| | | PCB-52 | 2.76 pg/L | |
| | | PCB-44/47/65 | 2.1 pg/L | |

Sample concentrations were compared to concentrations detected in the method blanks. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated method blanks with the following exceptions:

| Sample | Compound | Reported Concentration | Modified Final Concentration |
|---|---|---|---|
| LPR-071811-RB | PCB-4 | 7.89 pg/L | 7.89U pg/L |
| | PCB-11 | 19.4 pg/L | 19.4U pg/L |
| | PCB-30/18 | 3.5 pg/L | 3.5U pg/L |
| | PCB-17 | 3.3 pg/L | 3.3U pg/L |
| | PCB-32 | 3.67 pg/L | 3.67U pg/L |
| | PCB-31 | 3.92 pg/L | 3.92U pg/L |
| | PCB-28/20 | 7.57 pg/L | 7.57U pg/L |
| | PCB-52 | 3.95 pg/L | 3.95U pg/L |
| | PCB-44/47/65 | 4.29 pg/L | 4.29U pg/L |

Sample LPR-071811-RB was identified as a rinsate blank. No polychlorinated biphenyls as congeners contaminants were found in this blank with the following exceptions:

| Rinsate Blank ID | Sampling Date | Compound | Concentration | Associated Samples |
|---|---|---|---|---|
| LPR-071811-RB | 7/18/11 | Total Mono-CBs | 13 pg/L | No associated samples in this SDG |
| | | Total Di-CBs | 31.8 pg/L | |
| | | Total Tri-CBs | 27.4 pg/L | |
| | | Total Tetra-CBs | 22.2 pg/L | |
| | | Total Penta-CBs | 25.7 pg/L | |
| | | Total Hexa-CBs | 13 pg/L | |
| | | Total Hepta-CBs | 5.21 pg/L | |
| | | PCB-1 | 6.01 pg/L | |
| | | PCB-3 | 7.03 pg/L | |
| | | PCB-4 | 7.89 pg/L | |
| | | PCB-8 | 4.53 pg/L | |
| | | PCB-11 | 19.4 pg/L | |
| | | PCB-19 | 3.2 pg/L | |
| | | PCB-30/18 | 3.5 pg/L | |
| | | PCB-17 | 3.3 pg/L | |
| | | PCB-32 | 3.67 pg/L | |
| | | PCB-31 | 3.92 pg/L | |
| | | PCB-28/20 | 7.57 pg/L | |
| | | PCB-21/33 | 1.36 pg/L | |
| | | PCB-39 | 0.89 pg/L | |
| | | PCB-52 | 3.95 pg/L | |
| | | PCB-69/49 | 2.08 pg/L | |
| | | PCB-44/47/65 | 4.29 pg/L | |
| | | PCB-64 | 1.36 pg/L | |
| | | PCB-61/70/74/76 | 6.66 pg/L | |
| | | PCB-66 | 3.89 pg/L | |
| | | PCB-95 | 2.71 pg/L | |
| | | PCB-113/90/101 | 4.26 pg/L | |
| | | PCB-99 | 2.32 pg/L | |
| | | PCB-109/119/86/97/125/87 | 3.59 pg/L | |
| | | PCB-110 | 5.59 pg/L | |
| | | PCB-118 | 4.96 pg/L | |
| | | PCB-105 | 2.31 pg/L | |
| | | PCB-147/149 | 2.72 pg/L | |
| | | PCB-153/168 | 3.94 pg/L | |
| | | PCB-163/138/129 | 6.32 pg/L | |
| | | PCB-187 | 1.81 pg/L | |
| | | PCB-180/193 | 2.07 pg/L | |
| | | PCB-170 | 1.32 pg/L | |

## VI. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were not performed since the associated sample is a rinsate blank.

## VII. Batch Control Samples (BCS)

Batch control samples were reviewed for each matrix as applicable. Percent differences (%D) and relative percent differences (RPD) were within QC limits with the following exceptions:

| BCS ID (Associated Samples) | Compound | BCS %D (Limits) | BCSD %D (Limits) | Affected Compound | Flag | A or P |
|---|---|---|---|---|---|---|
| BCS3_8878_PCB_VA/VB (All samples in SDG A3380) | $^{13}$C-PCB-4<br>$^{13}$C-PCB-19<br>$^{13}$C-PCB-37 | 31.6 (≤30)<br>31.9 (≤30)<br>- | 30.2 (≤30)<br>32.7 (≤30)<br>31.4 (≤30) | PCB-4<br>PCB-10<br>Total Di-CBs<br>PCB-19<br>PCB-30/18<br>PCB-17<br>PCB-27<br>PCB-24<br>PCB-16<br>PCB-32<br>PCB-34<br>PCB-23<br>PCB-26/29<br>PCB-25<br>PCB-31<br>PCB-28/20<br>PCB-21/33<br>PCB-22<br>PCB-36<br>PCB-39<br>PCB-38<br>PCB-35<br>PCB-37<br>Total Tri-CBs | J (all detects)<br>UJ (all non-detects) | P |

## VIII. Regional Quality Assurance and Quality Control

Not applicable.

## IX. Internal Standards

All internal standard recoveries (%R) were within validation criteria.

All internal standard ion abundance ratios were within method criteria.

## X. Target Compound Identification

All target compounds met the identification criteria with the following exceptions:

| Sample | Compound | Flag | A or P |
|---|---|---|---|
| LPR-071811-RB | PCB-4<br>PCB-8<br>Total Di-CBs | J (all detects)<br>J (all detects)<br>J (all detects) | P |

For the above listed sample, the laboratory indicated that the Dichlorobiphenyl congeners were quantitated using single ion mode. The area for the secondary ion (m/z 223.9974) was not integrated due to significant interference from PFK. Using professional judgment, associated detected results were qualified as estimated.

## XI. Compound Quantitation and RLs

All compound quantitation and RLs were within validation criteria with the following exceptions:

| Sample | Compound | Flag | A or P |
|---|---|---|---|
| All samples in SDG A3380 | All compounds reported as estimated maximum possible concentration (EMPC). | EMPC-J | A |

## XII. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

## XIII. Field Duplicates

No field duplicates were identified in this SDG.

## Lower Passaic River Restoration Project
## Polychlorinated Biphenyls as Congeners - Data Qualification Summary - SDG A3380

| SDG | Sample | Compound | Flag | A or P | Reason |
|---|---|---|---|---|---|
| A3380 | LPR-071811-RB | PCB-37<br><br>Total Tri-CBs | J (all detects)<br>UJ (all non-detects)<br>J (all detects)<br>UJ (all non-detects) | P | Continuing calibration (%D) |
| A3380 | LPR-071811-RB | PCB-4<br>PCB-10<br>Total Di-CBs<br>PCB-19<br>PCB-30/18<br>PCB-17<br>PCB-27<br>PCB-24<br>PCB-16<br>PCB-32<br>PCB-34<br>PCB-23<br>PCB-26/29<br>PCB-25<br>PCB-31<br>PCB-28/20<br>PCB-21/33<br>PCB-22<br>PCB-36<br>PCB-39<br>PCB-38<br>PCB-35<br>PCB-37<br>Total Tri-CBs | J (all detects)<br>UJ (all non-detects) | P | Batch control samples (%D) |
| A3380 | LPR-071811-RB | PCB-4<br>PCB-8<br>Total Di-CBs | J (all detects)<br>J (all detects)<br>J (all detects) | P | Target compound identification |
| A3380 | LPR-071811-RB | All compounds reported as estimated maximum possible concentration (EMPC). | EMPC-J | A | Compound quantitation and RLs (EMPC) |

**Lower Passaic River Restoration Project**
**Polychlorinated Biphenyls as Congeners - Laboratory Blank Data Qualification Summary - SDG A3380**

| Sample | Compound | Reported Concentration | Modified Final Concentration |
|---|---|---|---|
| LPR-071811-RB | PCB-4 | 7.89 pg/L | 7.89U pg/L |
| | PCB-11 | 19.4 pg/L | 19.4U pg/L |
| | PCB-30/18 | 3.5 pg/L | 3.5U pg/L |
| | PCB-17 | 3.3 pg/L | 3.3U pg/L |
| | PCB-32 | 3.67 pg/L | 3.67U pg/L |
| | PCB-31 | 3.92 pg/L | 3.92U pg/L |
| | PCB-28/20 | 7.57 pg/L | 7.57U pg/L |
| | PCB-52 | 3.95 pg/L | 3.95U pg/L |
| | PCB-44/47/65 | 4.29 pg/L | 4.29U pg/L |

**Lower Passaic River Restoration Project**
**Polychlorinated Biphenyls as Congeners - Field Blank Data Qualification Summary - SDG A3380**

No Sample Data Qualified in this SDG

LDC #: 26203B31 **VALIDATION COMPLETENESS WORKSHEET** Date: 9/16/11

SDG #: A3380 Level IV Page: 1 of 1

Laboratory: Analytical Perspectives Reviewer: [illegible]

2nd Reviewer: [illegible]

**METHOD:** HRGC/HRMS Polychlorinated Biphenyl Congeners (EPA Method 1668B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

| | Validation Area | | Comments |
|---|---|---|---|
| I. | Technical holding times | A | Sampling dates: 7/18/11 |
| II. | GC/MS Instrument performance check | A | |
| III. | Initial calibration | A | RSD ≤ 20 |
| IV. | Routine calibration/~~ICV~~ | SW | CCV ≤ 20/50 |
| V. | Blanks | SW | |
| VI. | Matrix spike/Matrix spike duplicates | N | |
| VII. | Laboratory control samples | SW | BLS |
| VIII. | Regional quality assurance and quality control | N | |
| IX. | Internal standards | A | |
| X. | Target compound identifications | SW | |
| XI. | Compound quantitation and CRQLs | SW | EMPC-J/A |
| XII. | System performance | A | |
| XIII. | Overall assessment of data | A | |
| XIV. | Field duplicates | N | |
| XV. | Field blanks | SW | RB = 1 |

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples:

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1 | LPR-071811-RB W | 11 | | 21 | | 31 | |
| 2 | | 12 | | 22 | | 32 | |
| 3 | | 13 | | 23 | | 33 | |
| 4 | | 14 | | 24 | | 34 | |
| 5 | | 15 | | 25 | | 35 | |
| 6 | | 16 | | 26 | | 36 | |
| 7 | | 17 | | 27 | | 37 | |
| 8 | | 18 | | 28 | | 38 | |
| 9 | | 19 | | 29 | | 39 | |
| 10 | | 20 | | 30 | | 40 | |

LDC #: 26203B31

# VALIDATION FINDINGS WORKSHEET
## Routine Calibration


Reviewer: SC
2nd Reviewer: 9

**METHOD:** HRGC/MS Polychlorinated Biphenyls as Congeners (EPA Method 1668B)
Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a routine calibration was performed at the beginning of each 12 hour period?
Y N N/A Were all percent differences (%D) ≤ 20% for unlabeled compounds and ≤ 30% for labeled?
Y N N/A Did all routine calibration standards meet the Ion Abundance Ratio criteria?

| # | Date | Standard ID | Compound | Finding %D | Finding Ion Abundance Ratio | Associated Samples | Qualifications |
|---|---|---|---|---|---|---|---|
| | 8/1/11 | BCS3_8878-PCB_VA | PCB-37 | 22.6 | | All | J/UJ/P (+Total Tri-CBs) |
| | 8/1/11 | _VB | PCB-37 | 22.1 | | All | |

LDC #: 26203B31

# VALIDATION FINDINGS WORKSHEET
## Blanks


Reviewer:
2nd Reviewer:

**METHOD:** HRGC/HRMS PCB Congeners (EPA Method 1668B)

**Blank extraction date:** 7/27/11 **Blank analysis date:** 8/1/11
**Conc. units:** pg/L **Associated samples:** All Qualify U

| Compound | Blank ID | Sample Identification | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | MB1_8878 | 5X | 1 | | | | | | | |
| Total Di-CBs | 16.8 | 84 | | | | | | | | |
| Total Tri-CBs | 17.7 | 88.5 | | | | | | | | |
| Total Tetra-CBs | 4.87* | 24.35 | | | | | | | | |
| PCB-4 | 8.15 | 40.75 | 7.89 | | | | | | | |
| PCB-11 | 8.65 | 43.25 | 19.4 | | | | | | | |
| PCB-30/18 | 2.45 | 12.25 | 3.5 | | | | | | | |
| PCB-17 | 2.94 | 14.7 | 3.3* | | | | | | | |
| PCB-32 | 3.89 | 19.45 | 3.67 | | | | | | | |
| PCB-31 | 2.12 | 10.6 | 3.92* | | | | | | | |
| PCB-28/20 | 6.34 | 31.7 | 7.57 | | | | | | | |
| PCB-52 | 2.76 | 13.8 | 3.95 | | | | | | | |
| PCB-44/47/65 | 2.1* | 10.5 | 4.29 | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
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| | | | | | | | | | | |

*EMPC

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
All contaminants within five times the method blank concentr/ation were qualified as not detected, "U".

LDC #: 26203B31

# VALIDATION FINDINGS WORKSHEET
## Field Blank


Reviewer:
2nd Reviewer:

**METHOD:** HRGC/HRMS PCB Congeners (EPA Method 1668B)
**Blank units:** pg/L **Associated sample units:** NA
**Sampling date:** ~~12/20/10~~ 7/18/11
**Field blank type:** (circle one) Field Blank / Rinsate / Other **Associated samples:** NA

| Compound | Blank ID | Sample Identification | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 5X | | | | | | | | |
| Total Mono-CBs | 13 | 6.5 | | | | | | | | |
| Total Di-CBs | 31.8 | 15.9 | | | | | | | | |
| Total Tri-CBs | 27.4* | 13.7 | | | | | | | | |
| Total Tetra-CBs | 22.2* | 11.1 | | | | | | | | |
| Total Penta-CBs | 25.7* | 12.85 | | | | | | | | |
| Total Hexa-CBs | 13* | 6.5 | | | | | | | | |
| Total Hepta-CBs | 5.21* | 2.605 | | | | | | | | |
| PCB-1 | 6.01 | 3.005 | | | | | | | | |
| PCB-3 | 7.03 | 3.515 | | | | | | | | |
| PCB-4 | 7.89 | 3.945 | | | | | | | | |
| PCB-8 | 4.53 | 2.265 | | | | | | | | |
| PCB-11 | 19.4 | 9.7 | | | | | | | | |
| PCB-19 | 3.2 | 1.6 | | | | | | | | |
| PCB-30/18 | 3.5 | 1.75 | | | | | | | | |
| PCB-17 | 3.3* | 1.65 | | | | | | | | |
| PCB-32 | 3.67 | 1.835 | | | | | | | | |
| PCB-31 | 3.92* | 1.96 | | | | | | | | |
| PCB-28/20 | 7.57 | 3.785 | | | | | | | | |
| PCB-21/33 | 1.36* | 0.68 | | | | | | | | |
| PCB-39 | 0.89* | 0.445 | | | | | | | | |
| PCB-52 | 3.95 | 1.975 | | | | | | | | |
| PCB-69/49 | 2.08* | 1.04 | | | | | | | | |
| PCB-44/47/65 | 4.29 | 2.145 | | | | | | | | |

| Compound | Blank ID | Sample Identification | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 5X | | | | | | | | |
| PCB-64 | 1.36 | 0.68 | | | | | | | | |
| PCB-61/70/74/76 | 6.66 | 3.33 | | | | | | | | |
| PCB-66 | 3.89 | 1.945 | | | | | | | | |
| PCB-95 | 2.71* | 1.355 | | | | | | | | |
| PCB-113/90/101 | 4.26* | 2.13 | | | | | | | | |
| PCB-99 | 2.32* | 1.16 | | | | | | | | |
| PCB-109/119/86/97/125/87 | 3.59 | 1.795 | | | | | | | | |
| PCB-110 | 5.59 | 2.795 | | | | | | | | |
| PCB-118 | 4.96 | 2.48 | | | | | | | | |
| PCB-105 | 2.31 | 1.155 | | | | | | | | |
| PCB-147/149 | 2.72* | 1.36 | | | | | | | | |
| PCB-153/168 | 3.94 | 1.97 | | | | | | | | |
| PCB-163/138/129 | 6.32 | 3.16 | | | | | | | | |
| PCB-187 | 1.81 | 0.905 | | | | | | | | |
| PCB-180/193 | 2.07* | 1.035 | | | | | | | | |
| PCB-170 | 1.32* | 0.66 | | | | | | | | |

* EMPC

LDC #: 26203B31

# VALIDATION FINDINGS WORKSHEET
## Laboratory Control Samples (LCS)

Page: 1 of 1
Reviewer: R
2nd Reviewer: G

**METHOD:** HRGC/HRMS PCB Congeners (EPA Method 1668B)
Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a LCS required?
Y N N/A Was a LCS analyzed every 20 samples for each matrix or whenever a sample extraction was performed?
Y N N/A Were the LCS percent differences (%D) and relative percent difference (RPD) within the QC limits?

| # | Date | Lab ID/Reference | Compound | LCS %D (Limits) | LCSD %D (Limits) | RPD (Limits) | Associated Samples | Qualifications |
|---|---|---|---|---|---|---|---|---|
| | BCS3-SB78-PCB-VA | | 13CPCB-4 | 31.6 (≤30) | 30.2 (≤30) | ( ) | All | J/UJ/P |
| | | | 19 | 31.9 ( ↓ ) | 32.7 ( ↓ ) | ( ) | | (see attached) |
| | | | 37 | ( ) | 31.4 ( ↓ ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
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| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |

# AP Quantitation References - Standard

**ES PCB-1**
PCB-1

**ES PCB-2**
PCB-2
PCB-3

**ES PCB-4**
PCB-4
PCB-10
Total Di-CBs

**ES PCB-15**
PCB-9
PCB-7
PCB-6
PCB-5
PCB-8
PCB-14
PCB-11
PCB-13/12
PCB-15

**ES PCB-19**
PCB-19
PCB-30/18
PCB-17
PCB-27
PCB-24
PCB-16
PCB-32

**ES PCB-37**
PCB-34
PCB-23
PCB-26/29
PCB-25
PCB-31
PCB-28/20
PCB-21/33
PCB-22
PCB-36
PCB-39
PCB-38
PCB-35
PCB-37
Total Tri-CBs

**ES PCB-54**
PCB-54

**ES PCB-77**
PCB-77

**ES PCB-81**
PCB-52
PCB-73
PCB-43
PCB-69/49
PCB-48
PCB-44/47/65
PCB-59/62/75
PCB-42
PCB-41
PCB-71/40
PCB-64
PCB-72
PCB-68
PCB-57
PCB-58
PCB-67
PCB-63
PCB-61/70/74/76
PCB-66
PCB-55
PCB-56
PCB-60
PCB-80
PCB-79
PCB-78
PCB-50/53*
PCB-45*
PCB-51*
PCB-46*
PCB-81

**ES PCB-104**
PCB-104
PCB-96

**ES PCB-105**
PCB-105
PCB-127

**ES PCB-114**
PCB-122
PCB-114

**ES PCB-118**
PCB-118

**ES PCB-123**
PCB-103
PCB-94
PCB-95
PCB-100/93
PCB-102
PCB-98
PCB-88
PCB-91
PCB-84
PCB-89
PCB-121
PCB-92
PCB-113/90/101
PCB-83
PCB-99
PCB-112
PCB-108/119/86/97/125/87
PCB-117
PCB-116/85
PCB-110
PCB-115
PCB-82
PCB-111
PCB-120
PCB-107/124
PCB-109
PCB-123
PCB-106

**ES PCB-126**
PCB-126

**ES PCB-155**
PCB-155
PCB-152
PCB-150
PCB-136
PCB-145

**ES PCB-153**
PCB-148
PCB-151/135
PCB-154
PCB-144
PCB-147/149
PCB-134
PCB-143
PCB-139/140
PCB-131
PCB-142
PCB-132
PCB-133
PCB-165
PCB-146
PCB-161
PCB-153/168
PCB-141
PCB-130
PCB-137
PCB-164
PCB-163/138/129
PCB-160
PCB-158

**ES PCB-156/157**
PCB-156/157

**ES PCB-167**
PCB-120/100
PCB-159
PCB-162
PCB-167

**ES PCB-169**
PCB-169

**ES PCB-188**
PCB-188
PCB-179
PCB-184
PCB-176
PCB-186
PCB-178

**ES PCB-180**
PCB-175
PCB-187
PCB-182
PCB-183
PCB-185
PCB-174
PCB-177
PCB-181
PCB-171/173
PCB-172
PCB-192
PCB-180/193
PCB-191

**ES PCB-170**
PCB-170
PCB-190

**ES PCB-189**
PCB-189

**ES PCB-202**
PCB-202
PCB-201
PCB-204
PCB-197
PCB-200
PCB-198/199
PCB-196
PCB-203

**ES PCB-205**
PCB-195
PCB-194
PCB-205

**ES PCB-206**
PCB-206

**ES PCB-208**
PCB-208
PCB-207

**E**
PCB-20

*Note: Quantitation Reference for those congeners without a Labeled Standard is based on the nearest ES @ the same level of chlorination within the same function.*
*Quantitation of those congeners within a function where there is no ES is based on the nearest ES in the other functions of that homologue.*
** Based on analytical observations PCB's 50/53, 45,51& 46 were moved to ES 81 when the additional ES's were added.*

LDC #: 26203B31

# VALIDATION FINDINGS WORKSHEET
## Target Compound Identification


Reviewer: R
2nd Reviewer: A

**METHOD:** HRGC/HRMS Polychlorinated Biphenyls (EPA Method 1668B)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was the Ion Abundance Ratio for the two quantitation ions within criteria?
Y N N/A Was the signal to noise ratio for each target compound and labeled standard ≥ 2.5?
Y N N/A Does the maximum intensity of each specified characteristic ion coincide within ± 2 seconds (includes labeled standards)?

| # | Date | Sample ID | Finding | Associated Samples | Qualifications |
|---|---|---|---|---|---|
| | | 1 | PCB-4, 8 | The laboratory indicated that congeners were quantitated using single ion mode. The area for the secondary ion (m/z 223.9974) was not integrated due to significant interference from PFK.. | J dets/P (+ Total Di-CBs) |
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Notes:

LDC #: 26203B31

# VALIDATION FINDINGS WORKSHEET
## Initial Calibration Calculation Verification


Reviewer: [illegible]
2nd Reviewer: [illegible]

**METHOD:** HRGC/HRMS PCB Congeners (EPA Method 1668B)

The Relative Response Factor (RRF), average RRF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

RRF = $(A_x)(C_{is})/(A_{is})(C_x)$ — $A_x$ = Area of compound, $A_{is}$ = Area of associated internal standard
average RRF = sum of the RRFs/number of standards — $C_x$ = Concentration of compound, $C_{is}$ = Concentration of internal standard
%RSD = 100 * (S/X) — S = Standard deviation of the RRFs, X = Mean of the RRFs

| # | Standard ID | Calibration Date | Compound (Reference Internal Standard) | Reported Average RRF (initial) | Recalculated Average RRF (initial) | Reported RRF (CS3 std) | Recalculated RRF (CS3 std) | Reported %RSD | Recalculated %RSD |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 10AL | 3/4/11 | PCB 77 ($^{13}$C-PCB 77) | 1.15 | 1.15 | 1.16 | 1.16 | 3.9 | 4.0 |
| | | | PCB 105 ($^{13}$C-PCB 105) | 0.90 | 0.90 | 0.91 | 0.91 | 0.9 | 1.1 |
| | | | PCB 167 ($^{13}$C-PCB 167) | 1.04 | 1.04 | 1.03 | 1.03 | 1.3 | 1.2 |
| | | | PCB 189 ($^{13}$C-PCB 189) | 1.18 | 1.18 | 1.17 | 1.17 | 1.1 | 1.2 |
| 2 | | | PCB 77 ($^{13}$C-PCB 77) | | | | | | |
| | | | PCB 105 ($^{13}$C-PCB 105) | | | | | | |
| | | | PCB 167 ($^{13}$C-PCB 167) | | | | | | |
| | | | PCB 189 ($^{13}$C-PCB 189) | | | | | | |
| 3 | | | PCB 77 ($^{13}$C-PCB 77) | | | | | | |
| | | | PCB 105 ($^{13}$C-PCB 105) | | | | | | |
| | | | PCB 167 ($^{13}$C-PCB 167) | | | | | | |
| | | | PCB 189 ($^{13}$C-PCB 189) | | | | | | |

Comments: Refer to Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 76203B31

# VALIDATION FINDINGS WORKSHEET
## Routine Calibration Results Verification

Page: 1 of 1
Reviewer: R
2nd Reviewer: A

**METHOD:** HRGC/HRMS PCB Congeners (EPA Method 1668B)

The percent difference (%D) of the initial calibration average Relative Response Factors (RRFs) and the continuing calibration RRFs were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. RRF - RRF)/ave. RRF
RRF = $(A_x)(C_{is})/(A_{is})(C_x)$

Where: ave. RRF = initial calibration average RRF
RRF = continuing calibration RRF
$A_x$ = Area of compound, $A_{is}$ = Area of associated internal standard
$C_x$ = Concentration of compound, $C_{is}$ = Concentration of internal standard

| # | Standard ID | Calibration Date | Compound (Reference Internal Standard) | Average RRF (initial) | Reported RRF (CC) | Recalculated RRF (CC) | Reported %D | Recalculated %D |
|---|---|---|---|---|---|---|---|---|
| 1 | 110801V02 | 8/1/11 | PCB 77 ($^{13}$C-PCB 77) | 1.15 | 1.05 | 1.05 | 8.9 | 9.1 |
| | | | PCB 105 ($^{13}$C-PCB 105) | 0.90 | 0.83 | 0.83 | 8.2 | 7.7 |
| | | | PCB 167 ($^{13}$C-PCB 167) | 1.04 | 0.95 | 0.95 | 8.1 | 8.4 |
| | | | PCB 189 ($^{13}$C-PCB 189) | 1.18 | 1.17 | 1.17 | 0.2 | 0.4 |
| 2 | | | PCB 77 ($^{13}$C-PCB 77) | | | | | |
| | | | PCB 105 ($^{13}$C-PCB 105) | | | | | |
| | | | PCB 167 ($^{13}$C-PCB 167) | | | | | |
| | | | PCB 189 ($^{13}$C-PCB 189) | | | | | |
| 3 | | | PCB 77 ($^{13}$C-PCB 77) | | | | | |
| | | | PCB 105 ($^{13}$C-PCB 105) | | | | | |
| | | | PCB 167 ($^{13}$C-PCB 167) | | | | | |
| | | | PCB 189 ($^{13}$C-PCB 189) | | | | | |
| 4 | | | PCB 77 ($^{13}$C-PCB 77) | | | | | |
| | | | PCB 105 ($^{13}$C-PCB 105) | | | | | |
| | | | PCB 167 ($^{13}$C-PCB 167) | | | | | |
| | | | PCB 189 ($^{13}$C-PCB 189) | | | | | |

Comments: Refer to Routine Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the

LDC #: 26203B3/
~~SDG #:~~ —

# VALIDATION FINDINGS WORKSHEET
## Sample Calculation Verification

Page: 1 of 1
Reviewer: [illegible]
2nd reviewer: [illegible]

**METHOD:** HRGC/HRMS PCB Congeners (EPA Method 1668B)

Y N N/A Were all reported results recalculated and verified for all level IV samples?
Y N N/A Were all recalculated results for detected target compounds agree within 10.0% of the reported results?

Concentration = $\frac{(A_x)(I_s)(DF)}{(A_{is})(RRF)(V_o)(\%S)}$

| | | |
|---|---|---|
| $A_x$ | = | Area of the characteristic ion (EICP) for the compound to be measured |
| $A_{is}$ | = | Area of the characteristic ion (EICP) for the specific internal standard |
| $I_s$ | = | Amount of internal standard added in nanograms (ng) |
| $V_o$ | = | Volume or weight of sample extract in milliliters (ml) or grams (g). |
| RRF | = | Relative Response Factor (average) from the initial calibration |
| Df | = | Dilution Factor. |
| %S | = | Percent solids, applicable to soil and solid matrices only. |

Example:

Sample I.D. 1, PCB-105:

Conc. = $\frac{(5.44e4)(2000)(1)}{(4.61e7)(0.83)(1.225)(\ )}$

= 2.30 pg/L

| # | Sample ID | Compound | Reported Concentration ( ) | Calculated Concentration ( ) | Qualification |
|---|---|---|---|---|---|
| | | | | | |
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PACKAGE COMPLETENESS AND DELIVERABLES

CASE/SDGNUMBER: A3380 SITE: Lower Passaic River
LAB: Analytical Perspectives

CHECKLIST

1.0 Data Completeness and Deliverables

1.1 Does the Traffic Report or Field Chain of Custody list all samples? [✓] ___ ___

1.2 Is the Case Narrative, extraction logs, % solid worksheet, analysis logs present? [✓] ___ ___

1.3 Are the Case Number and SDG numbers contained in the case narrative? [✓] ___ ___

1.4 Do the Traffic Reports or Lab Case Narrative indicate problems with sample receipt, sample condition, analytical problems, or other comments affecting the quality of the data? ___ [✓] ___

ACTION: Use professional judgement to evaluate the effect of the noted problems on the quality of the data.

ACTION: As per Field Chain of Custody/Region II requirements, if any sample analyzed as a soil, contains 50% to 90% water, all data shall be flagged as estimated "J". If a soil sample contains more than 90% water, then qualify positive hits "J", and non detects "R".

NOTE: Samplers are required to maintain all types of environmental samples in the dark at < 4 ° C from the time of collection until receipt at the laboratory.

2.0 Reporting Requirements and Deliverables

2.1 All deliverables must be clearly labeled with the Case number and the associated sample/traffic number. Missing or illegible or incorrectly labeled items must be identified. The Project Officer must immediately be contacted and requested to ask laboratory to submit the missing or incorrect items.

2.2 The following forms were taken from the CLP SOW, CBC01.0 and should be specified in the Project Plan. A comparison of CLP forms must be made against the Laboratory's version. Some information may not be found on the exact form as the CLP version but may be located on another form. As long as the information is present and accessible, it is not a problem. Are these forms (CLP or lab's version) present?

a. Toxic CB Congener Sample Data Summary (Form I CB-1) [✓] ___ ___

b. Toxic CB Congener Toxicity Equivalency (Form I CB-2) [✓] ___ ___

c. CB Congener Sample Data Summary (Form I CB-3) [✓] ___ ___

Note: Form I is used for tabulating and reporting sample analysis, including dilutions, reanalysis, blank, LCS/Ongoing Precision and Recovery (OPR) and requested matrix spike and matrix spike duplicated for target compounds.

d. CB Congener Total Homologue Concentration Summary (Form II CB) [✓] ___ ___

Note: Form II is used to report the concentration of the mono- through nano-chloro

biphenyl homologue for each sample.

e. CB Congener Method Blank Summary (Form IV CB-1) [✓] ___ ___

Note: Form IV summarizes the samples associated with each method blank analysis.

f. CB Congener Descriptor Switching Resolution Summary (Form V CB-1) [ ] ___ ✓

Note: Form V CB-1 is used to report the descriptor switching windows for each level of chlorination for each 12-hour time period and to summarize the date and time of analysis, including dilutions, reanalysis, standards, blanks, and requested MS/MSD associated with each analysis of the instrument performance check solution.

g. CB Congener Ion Abundance Ratio Summary (Form V CB-2) [✓] ___ ___
h. CB Congener (Labeled) Ion Abundance Ion Ratio Summary (Form V CB-3) [✓] ___ ___

Note: Form V CB-2 & CB-3 are used to report the ion abundance ratios and signal-to-noise (S/N) ratios for the congeners contained in the LOC/WDM for each 12-hour time period.

i. Toxic CB Congener Initial Calibration Response Factor Summary (Form VI CB-1, CB-2) [✓] ___ ___

j. Individual Congener Initial Calibration Response Factor Summary (Form VI CB-3) [✓] ___ ___

Note: Form VI is used to report the relative response factors (RRF), average RRF, % RSD and RRT for the five or six-point initial calibration at the specific concentration levels.

k. Toxic CB Congener Continuing Calibration Summary (Form VII CB-1) [✓] ___ ___

l. Toxic CB Congener (Labeled) Continuing Calibration Summary (Form VII CB-2) [✓] ___ ___

m. Individual Congener Continuing Calibration Summary (Form VII CB-3) [✓] ___ ___

n. Toxic CB Congener Continuing Calibration Time Summary (Form VII CB-4) [ ] ___ ✓

o. Toxic CB Congener (Labeled) Continuing Calibration Summary (Form VII CB-5) [ ] ___ ✓

p. Individual Congener Continuing Calibration Summary (Form VII CB-6) [ ] ___ ✓

Note: Form VII is used to report the calibration verification of the HRGC/HRMS system by the analysis of specific calibration verification standard(s). The form is required for each 12-hour time period.

k. CB Congener Analytical Sequence (Form VIII CB) [✓] ___ ___
Note: Form VIII is used to report the analytical sequence for CB congener analyses.

ACTION: If forms are missing, contact the Project Officer to confirm which forms if any were specified in the Project Plan. If the forms are required, inform the Project Officer or obtain written permission to contact the lab for explanation/resubmittal. If the lab cannot provide missing deliverables, assess the effect on the validity of the data. Note in the Data Assessment.

Note: The above forms might be different or the laboratory might combine several forms into a single one. For example, the Target Analyte, Concentration and Q (qualifier) columns in the "CB Congener Sample Data Summary" form might include columns for IUPAC NO., Co-elution, Reporting Limits, Ion Abundance Ratio and Relative Retention Time (RRT).

2.3 GC/MS Displays
Are the following GC/MS displays present?

a. Standard and sample SICP/SIM chromatograms must list date and time of analysis; the file name; sample number; and instrument I.D. number [✓] ___ ___

b. Percent peak resolution valley [ ] ___ [✓]

c. Window Defining Mixture raw data [✓] ___ ___

d. SICP/SIM mass chromatograms must display ions used for quantitation, ion abundance ratio, absolute retention time/scan number, signal noise ratio [✓] ___ ___

e. Integrated area of the two ions must be listed for all peaks with signal noise ratio of 2.5 or greater (>10 for calibration and internal standards). [✓] ___ ___

ACTION: If deliverables are missing, contact the Project Officer to request explanation/ resubmittal or obtain written permission to contact the lab for explanation/resubmittal. If the lab cannot provide missing deliverables, assess the effect on the validity of the data. Note in the Data Assessment.

2.4 Are the following Chain of Custody Records and in-house Laboratory Control Documents present?

a. Chain of Custody Records/Traffic Report [✓] ___ ___

b. Sample Shipment Records [✓] ___ ___

c. Sample log-in sheets [✓] ___ ___

d. GC/MS Standard and Sample Run Log in chronological order [✓] ___ ___

e. Sample Extraction Log [✓] ___ ___

ACTION: If deliverables are missing, contact the Project Officer to request explanation/resubmittals or obtain written permission to contact the lab for explanation/resubmittal. If the lab cannot provide missing deliverables, assess the effect on the validity of the data. Note in the Data Assessment.

2.5 Was the sample data package paginated and one sided? [✓] ___ ___

ACTION: If no, document difficulties of reviewing data caused by lack of pagination in Data Assessment Report.

## 3.0 Holding Times

3.1 There are no demonstrated maximum holding times associated with CBs in aqueous, solid, semi-solid, tissues and other matrices. Aqueous samples must be preserved (pH 2-3) and stored up to one year in the dark at 0-4° C. Solid, semi-solids, multi-phase, and tissue samples must be stored in the dark at <-10° C.

## 4.0 Instrument Performance

### 4.1 Mass Spectrometer (MS) Resolution

Perfluorokerosene (PFK) tuning must be performed prior to analyzing calibration solutions, blanks, samples, and QC samples. A static resolving power of at least 10,000 (10% valley definition) must be demonstrated at appropriate masses before any analysis is performed. Static resolving power checks must be performed at the beginning and at the end of each 12 hour period of operation. A minimum required resolving power of 10000

should be obtained for PFK ion at mass 330.9792 or any significant PFK fragment in the range of 300-350.

A manual estimate of the resolving power can be done using the resolution check printout/calibration reports that contain the peak profiles of masses 300 to 350. At mass 330.9792, the first horizontal guideline above the baseline is the 5% line (some MS data system might not show this line). The ppm measurement of the window is usually given at 200 ppm, thus every vertical guideline represents 50 ppm. If the PFK peak is within 100 ppm at 5% height, resolution is equal or greater than 10,000.

NOTE: Because of the extensive mass range covered in each function (native, group and labeled congeners) it may not be possible to maintain 10,000 resolution throughout the mass range during the function. Therefore, resolution must be ≥ 8,000 throughout the mass range and must be ≥ 10,000 in the center of the mass range for each function.

4.1.1 Estimating resolving power (RP) from the resolution check printout containing the peak profiles of masses 300-350

A. Search the data package for the mass 330.9792 PFK peak ion (usually present before the calibration raw data).
A. Locate the 5% line which is the first horizontal gridline above the baseline.
C. At the top left hand corner of the profile, the ppm measurement of the window can be found (usually 200 ppm). Each vertical gridline represents 50 ppm.
D. If the PFK peak is within 100 ppm at 5% height, the resolution is greater than 10,000.

4.2 Gas Chromatographic (GC) Column Resolution

For the SPB-octyl column, the retention times (RT) for decachlororbiphenyl (PCB 209) in the Labeled/LOC/Window Defining Standard must be greater than 55 minutes and uniquely resolve congeners 34 from 23 and 187 from 182. Congeners 156 and 157 must co-elute within 2 seconds at the peak maximum.

4.2.1 The uniquely resolved congeners must resolve with a valley height less than 40% of the shortest of the two peaks.

Was this criterion met? [✓] ___ ___

Note: The criteria for chromatographic resolution must be met for all standards. The data validator should use professional judgment to determine severity of the problem and its effect on the final results.

ACTION: If the percent valley criteria are not met for the uniquely resolved congeners, qualify positive reported values "J" (estimate) or reject "R" all data collected during the 12-hour time window. Document in Data Assessment Report under contract non-compliance.

4.2.2 Were all peaks labeled and identified on the Selected Ion Current Profiles (SICPs)? [✓] ___ ___

4.2.3 Is the absolute retention time of CB congener 209 greater than 55.0 minutes with the SPB-octyl capillary GC column? [ ] ___ ✓

ACTION: If no, use professional judgment to assess the effect on the validity of the data. Make a note in the Data Assessment Report under contract non-compliance..

4.2.4 The relative retention times (RRT) of the native CBs and labeled congeners in the calibration verification standard (VER CS-3) must be within their respective RRT limits listed in Table 2/Method 1668A/CB01.0.

Was this criterion met? [ ] ___ ✓

ACTION: If no, use professional judgment to assess the effect on the validity of the data. Make a note in the Data Assessment Report under contract non-compliance.

4.3 Window Defining Mixture

4.3.1 The Window Defining Mixture (WDM) standard contains 27 labeled congeners (Table 3/Method 1668A) and is analyzed to establish the beginning retention time (RT) and ending RTs of each level of chlorination (LOC, homologue group).

Note: The WDM are also used to set the descriptor switching time such that congeners that elute from the HRGC during a given RT window will also be those congeners for which the ions are monitored.

Did the laboratory label the WDM congeners in each sample Quant report? [✓] ___ ___

ACTION: If no, contract project officer or the laboratory for missing data.

4.3.2 Frequency of Window Defining Mixture - must be analyzed as follows:

1. After HRMS PFK tune and before any initial calibration.

2. Once at the beginning of each 12-hour period during which standards or samples are analyzed.

3. Whenever adjustments or instrument maintenance activities are performed.

Note: The standard CS1 can be used before any initial calibration and CS3 can be used before any continuing calibration.

ACTION: Were the above criteria met? [✓] ___ ___

4.3.3 The CB congeners must be within QC limits for their respective ion abundance ratio and must have signal-to-noise (S/N) ratios $\geq$ 10.

Was this criteria met? [✓] ___ ___

If no, did the lab perform reanalysis? Use professional judgment to assess the effect on the validity of the data. Make a note in the Data Assessment Report under contract non-compliance.

5.0 Initial Calibration

The Isotope dilution technique is used in the calibration of Toxics/LOC CB Congeners using labeled reference compounds. An Internal Standard calibration is applied to the determination of the native CB Congeners for which a labeled is not available, to the determination of the labeled Toxics/LOC/Window Defining Congeners and Labeled Internal Standards except CB 178.

Was the above calibration performed at the frequency specified above? [✓] ___ ___

5.1 The method allows the Laboratory to perform quantitative analysis by isotope dilution and internal standard.

1. Isotope Dilution: performed for the twenty seven (27) CB Congeners. The relative response (RR) (labeled to native) vs concentration is calculated and the response of each Toxics/LOC CB relative to its labeled analog is determined using the area response of both primary and secondary exact m/z ratios. For labeled compounds, a calibration is performed using the data from five (or six) points in the calibration for the native Toxics/LOC CB Congeners.

2. Calibration by Internal Standard: for the native congeners (other than the native Toxics/LOC

CB Congeners), calibration is performed at a single point using the diluted combined 209-Congener Standard solution.

5.1.1 The following MS/DS conditions must be used:

5.1.1.1 Mass calibration as per Section 4.1? [✓] ___ ___

5.1.1.2 Were SIM data acquired for each of the ions listed in Table 7/Method 1668A including interfering ions? [✓] ___ ___

5.2 Were the following criteria met?

5.2.1 The SPB-Octyl column must resolve CB-34 from CB-23, CB-187 from CB-182, and CB-156 and CB-157 must coelute within 2 seconds at the peak maximum. Resolution must have a valley height less than 40 percent of the shorter of the two peaks. [✓] ___ ___

5.2.2 For analysis on a DB-1 (or equivalent) column the chromatographic resolution is evaluated by the analysis of the CS3 continuing calibration standard during both the initial and continuing calibrations. Resolution must have a valley less than 25% for CB-156 and CB-157. [ ] ___ [✓]

5.2.3 The relative ion abundance criteria listed in Table 8 (see analytical method) must be met for all PCB congeners peaks, including the labeled internal standards, clean-up standards, and recovery standards in all solutions. The lower and upper limits of the ion abundance ratios represent a ±15 percent window around the theoretical abundance ratio for each pair of selected ions. [✓] ___ ___

5.2.4 Are the two SIM ions for each homolog within 2 seconds of the corresponding labeled analyte ions? [✓] ___ ___

5.2.5 The relative ion abundance criteria listed in Table 8 (see analytical method) must be met for each PCB congener peak. [✓] ___ ___

5.2.6 For all calibration solutions the signal to noise ratio (S/N) for the GC signal present in every SICP, including the ones for the labeled standards must be ≥ 10. [✓] ___ ___

5.2.7 The percent relative standard deviations (% RSD) for the mean relative response factors (RRF) must be ≤ 20%. [✓] ___ ___

5.2.8 The relative response factor (RRF) for each congener standard must be greater than 0.05. [✓] ___ ___

5.2.9 For all calibration solutions, the retention times (RT) of the congeners must fall with the appropriate RT window established by the window defining mix analysis. In addition, the absolute RT of the of the recovery standards, internal standards and clean-up standards will not change by more than ± 15 seconds between the initial CS3 and the analysis of any other standard. [ ] ___ [✓]

ACTION:

1. If mass calibration criteria as specified in Section 4.1 were not met, make a note in Data Assessment.

2. If the selected monitoring ions specified in Table 7/Method 1668A were not used for data acquisition, the lab must be contacted by the Project Officer for an explanation. If an incorrect ion was used, reject "R" all the associated data.

3. If the 40% percent valley resolution for CBs listed in section 5.2.1 above were not met, quality

positive data "J". Do not qualify non-detects.

4. If the ion abundance ratio for an analyte is outside the limits, flag the results for that analyte "R" (reject).

5. If the ion abundance ratio for an internal or labeled standard falls outside the QC limits flag the associated positive hits with "J". No effect on the non-detects.

6. If the signal to noise ratio (S/N) is below control limits, use professional judgement to determine quality of the data.

7. If the %RSD for each analyte exceeds 20%, flag the associated sample positive results for that specific analyte as estimated ("J"). No effect on the non-detect data.

8. If the DB-1 column was used, did the resolution have a valley of less than 25% for CB-156 and CB-157? If not met, qualify the analytes as estimate ("J"). Do not qualify non-detects.

9. If the RRF < 0.05, flag associate sample positive results for that specific congener as estimate "J".

10. Non compliance of any other criteria specified above should be evaluated using professional judgement.

5.2.10 Spot check response factor calculations and ion ratios. Ensure that the correct quantitation ions for the unlabeled CBs and labeled standards were used. In addition, verify that the appropriate labeled standard was used for each analyte.

ACTION: If calculations were not performed correctly, notify the Project Officer to initiate resubmittals from the laboratory.

## 6.0 System and Laboratory Performance (Calibration Verification)

At the beginning of a 12-hour shift during which analyses are performed, the HR/MS system performance tune is verified prior to analyzing the calibration verification standard CS3. If required, the diluted combined 209-congener standard solutions must also be analyzed at the beginning of the 12-hour period. but after the CS3. The CS3 standard must analyzed at the end of the 12-hour. This closing CS3 standard may also be used as the beginning of the next 12-hour period.

Only if the laboratory meets all performance criteria may samples, blanks, and recovery standards be analyzed.

### 6.1 Calibration Verification

6.1.1 Were the relative ion abundance ratio for each congener in the CS3 standard within their respective criteria? [✓] ___ ___

6.1.2 Were the peaks representing each unlabeled and labeled compound in the verification standard present with signal to noise ratio (S/N) greater or equal to 10? [✓] ___ ___

6.1.3 For each congener, were the per cent recovery within the limit (Table 6/method 1668A)? (Native Toxics/LOC: ~~70-130%~~; Labeled Toxics/LOC/Window-Defining: 50-150% and 60-130% for the cleanup standards) [ ] ✓ ___

80-120%

6.1.4 Were the relative retention time (RRT) of the congeners within the limits defined in Table 2/Method 1668A? Note: RRT should be listed in each sample quant report. [ ] ___ ✓

ACTION: If no to section 6.1.1 - 6.1.4, qualify affected congener with "J" qualifier.

### 6.2 Instrument Sensitivity Test

6.2.1 Project technical specifications may require the laboratory to perform a GC/MS sensitivity test using the CS-0.2 standard. The following guidance is offered:

6.2.2 The test must be demonstrated every 12 hours by analysis of a CS-0.2 standard which must pass the following criteria

6.2.2.1 The absolute RT for the ending recovery standards $^{13}C_{12}$-$CL_4$-CB-52, $^{13}C_{12}$-$CL_5$-CB-101, $^{13}C_{12}$-Cl-CB-138, and $^{13}C_{12}$-$CL_7$-CB-178 must be within 10 seconds of the initial CS3.

6.2.2.2 The signal/noise ratio for the CS-0.2 standard must be at least 10:1 (or 3:1 for di- and nona-PCBs for unlabeled compounds and labeled internal and recovery standards.

6.2.2.3 Ion abundance ratio must be met.

ACTION:

1. If the ion abundance ratio for an analyte is outside the limits, flag the results for that analyte "R" (reject).
2. If the signal noise ratio (S/N) is below control limits, use professional judgement to determine the quality of the data.
3. The RT of the recovery standards from CS3 to the CS-0.2 will indicate the stability of the column during the 12 hours. If these criteria were not met, the estimate all reported values (J) and (UJ) non-detects associated with RT shifts greater than ± 10 seconds.

6.3 Spot check response factor calculations and ion ratios. Ensure that the correct quantitation ions for the unlabeled CBs and labeled standards were used. In addition, verify the appropriate labeled standard was used for each analyte.

## 7.0 Sample Analysis and Identification

NOTE: Any qualifications such as "J" applied to target compounds should be also applied to their associated total congeners concentration column.

7.1 A CB congener or labeled compound is identified in environment samples, blanks, or QC samples when all of the following qualitative criteria are met.

7.1.1 The signals for the two exact m/z ratios in Table 7/Method 1668A must be present and must maximize within the same two scans (area count for the m/z should be present in the Quant report) [ ] [✓] [ ]

7.1.2 The signal-to-noise (S/N) ratio for each ion peak at each exact m/z must be ≥2.5 for each congener detected in a sample extract and ≥10 for all congener in the calibration standards (Note: The SN ratio should be available in each sample Quant report) [ ] [✓] [ ]

7.1.3 The relative ion abundance criteria for all CB Congener detected as well as labeled compounds, cleanup and internal standards must be within the limits of Table 8 or within ±15% of the ratio in the midpoint calibration (CS-3) standard or calibration verification (VER), whichever is most recent. [ ] [✓] [ ]

7.1.4 The relative retention time (RRT) for each detected peak must be within the RRT QC limits specified in Table 2 of the method (Note: The RRT values should be present in each sample Quant report). [✓] [ ] [ ]

Note: For native congeners determined by Internal Standard Quantitation, a given congener may fall within more than one RT and mis-identified unless the RRT window are made very narrow, as in Table 2. Therefore, consistency of the RT and RRT with other congeners and the labeled compounds may be required for rigorous congener identification. The RT and RRT values should be available in each sample Quant report.

ACTION: If the identification criteria (section 7.1.1 - 7.1.4) were not met, check sample Quant report to verify the congener is listed as "non-detect".

7.2 Quantitative Determination

7.2.1 Isotope Dilution Quantitation

7.2.1.1 Were the Labeled Toxics/Level of Chlorination (LOC)/Window-Defining Congeners (WDC) and Cleanup standards added to every sample? [✓] ___ ___

ACTION: If no, contact project officer to contact the laboratory. Note problem in data assessment.

Note: Corrections for recovery of CB can be made because the native compound and its Labeled analog exhibit similar effects upon extraction, concentration and Gas Chromatography. Relative response (RR) are used in conjunction with the calibration data to determine the concentrations in the final extract providing the labeled compounds spiking levels are constant.

7.2.1.2 The percent recovery for the Labeled Toxics/LOC/Window Defining Congeners for each sample is ~~25-150%, except 15-150% for $^{13}C_{12}$-2-MoCB and $^{13}C_{12}$-4-MoCB~~. 30-140% 30 -135% for Cleanup Standards. Was this criteria met? [✓] ___ ___

ACTION: If no, qualify affected native congener with "J". Make a note in the data assessment.

7.2.1.3 The integrated ion current for the labeled compounds, internal standards, and cleanup standards have a signal noise ratio at least 10 times background noise. [✓] ___ ___
ACTION: If not, verify that the sample in question was reanalyzed. If s/n ratio is less than 10, qualify affected native congener with "J".

7.2.1.4 Did the laboratory provide a "sample calculation" for one of the reported value? [✓] ___ ___

ACTION: Check one value and if not in agreement with the reported value, have Project Officer contact laboratory for a sample calculation.

$$C_{ex}\ (ng/ml) = \frac{(A1_n + A2_n)Cl}{(A1_l + A2_l)RR} \qquad RR = \frac{(A1_n + A2_n)C_l}{(A1_l + A2_l)C_n}$$

$C_{ex}$ = Concentration of congener in the extract.
$A1_n$ and $A2_n$ = The areas of the primary and secondary m/z's for the congener.
$C_l$ = Concentration of the labeled compound in the calibration standard.
$C_n$ =Concentration of the native compound in the calibration standard.
RR = Relative Response

7.2.2 Internal Standard Quantitation and Labeled Compound Recovery

7.2.2.1 The concentration in the extract of the native compounds other than those in the Native Toxics/Labeled /LOC standard, in the Labeled cleanup standard and in the Labeled injection internal standard (except the Labeled CB 178) using the response factors determined from the calibration data and the following equations:

$$C_{ex}\ (ng/ml) = \frac{(A1_s + A2_s)C_{is}}{(A1_{is} + A2_{is})RF} \qquad RF = \frac{(A1_s + A2_s)C_{is}}{(A1_{is} + A2_{is})C_s}$$

$C_{ex}$ = Concentration of labeled compound in the extract.
$A1_s$ and $A2_s$ = Areas of the primary and secondary m/z's for the congener.
$A1_{is}$ and $A2_{is}$ = Areas of the primary and secondary m/z's for the internal standard
$C_{is}$ = Concentration of the internal standard.
$C_s$ = Concentration of the compound in the calibration standard.
RF = Response Factor

Note: The internal standard and associated CB congeners can be found in Table 2 of the method.

7.2.2.2 The percent recovery of the Labeled Toxics/LOC/Window-defining CBs and the Labeled cleanup standard CBs are computed using the concentration in the extract determined above and the following equation:

$$\text{Recovery (\%)} = \frac{\text{Concentration found (ng/ml)}}{\text{Concentration spiked (ng/ml)}} \times 100$$

7.2.2.3 The concentration of the native CB in the solid phase is computed using the following equation:

$$\text{Concentration in the solid (ng/kg)} = \frac{(C_{ex} \times V_{ex})}{W_s}$$

$C_{ex}$ = Concentration of the compound in the extract.
$V_{ex}$ = The extract volume in ml.
$W_s$ = The sample dry weight in kg.

7.2.2.4 The concentration of the native CB in the aqueous phase is computed using the following equation:

$$\text{Concentration in the aqueous phase (pg/L)} = 1000 \times \frac{(C_{ex} \times V_{ex})}{V_s}$$

$C_{ex}$ = Concentration of the compound in the extract.
$V_{ex}$ = The extract volume in ml.
$V_s$ = The sample volume in liters.

7.2.2.5 The analyte concentration must be within the calibration range. If not, dilution should have been made to bring the concentration within the calibration range. Was this criterion met? [✓] ___ ___

NOTE: When the sample extract is diluted by the factor necessary to bring the concentration within the calibration range, the analyst should adjust the concentration of the Labeled injection internal standard to 100 pg/uL in the extract and analyze an aliquot of the diluted extract.

7.3 Clean-up procedures

Clean-up may not be necessary for relatively clean samples (drinking waters, ground waters etc). If the matrix required clean-up, the laboratory has 6 different procedures to choose from (Section 7.5/Method 1668A). Before using any clean-up procedure, the laboratory must demonstrate that the Initial Precision and Recovery (IPR) requirements of the

method can be met using the clean-up procedure.

Labeled clean-up standards $^{13}C_{12}$-2,4,4-TriCB (CB-28), $^{13}C_{12}$-2,3 3,5,5'-PeCB (CB-111), $^{13}C_{12}$-2,2',3,3'5,5',6-HPCB (CB-178) are added to the sample just before the back extraction with base and acid procedure. This occurs before any recommended clean-up procedures are initiated.

7.3.1 Was the percent recovery of the clean-up standards within the recommended range 30-135%? [✓] ___ ___

ACTION: If no, and the recovery is less than 30%, qualify all data as estimated "J". If recovery is 0 %, qualify all positive data as estimated "J" and reject "R" all non-detects for that sample.
If recovery is > 135, qualify positive results as estimated, "J".

7.3.2 Check the chromatograms that clean-up procedure was needed for each sample. Were any clean-up procedures needed for either water or soil samples? ___ [✓] ___

ACTION: If yes, check extraction log to verify which clean-up procedures if any were performed. The laboratory is not limited to only one procedure.

1. If no clean-up was performed and the chromatograms indicated that some should have been performed. Use professional judgement to assess the effect on the interference on the validity of the data. Document lack of required clean-up for complex samples in Data Assessment.

2. If one type of clean-up was performed, but the chromatograms indicate that additional clean-up should have been utilized. Use professional judgement to assess the effect on the interference on the validity of the data. Document lack of additional clean-up for complex samples in the Data Assessment.

7.3.3 If clean-up procedures were used, did the Laboratory perform clean-up procedures on the Initial Precision and Recovery samples as required by the method? [ ] ___ [✓]

ACTION: If no, use professional judgement to assess the effect of the interference on the validity of the data. Document lack of IPR documentation for clean-up procedures in the Data Assessment.

## 8.0 Estimated Detection Limits (EMDL)

8.1 Was an EDL calculated using the formula in section 8.2 for CB congeners reported as non-detect? [✓] ___ ___

ACTION: 1. If EDL of an analyte which was not reported as a positive hit is missing, correct manually or contact the Project Officer to request from the laboratory corrections.

8.2 Use the equation below to check EDL calculations:

ALL MATRICES OTHER THAN WATER

$$EDL\ (pg/g) = \frac{2.5 \times Qis \times (Hx^1 + Hx^2) \times D}{(W) \times (His^1 + His^2) \times RR}$$

WATER

$$EDL\ (pg/L) = \frac{2.5 \times Qis \times (Hx^1 + Hx^2) \times D}{(V) \times (His^1 + His^2) \times RR}$$

Where:

$Hx^1$ and $Hx^2$ = peak heights of the noise for both quantitation ions of the non-detect isomer of interest.

$His^1$ and $His^2$ = peak heights of both the quantitation ions of the appropriate internal standards.

D = dilution factor

Qis = quantity (ng) of the appropriate internal standard added to the sample prior to extraction.

RR = Relative response factor from the initial calibration.

V = Volume of sample extracted in liters.

W = Sample dry weight.

NOTE: The validator should check the EDL data to verify that peak heights and not areas were used for this calculation. If the area algorithm was used, the validator should contact the Project Officer to request recalculations from the laboratory.

ACTION: If the spot check calculations yielded EDLs ≤ 15% difference from those reported in Form I, correct manually. If the difference between the validator's value and the Form I's values are > 15% contact the Project Officer to request from the laboratory for an explanation and a copy of the laboratory's calculations.

## 9.0 Method Blanks

9.1 Has a method blank per matrix been extracted and analyzed with each batch of 20 samples? [✓] ___ ___

9.2 If samples of some matrix were analyzed in different events (i.e. different shifts or days) has one blank for each matrix been extracted and analyzed for each event? [ ] ___ [✓]

9.3 Were the method blanks treated as a sample, i.e. spiked with Labeled Toxics/LOC/Window Defining Mixture, Labeled Internal and Labeled Cleanup standards? [✓] ___ ___

Note: 1 Liter of reagent water is used for aqueous samples, 10 gram sand for soil/sediment samples and 1.0 gram of corn oil for tissue samples.

9.4 Were any CB present in the method blank at a concentration less than the estimate minimum level (EML) of Table 2/Method 1668A or one-third the regulatory compliance limits? [✓] ___ ___

Note: The EML in Table 2 of the method are based on common contamination levels. A laboratory may establish an minimum level (ML) for a CB lower than the EMLs in Table 2. MLs may be established as low as the lowest calibration point. Check project plan regarding compliance limits.

ACTION: 1. If the proper number of method blanks were not analyzed, document in Data Assessment. If the validator feels that the validity of the data is seriously compromised and validation of data without the method blanks would be flawed, then notify the Project Officer. If decision is made to proceed with the validation process, consider the following actions: no action taken on non-detected analytes. If an analyte has a reported concentration that is > 5 times the EML, qualify "J" and all concentrations ≤ 5 times the EML are qualified "R" due to possibility of contamination.

2. A. If the congener concentration in the sample is less than five times the concentration in the blank, flag the congener reported value with a "U" qualifier.

B. If the concentration of the congener in the sample is greater than five times the concentration in the blank, no action is needed.

10.0 Labeled Internal and Cleanup Compound Recoveries

10.1 Were the samples spiked with all the labeled compounds as specified in the method? [✓] ___ ___

10.2 Are all labeled compound recoveries within the required limits ? [✓] ___ ___

Note: The percent recovery for the Labeled Toxics/LOC/Window Defining Congeners is ~~25-150%, except 15-150% for $^{13}C_{12}$-2-MoCB and $^{13}C_{12}$-4-MoCB~~ 30-140%. 30-135% for Cleanup Standards.

10.3 If not, were samples reanalyzed? [ ] ___ ✓

ACTION: 1. If the labeled compound recovery was below the lower limit, qualify as estimate with "J" the positive data for the associated compound.

2. No action on non-detects if the labeled compound recovery is above the upper limit.

3. If the labeled compound recovery is 0%, notify project officer. At a minimum, qualify positive value as estimate "J" and reject non-detects with "R" qualifier.

Note 1: If a labeled compound recovery is low, and the cleanup standards are not, the recovery problem may be associated with the extraction procedure or related to a particular difficult matrix. In this case, reanalysis may only serve to confirm a "matrix effect".

Note 2: Low recoveries of the labeled compounds and Cleanup standards suggest that losses may be due to the performance of the clean up steps. Re-extraction and reanalysis of the sample may yield better results.

Recalculate the percent recovery for each labeled standard in the sample extract, $Rec_i$, using the formula:

$$\% Rec_i = \frac{(A_{i1} + A_{i2}) \times Q_{is} \times 100}{(A_{is1} + A_{is2}) \times RF \times Q_i}$$

$A_{i1} + A_{i2}$ = integrated areas of the two quantitation ions of the appropriate labeled compound.

$A_{is1} + A_{is2}$= integrated areas of the two quantitation ions of the appropriate internal standard.

$Q_i$ = quantity of the appropriate labeled compound

$Q_{is}$ = quantity of the appropriate internal standard injected

RF = Response factor of the labeled compounds as determined by the five-point calibration.

11.0 Determination of CBs on a DB-1 Column

11.1 The DB-1 column is optional and is capable of uniquely resolving the congener 156 and 157 that are not resolved on the SPB-octyl column and for resolution of other CB congeners. Was the laboratory required to analyze sample extracts on the DB-1 column? [ ] ✓ ___

Note: The two-column system is capable of resolving a total of approximately 180 CB congeners.

ACTION: If yes, were the WDM, and Cleanup standards added to all samples, standards, blanks, etc? If no, check PO or project plan regarding modifications. [ ] ___ ✓

Note: Window-defining congeners - the beginning and ending congeners at each level of

chlorination are the same as for the SPB-octyl column.

12.0 Sample Reanalysis

12.1 The Project Officer will evaluate the need for reanalyzing the samples with qualified data based on site-specific Data Quality Objectives.

12.2 Due to a variety of situations (see below) that may occur during sample analysis, the laboratory is required to reanalyze or re-extract and reanalyze certain samples. If a reanalysis was required but was not performed, contact the Project Officer to initiate reanalysis. List in data assessment all re-extractions and reanalyses and identify the sample data summaries which must be used by the data user (when more than one analysis is submitted for a sample).

Lab must re-extract and/or re-analyzed samples when the following criteria are not met:

1. WDM must be met before any standard, samples, QC samples and required blank are analyzed.

2. Initial calibration criteria as outline in section 5.2.1, 5.2.3 - 5.2.9 above must be met.

3. Calibration verification standard criteria as outline in section 6.1.1 - 6.1.4 above must be met.

4. A method blank was not extracted and analyzed with each batch of samples/instrument.

ACTION: For criteria 1, 2, 3, or 4 notify the Project Officer to discuss possible re-analysis of sample by the laboratory.

13.0 Precision and Recovery (PAR)/Laboratory Control Sample (LCS)

The laboratory is required to show initial demonstration of capability, to evaluate and document data quality. Laboratory performance is compared to established performance criteria to determine if results of analyses meet the performance characteristics of the method.

The laboratory must perform and submit data to establish the ability to generate acceptable precision and accuracy.

13.1 Did the laboratory analyzed an Initial Precision and Recovery (IPR) standard containing the Native Toxics/LOC congeners, Labeled Toxics/LOC/WDM and Labeled cleanup standards? [✓] ___ ___

ACTION: If no, contact the Project Officer to request resubmittals from the laboratory.

If data is not available, check the project plan or discuss the issue with the Project Officer. If a decision is made to proceed with validation, use professional judgement. All data at a minimum should be qualified as estimated "J". Technically according to the method, data and system performance is unacceptable for all compounds. Analyses should not have continued as per the method. Document under contract non-compliance in Data Assessment.

13.2 Did the IPR standard deviation (s) and average concentration (x) passed criteria as outlined below? [ ] ___ ✓

1. %RSD < 40% and 60-140% recovery for Native Toxics/LOC congeners
2. %RSD < 50% and 35-135% recovery for Labeled Toxics/LOC/WDM (20-135% for $^{13}C_{12}$-2- MoCB and $^{13}C_{12}$-4- MoCB)
3. %RSD < 45% and 45-120% recovery for Labeled cleanup standards

ACTION: If no, qualify effected congeners as estimate "J"

The laboratory must analyzed an Ongoing Precision and Recovery standard (OPR) periodically, at the beginning of 12 hour shift after the analysis of the CS3 calibration verification (CV), and before the analysis of any sample in each set .

13.3 Was the ~~Ongoing Precision and Recovery (OPR)~~ BCS standard analyzed at the required frequency? [✓] ___ ___

13.4 Did the ~~OPR~~ BCS standard passed the ~~concentration criteria limits in outline below~~ QAPP? [ ] [✓] ___

1. 50-150% recovery for Native Toxics/LOC congeners
2. 30-140% recovery for Labeled Toxics/LOC/WDM (15-140% for $^{13}C_{12}$ -2- MoCB and $^{13}C_{12}$ -4- MoCB)
3. 40-125% recovery for Labeled cleanup standards

ACTION: If no, qualify affected congeners as estimate "J". All samples that do not have a passing OPR standard are potentially affected for that analyte.

Note: The laboratory might use laboratory control sample (LCS) for IPR and laboratory control sample duplicate (LCSD) for OPR.

**The following sections may be incorporated in the validation process on a case by case basis depending upon the requirements of the Project Plan. Sometimes a laboratory will provide data for some of the following sections on a routine basis. If not a requirement of the Project Plan, then professional judgement is needed to qualify data based on additional information.**

## 14.0 Toxicity Equivalency Factor (TEF)

NOTE: Certain CB congeners have been shown to cause toxic responses similar to those cause by 2,3,7,8-tetrachloro-dibenzo-p-dioxin (TCDD), the most potent congener. The concept of toxic equivalency factor (TEF; Reference 3) has been developed to facilitate risk assessment and regulatory control of exposure.

The TEF value concentrations are listed in the following Table 1 (Reference 3)

| Target Analyte | TEF Value |
|---|---|
| CB-77 | 0.0001 |
| CB-81 | 0.0001 |
| CB-105 | 0.0001 |
| CB-114 | 0.0005 |
| CB-118 | 0.0001 |
| CB-123 | 0.0001 |
| CB-126 | 0.1 |
| CB-156/147 | 0.0005 |
| CB-167 | 0.00001 |
| CB-169 | 0.01 |
| CB-189 | 0.0001 |

When calculating the 2,3,7,8-TCDD Toxicity Equivalency of a sample for the above CB congeners, only the positive reported values must be included in the calculations. The Toxicity Equivalency (TEQ) concentration is the sum of each concentration of each individual toxic congener value and multiplied by their respective TEF value.

14.1 Did the lab include EDL values in the TEF adjusted concentration calculations? [✓] ___ ___

ACTION: 1. If yes, the toxicity equivalency calculations were not calculated properly, notify the Project Officer to arrange for laboratory resubmittals.

NOTE: Any qualifications such as "J" applied to target compounds should be also applied to their associated total congener concentration.

15.0 Rinsate Blank/Rinse Blank *(Region 2 QA guidelines recommend rinse blanks for all projects)*

15.1 One rinsate blank should be collected for each batch of 20 soil samples or one per day Whichever is more frequent. Were rinsate blanks collected at the above frequency? [✓] ___ ___

15.2 Do any rinsate blanks show the presence of any CB congener at amount above the detection limits (i.e. reported as positive value)? [✓] ___ ___

ACTION: If any qualification is needed due to rinsate blank contamination, follow the guidelines outlined under Method Blanks, section 9, Actions 1 and 2.

16.0 Performance Evaluation Sample (PES)

NOTE: This type of sample may not be available at this time. In many cases, laboratories will substitute matrix spike/matrix spike duplicate (MS/MSD). If PEM(s) were not analyzed but MS/MSD data were submitted, skip this section and go to section 17.

16.1 One or more PES is supplied to the Laboratory. The frequency of this QC sample is one per group of 20 environmental samples or one per samples collected over one week period, whichever occurs first (check project plan).

16.2 Was a PES analyzed at the frequency described above? [ ] ✓ ___

16.3 Were the percent recovery of CB congeners within the 50 to 150 percent control limits? [ ] ___ ✓

ACTION: 1. If any CB congener fall outside the 50-150 percent control limit, flag positive and non-detect data as estimate "J". However, if the recovery is below 20%, qualify all associated non-detects "R" and positive hits as "J". Notify the Project Officer. Reanalysis may be initiated.

17.0 Matrix Spike (MS) Field Samole

Note: Matrix spike is not required by this method although Labs may routinely perform this analysis as part of internal QA/QC and submit this data as part of the package. Verify requirements with Project Officer.

17.1 Was a matrix spike analyzed at the frequency of one per SDG samples per matrix? [ ] ✓ ___

17.2 Were the percent recovery of the spiking congeners within 60 to 140 percent? [ ] ___ ✓

ACTION: If problems such as interferences are observed, use professional judgement to assess the quality of the data. The 60-140% limits of the matrix spike data may be used to flag data of the spiked sample only. *The matrix spike data of the PE blank* sample are more important and must be used primarily in data validation.

17.3 Was a matrix spike duplicate analyzed? [ ] ___ ✓

ACTION: No action required. A matrix spike duplicate is not required. Use professional judgement if there is a large difference in concentrations reported between MS and MSD. Qualifications if any, can only be performed on the sample that was used for this criteria.

18.0 Environmental Duplicate Samples *(recommended in Region 2 for all Projects)*

NOTE: Do not confuse an environmental duplicate with a matrix spike duplicate. An environmental duplicate is a sample that has been divided into 2 parts (extracted and analyzed as two different samples) or as 2 separate samples from the same location sent by the sampling crew. This sample is not spike with any additional compounds other than those compounds required by the method for analysis of all routine samples.

18.1 For every batch of 20 samples or samples collected over a period of one week, whichever is less, there must be a sample designated as duplicate. Were duplicate samples collected at the above frequency? [ ] ✓ ___

18.2 Did results of the duplicate samples agree within ~~25% relative difference~~ 20% RPD for water samples and ~~50%~~ for other type of samples? [ ] ___ ✓

ACTION: The duplicate results can be used in conjunction of other QC data. Use professional judgement.

19.0 REFERENCES

They are important references for technical information and are submitted here as part of this method's documentation.

1. Method 1668, Revision A, "Chlorinated Biphenyl Congeners in Water, Soil, sediment, Biosolids and Tissue by HRGC/HRMS, August 20, 2003.

2. EPA Statement of Work for Chlorinated Biphenyl (CB) Congeners, Multi-Media, Multi-Concentration, CBC01.0, May 2005.

3. Van den Berg, Linda Birnbaum, Albetus T.C., "Environmental Health Perspectives 106:12, 775-792, 1998.

**LABORATORY DATA CONSULTANTS, INC.**
7750 El Camino Real, Suite 2L Carlsbad, CA 92009 Phone: 760/634-0437 Fax: 760/634-0439

Windward Environmental, LLC
200 West Mercer Street, Suite 401
Seattle, WA 98119
ATTN: Ms. Jennifer Parker

September 29, 2011

SUBJECT: Lower Passaic River Restoration Project, Data Validation

Dear Ms. Parker,

Enclosed are the final validation reports for the fractions listed below. These SDGs were received on September 12, 2011. Attachment 1 is a summary of the samples that were reviewed for each analysis.

**LDC Project # 26234:**

| SDG # | Fraction |
|---|---|
| A3406 | Polychlorinated Biphenyls as Congeners<br>Dioxins/Dibenzofurans |

The data validation was performed under EPA Level IV guidelines. The analyses were validated using the following documents, as applicable to each method:

- Final Surface Sediment Chemical Analyses and Benthic Invertebrate Toxicity and Bioaccumulation Testing Quality Assurance Project Plan (QAPP) for the Lower Passaic River Restoration Project, October 2009
- Caged Bivalve Study Addendum, March 2011
- USEPA Region II Validation SOP HW-25, (Revision 3, September 2006) forTetra-through Octochlorinated Dioxins and Furans by Isotope Dilution, modified as necessary to accommodate the QAPP criteria
- USEPA Region II Validation SOP HW-46, (Revision 1, September 2008) for Chlorinated Biphenyls Congeners in Water, Soil, Sediment, and Tissue, modified as necessary to accommodate the QAPP criteria

Please feel free to contact us if you have any questions.

Sincerely,

Stella Cuenco

Stella S. Cuenco
Data Validation Operations Manager/Senior Chemist

L:\Windward\Passaic\26234COV.wpd

Attachment 1

# EDD LDC #26234 (Windward Environmental, LLC - Seattle WA / Lower Passaic River Restoration Project) PO# 2011-0012

| LDC | SDG# | DATE REC'D | (3) DATE DUE | PCB Cong (1668B) | | Dioxin (1613B) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Matrix: Water/Tissue | | | | W | T | W | T | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S |
| A | A3406 | 09/13/11 | 10/04/11 | 0 | 10 | 0 | 10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total | A/SC | | | 0 | 10 | 0 | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 20 |

For Internal Use Only: Shaded cells indicate Level IV validation (all other cells are Level III validation). These sample counts do not include MS/MSD, and DUPs

# Laboratory Data Consultants, Inc.
# Data Validation Report

| | |
|---|---|
| **Project/Site Name:** | Lower Passaic River Restoration Project |
| **Collection Date** | March 8 through June 8, 2011 |
| **LDC Report Date:** | September 30, 2011 |
| **Matrix:** | Tissue |
| **Parameters:** | Polychlorinated Biphenyls as Congeners |
| **Validation Level:** | EPA Level IV |
| **Laboratory:** | Analytical Perspectives |
| **Sample Delivery Group (SDG):** | A3406 |

**Sample Identification**

LPR6-ECST-Comp01
LPRBG-ECST-Comp01
LPR6-ECST-Comp02
LPR7-ECST-Comp03
LPR7-ECST-Comp04
LPR8-ECST-Comp05
LPR1-GDST-Comp01
LPRBG-GDST-Comp01
LPR2-GDST-Comp02
LPR3-GDST-Comp03
LPR6-ECST-Comp02DUP

## Introduction

This data review covers 11 tissue samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 1668B for Polychlorinated Biphenyl as Congeners.

This review follows the Final Surface Sediment Chemical Analyses and Benthic Invertebrate Toxicity and Bioaccumulation Testing Quality Assurance Project Plan (QAPP) for the Lower Passaic River Restoration Project, (October 8, 2009), the Caged Bivalve Study Addendum (March 2, 2011), and USEPA Region II Validation SOP HW-46 (Revision 1, September 2008) for Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue, modified as necessary to accommodate the QAPP criteria.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

NJ Presumptive evidence of presence of the compound at an estimated quantity.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

## I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

## II. HRGC/HRMS Instrument Performance Check

Instrument performance was checked at the required daily frequency.

Retention time windows were established for all congeners. The chromatographic resolution between the congeners PCB-23 and PCB-34 and congeners PCB-182 and PCB-187 was resolved with a valley of less than or equal to 40%.

The static resolving power was at least 10,000 (10% valley definition).

## III. Initial Calibration

A five point initial calibration was performed as required by the method.

Percent relative standard deviations (%RSD) were less than or equal to 20.0% for all compounds.

The ion abundance ratios for all compounds were within validation criteria.

## IV. Routine Calibration (Continuing)

Routine calibration was performed at the required frequencies.

All of the routine calibration percent differences (%D) between the initial calibration RRF and the routine calibration RRF were less than or equal to 20.0% for unlabeled compounds and less than or equal to 50.0% for labeled compounds with the following exceptions:

| Date | Compound | %D | Associated Samples | Affected Compound | Flag | A or P |
|---|---|---|---|---|---|---|
| 8/22/11 (BCS3_8929_PCB_VB) | PCB-37 | 20.2 | All samples in SDG A3406 | PCB-37<br>Total Tri-CBs | J (all detects)<br>UJ (all non-detects)<br>J (all detects)<br>UJ (all non-detects) | P |

The ion abundance ratios for all PCBs were within validation criteria.

## V. Blanks

Method blanks were reviewed for each matrix as applicable. No polychlorinated biphenyls as congeners contaminants were found in the method blanks with the following exceptions:

| Method Blank ID | Extraction Date | Compound | Concentration | Associated Samples |
|---|---|---|---|---|
| MB1_8929 | 8/15/11 | Total Di-CBs | 4.49 pg/L | All samples in SDG A3406 |
| | | Total Tri-CBs | 2.38 pg/L | |
| | | Total Tetra-CBs | 2.24 pg/L | |
| | | Total Penta-CBs | 0.727 pg/L | |
| | | Total Hexa-CBs | 1.2 pg/L | |
| | | Total Hepta-CBs | 0.448 pg/L | |
| | | PCB-11 | 4.49 pg/L | |
| | | PCB-30/18 | 0.577 pg/L | |
| | | PCB-32 | 0.438 pg/L | |
| | | PCB-31 | 0.535 pg/L | |
| | | PCB-28/20 | 0.833 pg/L | |
| | | PCB-52 | 1.04 pg/L | |
| | | PCB-69/49 | 0.492 pg/L | |
| | | PCB-61/70/74/76 | 0.699 pg/L | |
| | | PCB-113/90/101 | 0.727 pg/L | |
| | | PCB-153/168 | 0.53 pg/L | |
| | | PCB-163/138/129 | 0.666 pg/L | |
| | | PCB-180/193 | 0.448 pg/L | |

Sample concentrations were compared to concentrations detected in the method blanks. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated method blanks.

Sample LPR-071811-RB (from SDG A3380) was identified as a rinsate blank. No polychlorinated biphenyls as congeners contaminants were found in this blank with the following exceptions:

| Rinsate Blank ID | Sampling Date | Compound | Concentration | Associated Samples |
|---|---|---|---|---|
| LPR-071811-RB | 7/18/11 | Total Mono-CBs | 13 pg/L | All samples in SDG A3406 |
| | | Total Di-CBs | 31.8 pg/L | |
| | | Total Tri-CBs | 27.4 pg/L | |
| | | Total Tetra-CBs | 22.2 pg/L | |
| | | Total Penta-CBs | 25.7 pg/L | |
| | | Total Hexa-CBs | 13 pg/L | |
| | | Total Hepta-CBs | 5.21 pg/L | |
| | | PCB-1 | 6.01 pg/L | |
| | | PCB-3 | 7.03 pg/L | |
| | | PCB-4 | 7.89 pg/L | |
| | | PCB-8 | 4.53 pg/L | |
| | | PCB-11 | 19.4 pg/L | |
| | | PCB-19 | 3.2 pg/L | |
| | | PCB-30/18 | 3.5 pg/L | |
| | | PCB-17 | 3.3 pg/L | |
| | | PCB-32 | 3.67 pg/L | |
| | | PCB-31 | 3.92 pg/L | |
| | | PCB-28/20 | 7.57 pg/L | |
| | | PCB-21/33 | 1.36 pg/L | |
| | | PCB-39 | 0.89 pg/L | |
| | | PCB-52 | 3.95 pg/L | |
| | | PCB-69/49 | 2.08 pg/L | |
| | | PCB-44/47/65 | 4.29 pg/L | |
| | | PCB-64 | 1.36 pg/L | |
| | | PCB-61/70/74/76 | 6.66 pg/L | |
| | | PCB-66 | 3.89 pg/L | |
| | | PCB-95 | 2.71 pg/L | |
| | | PCB-113/90/101 | 4.26 pg/L | |
| | | PCB-99 | 2.32 pg/L | |
| | | PCB-109/119/86/97/125/87 | 3.59 pg/L | |
| | | PCB-110 | 5.59 pg/L | |
| | | PCB-118 | 4.96 pg/L | |
| | | PCB-105 | 2.31 pg/L | |
| | | PCB-147/149 | 2.72 pg/L | |
| | | PCB-153/168 | 3.94 pg/L | |
| | | PCB-163/138/129 | 6.32 pg/L | |
| | | PCB-187 | 1.81 pg/L | |
| | | PCB-180/193 | 2.07 pg/L | |
| | | PCB-170 | 1.32 pg/L | |

Sample concentrations were compared to concentrations detected in the field blanks. The sample concentrations were either not detected or were significantly greater (>5X for other contaminants) than the concentrations found in the associated field blanks.

## VI. Matrix Spike/Matrix Spike Duplicates

Matrix spike and matrix spike duplicate analyses were not required in the QAPP, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Results were within QC limits with the following exceptions:

| DUP ID (Associated Samples) | Compound | RPD (Limits) | Affected Compound | Flag | A or P |
|---|---|---|---|---|---|
| LPR6-ECST-Comp02DUP (LPR6-ECST-Comp02 LPR6-ECST-Comp02DUP) | PCB-118 | 21 (≤20) | PCB-118 | J (all detects) | A |
| | PCB-156 | 34 (≤20) | PCB-156 | J (all detects) | |
| | PCB-167 | 32 (≤20) | PCB-167 | J (all detects) | |
| | PCB-209 | 43 (≤20) | PCB-209 | J (all detects) | |
| | PCB-68 | 22 (≤20) | PCB-68 | J (all detects) | |
| | PCB-79 | 27 (≤20) | PCB-79 | J (all detects) | |
| | PCB-103 | 21 (≤20) | PCB-103 | J (all detects) | |
| | PCB-94 | 22 (≤20) | PCB-94 | J (all detects) | |
| | PCB-102 | 23 (≤20) | PCB-102 | J (all detects) | |
| | PCB-92 | 21 (≤20) | PCB-92 | J (all detects) | |
| | PCB-90 | 23 (≤20) | PCB-90 | J (all detects) | |
| | PCB-83 | 26 (≤20) | PCB-83 | J (all detects) | |
| | PCB-99 | 21 (≤20) | PCB-99 | J (all detects) | |
| | PCB-86 | 21 (≤20) | PCB-86 | J (all detects) | |
| | PCB-85 | 26 (≤20) | PCB-95 | J (all detects) | |
| | PCB-115 | 77 (≤20) | PCB-115 | J (all detects) | |
| | PCB-155 | 25 (≤20) | PCB-155 | J (all detects) | |
| | PCB-135 | 39 (≤20) | PCB-135 | J (all detects) | |
| | PCB-154 | 40 (≤20) | PCB-154 | J (all detects) | |
| | PCB-144 | 38 (≤20) | PCB-144 | J (all detects) | |
| | PCB-147 | 35 (≤20) | PCB-147 | J (all detects) | |
| | PCB-134 | 29 (≤20) | PCB-134 | J (all detects) | |
| | PCB-139 | 27 (≤20) | PCB-139 | J (all detects) | |
| | PCB-131 | 24 (≤20) | PCB-131 | J (all detects) | |
| | PCB-132 | 30 (≤20) | PCB-132 | J (all detects) | |
| | PCB-133 | 29 (≤20) | PCB-133 | J (all detects) | |
| | PCB-146 | 40 (≤20) | PCB-146 | J (all detects) | |
| | PCB-153 | 42 (≤20) | PCB-153 | J (all detects) | |
| | PCB-141 | 44 (≤20) | PCB-141 | J (all detects) | |
| | PCB-130 | 33 (≤20) | PCB-130 | J (all detects) | |
| | PCB-137 | 33 (≤20) | PCB-137 | J (all detects) | |
| | PCB-164 | 37 (≤20) | PCB-164 | J (all detects) | |
| | PCB-129 | 37 (≤20) | PCB-129 | J (all detects) | |
| | PCB-158 | 40 (≤20) | PCB-158 | J (all detects) | |
| | PCB-179 | 34 (≤20) | PCB-179 | J (all detects) | |
| | PCB-176 | 35 (≤20) | PCB-176 | J (all detects) | |
| | PCB-178 | 41 (≤20) | PCB-178 | J (all detects) | |
| | PCB-175 | 40 (≤20) | PCB-175 | J (all detects) | |
| | PCB-187 | 40 (≤20) | PCB-187 | J (all detects) | |
| | PCB-183 | 47 (≤20) | PCB-183 | J (all detects) | |
| | PCB-185 | 45 (≤20) | PCB-185 | J (all detects) | |
| | PCB-174 | 39 (≤20) | PCB-174 | J (all detects) | |
| | PCB-177 | 42 (≤20) | PCB-177 | J (all detects) | |
| | PCB-171 | 41 (≤20) | PCB-171 | J (all detects) | |
| | PCB-172 | 49 (≤20) | PCB-172 | J (all detects) | |
| | PCB-180 | 52 (≤20) | PCB-180 | J (all detects) | |
| | PCB-191 | 58 (≤20) | PCB-191 | J (all detects) | |
| | PCB-170 | 51 (≤20) | PCB-170 | J (all detects) | |
| | PCB-190 | 57 (≤20) | PCB-190 | J (all detects) | |
| | PCB-202 | 42 (≤20) | PCB-202 | J (all detects) | |
| | PCB-201 | 47 (≤20) | PCB-201 | J (all detects) | |
| | PCB-200 | 46 (≤20) | PCB-200 | J (all detects) | |
| | PCB-198 | 42 (≤20) | PCB-198 | J (all detects) | |
| | PCB-196 | 46 (≤20) | PCB-196 | J (all detects) | |
| | PCB-203 | 45 (≤20) | PCB-203 | J (all detects) | |
| | PCB-195 | 47 (≤20) | PCB-195 | J (all detects) | |
| | PCB-194 | 54 (≤20) | PCB-194 | J (all detects) | |
| | PCB-208 | 38 (≤20) | PCB-208 | J (all detects) | |
| | PCB-206 | 38 (≤20) | PCB-206 | J (all detects) | |
| | | | Total Tetra-CBs | J (all detects) | |
| | | | Total Penta-CBs | J (all detects) | |
| | | | Total Hexa-CBs | J (all detects) | |
| | | | Total Hepta-CBs | J (all detects) | |
| | | | Total Octa-CBs | J (all detects) | |
| | | | Total Nona-CBs | J (all detects) | |

## VII. Laboratory Control Samples (LCS) and Standard Reference Material (SRM)

Batch control samples were reviewed for each matrix as applicable. Percent differences (%D) and relative percent differences (RPD) were within QC limits with the following exceptions:

| BCS ID | Compound | BCS %D (Limits) | Affected Compound | Flag | A or P |
|---|---|---|---|---|---|
| BCS3_8929_PCB_VA (All samples in SDG A3406) | PCB-37 | 20.2 (≤20) | PCB-37<br>Total Tri-CBs | J (all detects)<br>UJ (all non-detects)<br>J (all detects)<br>UJ (all non-detects) | P |

The percent difference (%D) of the standard reference material was less than or equal to 25.0% for all compounds with the following exceptions:

| SRM ID | Compound | %D | Associated Samples | Affected Compound | Flag | A or P |
|---|---|---|---|---|---|---|
| CARP2 SRM | PCB-206 | 45.7 (≤20) | All samples in SDG A3406 | PCB-206<br>Total Nona-CBs | J (all detects)<br>J (all detects) | A |

Although SRM percent differences (%D) exceeded criteria for PCB-28, PCB-44, PCB-138/163/164 and PCB-194, the associated results were not qualified. The reported PCB congeners either had different coeluting isomers than the SRM or the concentrations exceeded calibration range.

## VIII. Regional Quality Assurance and Quality Control

Not applicable.

## IX. Internal Standards

All internal standard recoveries (%R) were within validation criteria.

All internal standard ion abundance ratios were within method criteria.

## X. Target Compound Identification

All target compounds met the identification criteria with the following exceptions:

| Sample | Compound | Flag | A or P |
|---|---|---|---|
| LPRBG-ECST-Comp01 | PCB-8<br>Total Di-CBs | J (all detects)<br>J (all detects) | P |

| Sample | Compound | Flag | A or P |
|---|---|---|---|
| LPRBG-GDST-Comp01 | PCB-9<br>PCB-7<br>PCB-5<br>PCB-13/12<br>Total Di-CBs | J (all detects)<br>J (all detects)<br>J (all detects)<br>J (all detects) | P |

For the above listed samples, the laboratory indicated that the Dichlorobiphenyl congeners were quantitated using single ion mode. The area for the secondary ion (m/z 223.9974) was not integrated due to significant interference from PFK. Using professional judgment, associated detected results were qualified as estimated.

## XI. Compound Quantitation and RLs

All compound quantitation and RLs were within validation criteria with the following exceptions:

| Sample | Compound | Flag | A or P |
|---|---|---|---|
| All samples in SDG A3406 | All compounds reported as estimated maximum possible concentration (EMPC). | EMPC-J | A |

## XII. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

## XIII. Field Duplicates

No field duplicates were identified in this SDG.

## Lower Passaic River Restoration Project
## Polychlorinated Biphenyls as Congeners - Data Qualification Summary - SDG A3406

| SDG | Sample | Compound | Flag | A or P | Reason |
|---|---|---|---|---|---|
| A3406 | LPR6-ECST-Comp01<br>LPRBG-ECST-Comp01<br>LPR6-ECST-Comp02<br>LPR7-ECST-Comp03<br>LPR7-ECST-Comp04<br>LPR8-ECST-Comp05<br>LPR1-GDST-Comp01<br>LPRBG-GDST-Comp01<br>LPR2-GDST-Comp02<br>LPR3-GDST-Comp03<br>LPR6-ECST-Comp02DUP | PCB-37<br><br>Total Tri-CBs | J (all detects)<br>UJ (all non-detects)<br>J (all detects)<br>UJ (all non-detects) | P | Continuing calibration (%D) |

| SDG | Sample | Compound | Flag | A or P | Reason |
|---|---|---|---|---|---|
| A3406 | LPR6-ECST-Comp02<br>LPR6-ECST-Comp02DUP | PCB-118 | J (all detects) | A | Duplicate analysis (RPD) |
| | | PCB-156 | J (all detects) | | |
| | | PCB-167 | J (all detects) | | |
| | | PCB-209 | J (all detects) | | |
| | | PCB-68 | J (all detects) | | |
| | | PCB-79 | J (all detects) | | |
| | | PCB-103 | J (all detects) | | |
| | | PCB-94 | J (all detects) | | |
| | | PCB-102 | J (all detects) | | |
| | | PCB-92 | J (all detects) | | |
| | | PCB-90 | J (all detects) | | |
| | | PCB-83 | J (all detects) | | |
| | | PCB-99 | J (all detects) | | |
| | | PCB-86 | J (all detects) | | |
| | | PCB-85 | J (all detects) | | |
| | | PCB-115 | J (all detects) | | |
| | | PCB-155 | J (all detects) | | |
| | | PCB-135 | J (all detects) | | |
| | | PCB-154 | J (all detects) | | |
| | | PCB-144 | J (all detects) | | |
| | | PCB-147 | J (all detects) | | |
| | | PCB-134 | J (all detects) | | |
| | | PCB-139 | J (all detects) | | |
| | | PCB-131 | J (all detects) | | |
| | | PCB-132 | J (all detects) | | |
| | | PCB-133 | J (all detects) | | |
| | | PCB-146 | J (all detects) | | |
| | | PCB-153 | J (all detects) | | |
| | | PCB-141 | J (all detects) | | |
| | | PCB-130 | J (all detects) | | |
| | | PCB-137 | J (all detects) | | |
| | | PCB-164 | J (all detects) | | |
| | | PCB-129 | J (all detects) | | |
| | | PCB-158 | J (all detects) | | |
| | | PCB-179 | J (all detects) | | |
| | | PCB-176 | J (all detects) | | |
| | | PCB-178 | J (all detects) | | |
| | | PCB-175 | J (all detects) | | |
| | | PCB-187 | J (all detects) | | |
| | | PCB-183 | J (all detects) | | |
| | | PCB-185 | J (all detects) | | |
| | | PCB-174 | J (all detects) | | |
| | | PCB-177 | J (all detects) | | |
| | | PCB-171 | J (all detects) | | |
| | | PCB-172 | J (all detects) | | |
| | | PCB-180 | J (all detects) | | |
| | | PCB-191 | J (all detects) | | |
| | | PCB-170 | J (all detects) | | |
| | | PCB-190 | J (all detects) | | |
| | | PCB-202 | J (all detects) | | |
| | | PCB-201 | J (all detects) | | |
| | | PCB-200 | J (all detects) | | |
| | | PCB-198 | J (all detects) | | |
| | | PCB-196 | J (all detects) | | |
| | | PCB-203 | J (all detects) | | |
| | | PCB-195 | J (all detects) | | |
| | | PCB-194 | J (all detects) | | |
| | | PCB-208 | J (all detects) | | |
| | | PCB-206 | J (all detects) | | |
| | | Total Tetra-CBs | J (all detects) | | |
| | | Total Penta-CBs | J (all detects) | | |
| | | Total Hexa-CBs | J (all detects) | | |
| | | Total Hepta-CBs | J (all detects) | | |
| | | Total Octa-CBs | J (all detects) | | |
| | | Total Nona-CBs | J (all detects) | | |

| SDG | Sample | Compound | Flag | A or P | Reason |
|---|---|---|---|---|---|
| A3406 | LPR6-ECST-Comp01<br>LPRBG-ECST-Comp01<br>LPR6-ECST-Comp02<br>LPR7-ECST-Comp03<br>LPR7-ECST-Comp04<br>LPR8-ECST-Comp05<br>LPR1-GDST-Comp01<br>LPRBG-GDST-Comp01<br>LPR2-GDST-Comp02<br>LPR3-GDST-Comp03<br>LPR6-ECST-Comp02DUP | PCB-37<br><br>Total Tri-CBs | J (all detects)<br>UJ (all non-detects)<br>J (all detects)<br>UJ (all non-detects) | P | Batch control samples (%D) |
| A3406 | LPR6-ECST-Comp01<br>LPRBG-ECST-Comp01<br>LPR6-ECST-Comp02<br>LPR7-ECST-Comp03<br>LPR7-ECST-Comp04<br>LPR8-ECST-Comp05<br>LPR1-GDST-Comp01<br>LPRBG-GDST-Comp01<br>LPR2-GDST-Comp02<br>LPR3-GDST-Comp03<br>LPR6-ECST-Comp02DUP | PCB-206<br>Total Nona-CBs | J (all detects)<br>J (all detects) | A | Standard reference material (%D) |
| A3406 | LPRBG-ECST-Comp01 | PCB-8<br>Total Di-CBs | J (all detects) | P | Target compound identification |
| A3406 | LPRBG-GDST-Comp01 | PCB-9<br>PCB-7<br>PCB-5<br>PCB-13/12<br>Total Di-CBs | J (all detects)<br>J (all detects)<br>J (all detects)<br>J (all detects)<br>J (all detects) | P | Target compound identification |
| A3406 | LPR6-ECST-Comp01<br>LPRBG-ECST-Comp01<br>LPR6-ECST-Comp02<br>LPR7-ECST-Comp03<br>LPR7-ECST-Comp04<br>LPR8-ECST-Comp05<br>LPR1-GDST-Comp01<br>LPRBG-GDST-Comp01<br>LPR2-GDST-Comp02<br>LPR3-GDST-Comp03<br>LPR6-ECST-Comp02DUP | All compounds reported as estimated maximum possible concentration (EMPC). | EMPC-J | A | Compound quantitation and RLs (EMPC) |

**Lower Passaic River Restoration Project**
**Polychlorinated Biphenyls as Congeners - Laboratory Blank Data Qualification Summary - SDG A3406**

No Sample Data Qualified in this SDG

**Lower Passaic River Restoration Project**
**Polychlorinated Biphenyls as Congeners - Field Blank Data Qualification Summary - SDG A3406**

No Sample Data Qualified in this SDG

LDC #: 26234A31 **VALIDATION COMPLETENESS WORKSHEET** Date: 9/21/11
SDG #: A3406 Level IV Page: 1 of 1
Laboratory: Analytical Perspectives Reviewer: [illegible]
2nd Reviewer: [illegible]

**METHOD:** HRGC/HRMS Polychlorinated Biphenyl Congeners (EPA Method 1668B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

| | Validation Area | | Comments |
|---|---|---|---|
| I. | Technical holding times | A | Sampling dates: 3/8 - 6/8/11 |
| II. | GC/MS Instrument performance check | A | |
| III. | Initial calibration | A | 20% |
| IV. | Routine calibration ~~/ICV~~ | SW | 20/50% |
| V. | Blanks | SW | |
| VI. | Matrix spike/Matrix spike duplicates /DMP | N/SW | |
| VII. | Laboratory control samples | SW | BOS, SRM |
| VIII. | Regional quality assurance and quality control | N | |
| IX. | Internal standards | A | |
| X. | Target compound identifications | SW | |
| XI. | Compound quantitation and CRQLs | SW | EMPC-J |
| XII. | System performance | A | |
| XIII. | Overall assessment of data | A | |
| XIV. | Field duplicates | N | |
| XV. | Field blanks | SW | RB = LPR-07811-RB (A3380) |

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: tissue

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1 | LPR6-ECST-Comp01 | 11 | LPR6-ECST-Comp02DUP | 21 | MB1-8929 | 31 | |
| 2 | LPRBG-ECST-Comp01 | 12 | | 22 | | 32 | |
| 3 | LPR6-ECST-Comp02 | 13 | | 23 | | 33 | |
| 4 | LPR7-ECST-Comp03 | 14 | | 24 | | 34 | |
| 5 | LPR7-ECST-Comp04 | 15 | | 25 | | 35 | |
| 6 | LPR8-ECST-Comp05 | 16 | | 26 | | 36 | |
| 7 | LPR1-GDST-Comp01 | 17 | | 27 | | 37 | |
| 8 | LPRBG-GDST-Comp01 | 18 | | 28 | | 38 | |
| 9 | LPR2-GDST-Comp02 | 19 | | 29 | | 39 | |
| 10 | LPR3-GDST-Comp03 | 20 | | 30 | | 40 | |

LDC #: 26234A31

# VALIDATION FINDINGS WORKSHEET
## Routine Calibration


Reviewer: A
2nd Reviewer: N

**METHOD:** HRGC/MS Polychlorinated Biphenyls as Congeners (EPA Method 1668B)
Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a routine calibration was performed at the beginning of each 12 hour period?
Y N N/A Were all percent differences (%D) ≤ 30% for unlabeled compounds and ≤ 50% for labeled?
Y N N/A Did all routine calibration standards meet the Ion Abundance Ratio criteria?

| # | Date | Standard ID | Compound | Finding %D | Finding Ion Abundance Ratio | Associated Samples | Qualifications |
|---|---|---|---|---|---|---|---|
| | 8/22/11 | BCS3_8929_PCB_VB | PCB-37 | 29.2 | | All, blk | J/UJ/P (+Total TriCBs) |
| | | | | | | | |
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LDC #: 26234A31

# VALIDATION FINDINGS WORKSHEET
## Blanks


Reviewer: IV
2nd Reviewer: Q

**METHOD:** HRGC/HRMS PCB Congeners (EPA Method 1668B)

**Blank extraction date:** 8/15/11 **Blank analysis date:** 8/22/11
**Conc. units:** pg/L **Associated samples:** All

| Compound | Blank ID | Sample Identification | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | MB1_8929 | 5X | | | | | | | | |
| Total Di-CBs | 4.49 | 22.45 | | | | | | | | |
| Total Tri-CBs | 2.38* | 11.9 | | | | | | | | |
| Total Tetra-CBs | 2.24 | 11.2 | | | | | | | | |
| Total Penta-CBs | 0.727 | 3.635 | | | | | | | | |
| Total Hexa-CBs | 1.2* | 6 | | | | | | | | |
| Total Hepta-CBs | 0.448 | 2.24 | | | | | | | | |
| PCB-11 | 4.49 | 22.45 | | | | | | | | |
| PCB-30/18 | 0.577* | 2.885 | | | | | | | | |
| PCB-32 | 0.438 | 2.19 | | | | | | | | |
| PCB-31 | 0.535 | 2.675 | | | | | | | | |
| PCB-28/20 | 0.833 | 4.165 | | | | | | | | |
| PCB-52 | 1.04 | 5.2 | | | | | | | | |
| PCB-69/49 | 0.492 | 2.46 | | | | | | | | |
| PCB-61/70/74/76 | 0.699 | 3.495 | | | | | | | | |
| PCB-113/90/101 | 0.727 | 3.635 | | | | | | | | |
| PCB-153/168 | 0.53* | 2.65 | | | | | | | | |
| PCB-163/138/129 | 0.666 | 3.33 | | | | | | | | |
| PCB-180/193 | 0.448 | 2.24 | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |

*EMPC

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
All contaminants within five times the method blank concentr/ation were qualified as not detected, "U".

LDC #: 26234A31

# VALIDATION FINDINGS WORKSHEET
## Field Blank


Reviewer: 1C
2nd Reviewer: C

**METHOD:** HRGC/HRMS PCB Congeners (EPA Method 1668B)
**Blank units:** pg/L **Associated sample units:** NA
**Sampling date:** ~~12/20/10~~ 7/18/11
**Field blank type:** (circle one) Field Blank / Rinsate / Other **Associated samples:** ~~NA~~ AC

| Compound | Blank ID | Sample Identification | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | LPR-071811-RB | 5X | | | | | | | | |
| Total Mono-CBs | 13 | 6.5 | | | | | | | | |
| Total Di-CBs | 31.8 | 15.9 | | | | | | | | |
| Total Tri-CBs | 27.4* | 13.7 | | | | | | | | |
| Total Tetra-CBs | 22.2* | 11.1 | | | | | | | | |
| Total Penta-CBs | 25.7* | 12.85 | | | | | | | | |
| Total Hexa-CBs | 13* | 6.5 | | | | | | | | |
| Total Hepta-CBs | 5.21* | 2.605 | | | | | | | | |
| PCB-1 | 6.01 | 3.005 | | | | | | | | |
| PCB-3 | 7.03 | 3.515 | | | | | | | | |
| PCB-4 | 7.89 | 3.945 | | | | | | | | |
| PCB-8 | 4.53 | 2.265 | | | | | | | | |
| PCB-11 | 19.4 | 9.7 | | | | | | | | |
| PCB-19 | 3.2 | 1.6 | | | | | | | | |
| PCB-30/18 | 3.5 | 1.75 | | | | | | | | |
| PCB-17 | 3.3* | 1.65 | | | | | | | | |
| PCB-32 | 3.67 | 1.835 | | | | | | | | |
| PCB-31 | 3.92* | 1.96 | | | | | | | | |
| PCB-28/20 | 7.57 | 3.785 | | | | | | | | |
| PCB-21/33 | 1.36* | 0.68 | | | | | | | | |
| PCB-39 | 0.89* | 0.445 | | | | | | | | |
| PCB-52 | 3.95 | 1.975 | | | | | | | | |
| PCB-69/49 | 2.08* | 1.04 | | | | | | | | |
| PCB-44/47/65 | 4.29 | 2.145 | | | | | | | | |

| Compound | Blank ID | Sample Identification | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| LPR- | 071811-RB | 5X | | | | | | | | |
| PCB-64 | 1.36 | 0.68 | | | | | | | | |
| PCB-61/70/74/76 | 6.66 | 3.33 | | | | | | | | |
| PCB-66 | 3.89 | 1.945 | | | | | | | | |
| PCB-95 | 2.71* | 1.355 | | | | | | | | |
| PCB-113/90/101 | 4.26* | 2.13 | | | | | | | | |
| PCB-99 | 2.32* | 1.16 | | | | | | | | |
| PCB-109/119/86/97/125/87 | 3.59 | 1.795 | | | | | | | | |
| PCB-110 | 5.59 | 2.795 | | | | | | | | |
| PCB-118 | 4.96 | 2.48 | | | | | | | | |
| PCB-105 | 2.31 | 1.155 | | | | | | | | |
| PCB-147/149 | 2.72* | 1.36 | | | | | | | | |
| PCB-153/168 | 3.94 | 1.97 | | | | | | | | |
| PCB-163/138/129 | 6.32 | 3.16 | | | | | | | | |
| PCB-187 | 1.81 | 0.905 | | | | | | | | |
| PCB-180/193 | 2.07* | 1.035 | | | | | | | | |
| PCB-170 | 1.32* | 0.66 | | | | | | | | |

* EMPC

LDC: 26234A31

VALIDATION FINDINGS WORKSHEET

Laboratory Duplicate



Reviewer: A

2nd Reviewer: A

| Compound | LPR6-ECST-Comp02 | LPR6-ECST-Comp02DUP | RPD | Qualifications |
|---|---|---|---|---|
| PCB-118 | 696 | 857 | 21 | Jute /A |
| PCB-156 | 63.7 | 89.6 | 34 | |
| PCB-167 | 25.2 | 34.8 | 32 | |
| PCB-209 | 42.1 | 65.4 | 43 | |
| PCB-68 | 8.3 | 10.4 | 22 | |
| PCB-79 | 8.57 | 11.2 | 27 | |
| PCB-103 | 19.8 | 24.4 | 21 | |
| PCB-94 | 16.9 | 21 | 22 | |
| PCB-102 | 46.6 | 58.5 | 23 | |
| PCB-92 | 206 | 254 | 21 | |
| PCB-90 | 949 | 1190 | 23 | |
| PCB-83 | 55.8 | 72.2 | 26 | |
| PCB-99 | 460 | 567 | 21 | |
| PCB-86 | 617 | 762 | 21 | |
| PCB-85 | 138 | 180 | 26 | |
| PCB-115 | 15.6 | 35.2 | 77 | |
| PCB-155 | 8.19 | 10.5 | 25 | |
| PCB-135 | 358 | 533 | 39 | |
| PCB-154 | 15.3 | 22.9 | 40 | |
| PCB-144 | 41.2 | 60.5 | 38 | |
| PCB-147 | 738 | 1050 | 35 | |
| PCB-134 | 56.9 | 76.3 | 29 | |
| PCB-139 | 14.6 | 19.2 | 27 | |
| PCB-131 | 11.8 | 15 | 24 | |
| PCB-132 | 289 | 391 | 30 | |
| PCB-133 | 16.3 | 21.8 | 29 | |
| PCB-146 | 119 | 178 | 40 | |
| PCB-153 | 633 | 972 | 42 | |
| PCB-141 | 158 | 248 | 44 | |
| PCB-130 | 52.1 | 72.4 | 33 | |
| PCB-137 | 32.9 | 46.1 | 33 | |
| PCB-164 | 61.9 | 89.7 | 37 | |
| PCB-129 | 884 | 1290 | 37 | |
| PCB-158 | 67.6 | 101 | 40 | |
| PCB-179 | 98.9 | 139 | 34 | |
| PCB-176 | 24.7 | 35 | 35 | |
| PCB-178 | 43.2 | 65.8 | 41 | |
| PCB-175 | 7.9 | 11.8 | 40 | |
| PCB-187 | 282 | 425 | 40 | |
| PCB-183 | 108 | 175 | 47 | |
| PCB-185 | 19.2 | 30.4 | 45 | |

LDC: 26234A31

VALIDATION FINDINGS WORKSHEET

Laboratory Duplicate



Reviewer: R

2nd Reviewer: V

| Compound | LPR6-ECST-Comp02 | LPR6-ECST-Comp02DUP | RPD | Qualifications |
|---|---|---|---|---|
| PCB-174 | 221 | 328 | 39 | J all /A |
| PCB-177 | 118 | 180 | 42 | |
| PCB-171 | 47.3 | 71.7 | 41 | |
| PCB-172 | 34 | 56.3 | 49 | |
| PCB-180 | 324 | 551 | 52 | |
| PCB-191 | 5.37 | 9.79 | 58 | |
| PCB-170 | 111 | 186 | 51 | |
| PCB-190 | 26.6 | 47.7 | 57 | |
| PCB-202 | 27.6 | 42.2 | 42 | |
| PCB-201 | 9.74 | 15.8 | 47 | |
| PCB-200 | 11.4 | 18.3 | 46 | |
| PCB-198 | 102 | 157 | 42 | |
| PCB-196 | 25.9 | 41.3 | 46 | |
| PCB-203 | 62.6 | 99.3 | 45 | |
| PCB-195 | 33.6 | 54.3 | 47 | |
| PCB-194 | 74.6 | 130 | 54 | |
| PCB-208 | 22.8 | 33.6 | 38 | |
| PCB-206 | 49.3 | 72.7 | 38 | |

+ Total Tetra CBs
Penta CBs
Hexa CBs
Hepta CBs
Octa CBs
Nona CBs

LDC #: 26234A31

# VALIDATION FINDINGS WORKSHEET
## Laboratory Control Samples (LCS)

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

**METHOD:** HRGC/HRMS PCB Congeners (EPA Method 1668B)
Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a LCS required?
Y N N/A Was a LCS analyzed every 20 samples for each matrix or whenever a sample extraction was performed?
Y N N/A Were the LCS percent differences (%D) and relative percent difference (RPD) within the QC limits?

| # | Date | Lab ID/Reference | Compound | LCS %D (Limits) | LCSD %D (Limits) | RPD (Limits) | Associated Samples | Qualifications |
|---|---|---|---|---|---|---|---|---|
| | | CARP2 SRM | PCB-28 | 25.6 (≤25) | ( ) | ( ) | All | no qual * |
| | | | 44 | 58.2 ( ) | ( ) | ( ) | | |
| | | PCB-138/163/164 | | 35.9 ( ) | ( ) | ( ) | | |
| | | | PCB-194 | 43.1 ( ) | ( ) | ( ) | | |
| | | | 206 | 45.7 ( ) | ( ) | ( ) | | Tetra/A (+Total Non-Ortho) |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | * diff't coeluting |
| | | | | ( ) | ( ) | ( ) | | isomers or > calib range |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
| | BCS3_8929_PCB_VB | PCB-37 | 20.2 (≤20) | ( ) | ( ) | ( ) | All, blk | J/UJ/P |
| | | | | ( ) | ( ) | ( ) | | (+Total Tri-Che) |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
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| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |

LDC #: 26234A31

# VALIDATION FINDINGS WORKSHEET
## Target Compound Identification


Reviewer: K
2nd Reviewer: T

**METHOD:** HRGC/HRMS Polychlorinated Biphenyls (EPA Method 1668B)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was the Ion Abundance Ratio for the two quantitation ions within criteria?
Y N N/A Was the signal to noise ratio for each target compound and labeled standard ≥ 2.5?
Y N N/A Does the maximum intensity of each specified characteristic ion coincide within ± 2 seconds (includes labeled standards)?

| # | Date | Sample ID | Finding | Associated Samples | Qualifications |
|---|---|---|---|---|---|
| | | 2 | PCB-8 | The laboratory indicated that congeners were | J dets/P (+ Total Di-CBs) |
| | | | | quantitated using single ion mode. The area | ↓ |
| | | 8 | PCB-9, 7, 5, 13/12 | for the secondary ion (m/z 223.9974) was not | ↓ |
| | | | | integrated due to significant interference from | |
| | | | | PFK.. | |
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Notes:

LDC #: 26234A31

# VALIDATION FINDINGS WORKSHEET
## Initial Calibration Calculation Verification


Reviewer: A
2nd Reviewer: G

**METHOD:** HRGC/HRMS PCB Congeners (EPA Method 1668B)

The Relative Response Factor (RRF), average RRF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

$RRF = (A_x)(C_{is})/(A_{is})(C_x)$ — $A_x$ = Area of compound, $A_{is}$ = Area of associated internal standard
average RRF = sum of the RRFs/number of standards — $C_x$ = Concentration of compound, $C_{is}$ = Concentration of internal standard
%RSD = 100 * (S/X) — S = Standard deviation of the RRFs, X = Mean of the RRFs

| # | Standard ID | Calibration Date | Compound (Reference Internal Standard) | Reported Average RRF (initial) | Recalculated Average RRF (initial) | Reported RRF ( C83 std) | Recalculated RRF ( C83 std) | Reported %RSD | Recalculated %RSD |
|---|---|---|---|---|---|---|---|---|---|
| 1 | CAL | 3/4/11 | PCB 77 ($^{13}$C-PCB 77) | 1.15 | 1.15 | 1.16 | 1.16 | 3.9 | 4.0 |
| | | | PCB 105 ($^{13}$C-PCB 105) | 0.90 | 0.90 | 0.91 | 0.91 | 0.9 | 1.1 |
| | | | PCB 167 ($^{13}$C-PCB 167) | 1.04 | 1.04 | 1.03 | 1.03 | 1.3 | 1.2 |
| | | | PCB 189 ($^{13}$C-PCB 189) | 1.18 | 1.18 | 1.17 | 1.17 | 1.1 | 1.2 |
| 2 | | | PCB 77 ($^{13}$C-PCB 77) | | | | | | |
| | | | PCB 105 ($^{13}$C-PCB 105) | | | | | | |
| | | | PCB 167 ($^{13}$C-PCB 167) | | | | | | |
| | | | PCB 189 ($^{13}$C-PCB 189) | | | | | | |
| 3 | | | PCB 77 ($^{13}$C-PCB 77) | | | | | | |
| | | | PCB 105 ($^{13}$C-PCB 105) | | | | | | |
| | | | PCB 167 ($^{13}$C-PCB 167) | | | | | | |
| | | | PCB 189 ($^{13}$C-PCB 189) | | | | | | |

Comments: Refer to Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 26234A2

# VALIDATION FINDINGS WORKSHEET
## Routine Calibration Results Verification


Reviewer: R
2nd Reviewer: Q

**METHOD:** HRGC/HRMS PCB Congeners (EPA Method 1668B)

The percent difference (%D) of the initial calibration average Relative Response Factors (RRFs) and the continuing calibration RRFs were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. RRF - RRF)/ave. RRF
RRF = $(A_x)(C_{is})/(A_{is})(C_x)$

Where: ave. RRF = initial calibration average RRF
RRF = continuing calibration RRF
$A_x$ = Area of compound, $A_{is}$ = Area of associated internal standard
$C_x$ = Concentration of compound, $C_{is}$ = Concentration of internal standard

| # | Standard ID | Calibration Date | Compound (Reference Internal Standard) | Average RRF (initial) | Reported RRF (CC) | Recalculated RRF (CC) | Reported %D | Recalculated %D |
|---|---|---|---|---|---|---|---|---|
| 1 | 110822V02 | 8/22/11 | PCB 77 ($^{13}$C-PCB 77) | 1.15 | 1.14 | 1.14 | 0.3 | 0.1 |
| | | | PCB 105 ($^{13}$C-PCB 105) | 0.90 | 0.86 | 0.86 | 5.5 | 5.0 |
| | | | PCB 167 ($^{13}$C-PCB 167) | 1.04 | 0.97 | 0.97 | 6.8 | 6.9 |
| | | | PCB 189 ($^{13}$C-PCB 189) | 1.18 | 1.24 | 1.24 | 4.9 | 4.9 |
| 2 | 110822V12 | 8/22/11 | PCB 77 ($^{13}$C-PCB 77) | 1.15 | 1.19 | 1.19 | 3.5 | 3.4 |
| | | | PCB 105 ($^{13}$C-PCB 105) | 0.90 | 0.88 | 0.88 | 3.1 | 2.8 |
| | | | PCB 167 ($^{13}$C-PCB 167) | 1.04 | 1.01 | 1.01 | 2.5 | 2.8 |
| | | | PCB 189 ($^{13}$C-PCB 189) | 1.18 | 1.27 | 1.27 | 7.5 | 7.4 |
| 3 | | | PCB 77 ($^{13}$C-PCB 77) | | | | | |
| | | | PCB 105 ($^{13}$C-PCB 105) | | | | | |
| | | | PCB 167 ($^{13}$C-PCB 167) | | | | | |
| | | | PCB 189 ($^{13}$C-PCB 189) | | | | | |
| 4 | | | PCB 77 ($^{13}$C-PCB 77) | | | | | |
| | | | PCB 105 ($^{13}$C-PCB 105) | | | | | |
| | | | PCB 167 ($^{13}$C-PCB 167) | | | | | |
| | | | PCB 189 ($^{13}$C-PCB 189) | | | | | |

Comments: Refer to Routine Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the

LDC #: 26534A31

# VALIDATION FINDINGS WORKSHEET
## Sample Calculation Verification


Reviewer: M
2nd reviewer: [illegible]

**METHOD:** HRGC/HRMS PCB Congeners (EPA Method 1668B)

Y N N/A Were all reported results recalculated and verified for all level IV samples?
Y N N/A Were all recalculated results for detected target compounds agree within 10.0% of the reported results?

Concentration = $\frac{(A_x)(I_s)(DF)}{(A_{is})(RRF)(V_o)(\%S)}$

| | | |
|---|---|---|
| $A_x$ | = | Area of the characteristic ion (EICP) for the compound to be measured |
| $A_{is}$ | = | Area of the characteristic ion (EICP) for the specific internal standard |
| $I_s$ | = | Amount of internal standard added in nanograms (ng) |
| $V_o$ | = | Volume or weight of sample extract in milliliters (ml) or grams (g). |
| RRF | = | Relative Response Factor (average) from the initial calibration |
| Df | = | Dilution Factor. |
| %S | = | Percent solids, applicable to soil and solid matrices only. |

Example:

Sample I.D. 1, PCB-77:

Conc. = $\frac{(10.18e6)(2000)(1)}{(2.8e7)(1.17)(10.11)(\ )}$

= 61.2 pg/g

| # | Sample ID | Compound | Reported Concentration ( ) | Calculated Concentration ( ) | Qualification |
|---|---|---|---|---|---|
| | | | | | |
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PACKAGE COMPLETENESS AND DELIVERABLES

CASE/SDGNUMBER: A3406 SITE: Lower Passaic River
LAB: Analytical Perspectives

**CHECKLIST**

I.0 Data Completeness and Deliverables

1.1 Does the Traffic Report or Field Chain of Custody list all samples? [✓] ___ ___

1.2 Is the Case Narrative, extraction logs, % solid worksheet, analysis logs present? [✓] ___ ___

1.3 Are the Case Number and SDG numbers contained in the case narrative? [✓] ___ ___

1.4 Do the Traffic Reports or Lab Case Narrative indicate problems with sample receipt, sample condition, analytical problems, or other comments affecting the quality of the data? ___ [✓] ___

ACTION: Use professional judgement to evaluate the effect of the noted problems on the quality of the data.

ACTION: **As per Field Chain of Custody/Region II requirements, if any sample analyzed as a soil, contains 50% to 90% water, all data shall be flagged as estimated "J". If a soil sample contains more than 90% water, then qualify positive hits "J", and non detects "R".**

NOTE: Samplers are required to maintain all types of environmental samples in the dark at < 4 ° C from the time of collection until receipt at the laboratory.

2.0 Reporting Requirements and Deliverables

2.1 All deliverables must be clearly labeled with the Case number and the associated sample/traffic number. Missing or illegible or incorrectly labeled items must be identified. The Project Officer must immediately be contacted and requested to ask laboratory to submit the missing or incorrect items.

2.2 The following forms were taken from the CLP SOW, CBC01.0 and should be specified in the Project Plan. A comparison of CLP forms must be made against the Laboratory's version. Some information may not be found on the exact form as the CLP version but may be located on another form. As long as the information is present and accessible, it is not a problem. Are these forms (CLP or lab's version) present?

a. Toxic CB Congener Sample Data Summary (Form I CB-1) [✓] ___ ___

b. Toxic CB Congener Toxicity Equivalency (Form I CB-2) [✓] ___ ___

c. CB Congener Sample Data Summary (Form I CB-3) [✓] ___ ___

Note: Form I is used for tabulating and reporting sample analysis, including dilutions, reanalysis, blank, LCS/Ongoing Precision and Recovery (OPR) and requested matrix spike and matrix spike duplicated for target compounds.

d. CB Congener Total Homologue Concentration Summary (Form II CB) [✓] ___ ___

Note: Form II is used to report the concentration of the mono- through nano-chloro

biphenyl homologue for each sample.

e. CB Congener Method Blank Summary (Form IV CB-1) [✓] ___ ___

Note: Form IV summarizes the samples associated with each method blank analysis.

f. CB Congener Descriptor Switching Resolution Summary (Form V CB-1) [ ] ___ ✓

Note: Form V CB-1 is used to report the descriptor switching windows for each level of chlorination for each 12-hour time period and to summarize the date and time of analysis, including dilutions, reanalysis, standards, blanks, and requested MS/MSD associated with each analysis of the instrument performance check solution.

g. CB Congener Ion Abundance Ratio Summary (Form V CB-2) [✓] ___ ___
h. CB Congener (Labeled) Ion Abundance Ion Ratio Summary (Form V CB-3) [✓] ___ ___

Note: Form V CB-2 & CB-3 are used to report the ion abundance ratios and signal-to-noise (S/N) ratios for the congeners contained in the LOC/WDM for each 12-hour time period.

i. Toxic CB Congener Initial Calibration Response Factor Summary (Form VI CB-1, CB-2) [✓] ___ ___

j. Individual Congener Initial Calibration Response Factor Summary (Form VI CB-3) [✓] ___ ___

Note: Form VI is used to report the relative response factors (RRF), average RRF, % RSD and RRT for the five or six-point initial calibration at the specific concentration levels.

k. Toxic CB Congener Continuing Calibration Summary (Form VII CB-1) [✓] ___ ___

l. Toxic CB Congener (Labeled) Continuing Calibration Summary (Form VII CB-2) [✓] ___ ___

m. Individual Congener Continuing Calibration Summary (Form VII CB-3) [✓] ___ ___

n. Toxic CB Congener Continuing Calibration Time Summary (Form VII CB-4) [ ] ___ ✓

o. Toxic CB Congener (Labeled) Continuing Calibration Summary (Form VII CB-5) [ ] ___ ✓

p. Individual Congener Continuing Calibration Summary (Form VII CB-6) [ ] ___ ✓

Note: Form VII is used to report the calibration verification of the HRGC/HRMS system by the analysis of specific calibration verification standard(s). The form is required for each 12-hour time period.

k. CB Congener Analytical Sequence (Form VIII CB) [✓] ___ ___
Note: Form VIII is used to report the analytical sequence for CB congener analyses.

ACTION: If forms are missing, contact the Project Officer to confirm which forms if any were specified in the Project Plan. If the forms are required, inform the Project Officer or obtain written permission to contact the lab for explanation/resubmittal. If the lab cannot provide missing deliverables, assess the effect on the validity of the data. Note in the Data Assessment.

Note: The above forms might be different or the laboratory might combine several forms into a single one. For example, the Target Analyte, Concentration and Q (qualifier) columns in the "CB Congener Sample Data Summary" form might include columns for IUPAC NO., Co-elution, Reporting Limits, Ion Abundance Ratio and Relative Retention Time (RRT).

2.3 GC/MS Displays
Are the following GC/MS displays present?

a. Standard and sample SICP/SIM chromatograms must list date and time of analysis; the file name; sample number; and instrument I.D. number [✓] ___ ___

b. Percent peak resolution valley [ ] ___ [✓]

c. Window Defining Mixture raw data [✓] ___ ___

d. SICP/SIM mass chromatograms must display ions used for quantitation, ion abundance ratio, absolute retention time/scan number, signal noise ratio [✓] ___ ___

e. Integrated area of the two ions must be listed for all peaks with signal noise ratio of 2.5 or greater (>10 for calibration and internal standards). [✓] ___ ___

ACTION: If deliverables are missing, contact the Project Officer to request explanation/ resubmittal or obtain written permission to contact the lab for explanation/resubmittal. If the lab cannot provide missing deliverables, assess the effect on the validity of the data. Note in the Data Assessment.

2.4 Are the following Chain of Custody Records and in-house Laboratory Control Documents present?

a. Chain of Custody Records/Traffic Report [✓] ___ ___

b. Sample Shipment Records [✓] ___ ___

c. Sample log-in sheets [✓] ___ ___

d. GC/MS Standard and Sample Run Log in chronological order [✓] ___ ___

e. Sample Extraction Log [✓] ___ ___

ACTION: If deliverables are missing, contact the Project Officer to request explanation/resubmittals or obtain written permission to contact the lab for explanation/resubmittal. If the lab cannot provide missing deliverables, assess the effect on the validity of the data. Note in the Data Assessment.

2.5 Was the sample data package paginated and one sided? [✓] ___ ___

ACTION: If no, document difficulties of reviewing data caused by lack of pagination in Data Assessment Report.

## 3.0 Holding Times

3.1 There are no demonstrated maximum holding times associated with CBs in aqueous, solid, semi-solid, tissues and other matrices. Aqueous samples must be preserved (pH 2-3) and stored up to one year in the dark at 0-4° C. Solid, semi-solids, multi-phase, and tissue samples must be stored in the dark at <-10° C.

## 4.0 Instrument Performance

### 4.1 Mass Spectrometer (MS) Resolution

Perfluorokerosene (PFK) tuning must be performed prior to analyzing calibration solutions, blanks, samples, and QC samples. A static resolving power of at least 10,000 (10% valley definition) must be demonstrated at appropriate masses before any analysis is performed. Static resolving power checks must be performed at the beginning and at the end of each 12 hour period of operation. A minimum required resolving power of 10000

should be obtained for PFK ion at mass 330.9792 or any significant PFK fragment in the range of 300-350.

A manual estimate of the resolving power can be done using the resolution check printout/calibration reports that contain the peak profiles of masses 300 to 350. At mass 330.9792, the first horizontal guideline above the baseline is the 5% line (some MS data system might not show this line). The ppm measurement of the window is usually given at 200 ppm, thus every vertical guideline represents 50 ppm. If the PFK peak is within 100 ppm at 5% height, resolution is equal or greater than 10,000.

NOTE: Because of the extensive mass range covered in each function (native, group and labeled congeners) it may not be possible to maintain 10,000 resolution throughout the mass range during the function. Therefore, resolution must be ≥ 8,000 throughout the mass range and must be ≥ 10,000 in the center of the mass range for each function.

4.1.1 Estimating resolving power (RP) from the resolution check printout containing the peak profiles of masses 300-350

A. Search the data package for the mass 330.9792 PFK peak ion (usually present before the calibration raw data).
A. Locate the 5% line which is the first horizontal gridline above the baseline.
C. At the top left hand corner of the profile, the ppm measurement of the window can be found (usually 200 ppm). Each vertical gridline represents 50 ppm.
D. If the PFK peak is within 100 ppm at 5% height, the resolution is greater than 10,000.

4.2 Gas Chromatographic (GC) Column Resolution

For the SPB-octyl column, the retention times (RT) for decachlororbiphenyl (PCB 209) in the Labeled/LOC/Window Defining Standard must be greater than 55 minutes and uniquely resolve congeners 34 from 23 and 187 from 182. Congeners 156 and 157 must co-elute within 2 seconds at the peak maximum.

4.2.1 The uniquely resolved congeners must resolve with a valley height less than 40% of the shortest of the two peaks.

Was this criterion met? [✓] ___ ___

Note: The criteria for chromatographic resolution must be met for all standards. The data validator should use professional judgment to determine severity of the problem and its effect on the final results.

ACTION: If the percent valley criteria are not met for the uniquely resolved congeners, qualify positive reported values "J" (estimate) or reject "R" all data collected during the 12-hour time window. Document in Data Assessment Report under contract non-compliance.

4.2.2 Were all peaks labeled and identified on the Selected Ion Current Profiles (SICPs)? [✓] ___ ___

4.2.3 Is the absolute retention time of CB congener 209 greater than 55.0 minutes with the SPB-octyl capillary GC column? [ ] ___ ✓

ACTION: If no, use professional judgment to assess the effect on the validity of the data. Make a note in the Data Assessment Report under contract non-compliance..

4.2.4 The relative retention times (RRT) of the native CBs and labeled congeners in the calibration verification standard (VER CS-3) must be within their respective RRT limits listed in Table 2/Method 1668A/CB01.0.

Was this criterion met? [ ] ___ ✓

ACTION: If no, use professional judgment to assess the effect on the validity of the data. Make a note in the Data Assessment Report under contract non-compliance.

4.3 Window Defining Mixture

4.3.1 The Window Defining Mixture (WDM) standard contains 27 labeled congeners (Table 3/Method 1668A) and is analyzed to establish the beginning retention time (RT) and ending RTs of each level of chlorination (LOC, homologue group).

Note: The WDM are also used to set the descriptor switching time such that congeners that elute from the HRGC during a given RT window will also be those congeners for which the ions are monitored.

Did the laboratory label the WDM congeners in each sample Quant report? [✓] ___ ___

ACTION: If no, contract project officer or the laboratory for missing data.

4.3.2 Frequency of Window Defining Mixture - must be analyzed as follows:

1. After HRMS PFK tune and before any initial calibration.

2. Once at the beginning of each 12-hour period during which standards or samples are analyzed.

3. Whenever adjustments or instrument maintenance activities are performed.

Note: The standard CS1 can be used before any initial calibration and CS3 can be used before any continuing calibration.

ACTION: Were the above criteria met? [✓] ___ ___

4.3.3 The CB congeners must be within QC limits for their respective ion abundance ratio and must have signal-to-noise (S/N) ratios $\geq$ 10.

Was this criteria met? [✓] ___ ___

If no, did the lab perform reanalysis? Use professional judgment to assess the effect on the validity of the data. Make a note in the Data Assessment Report under contract non-compliance.

## 5.0 Initial Calibration

The Isotope dilution technique is used in the calibration of Toxics/LOC CB Congeners using labeled reference compounds. An Internal Standard calibration is applied to the determination of the native CB Congeners for which a labeled is not available, to the determination of the labeled Toxics/LOC/Window Defining Congeners and Labeled Internal Standards except CB 178.

Was the above calibration performed at the frequency specified above? [✓] ___ ___

5.1 The method allows the Laboratory to perform quantitative analysis by isotope dilution and internal standard.

1. Isotope Dilution: performed for the twenty seven (27) CB Congeners. The relative response (RR) (labeled to native) vs concentration is calculated and the response of each Toxics/LOC CB relative to its labeled analog is determined using the area response of both primary and secondary exact m/z ratios. For labeled compounds, a calibration is performed using the data from five (or six) points in the calibration for the native Toxics/LOC CB Congeners.

2. Calibration by Internal Standard: for the native congeners (other than the native Toxics/LOC

CB Congeners), calibration is performed at a single point using the diluted combined 209-Congener Standard solution.

5.1.1 The following MS/DS conditions must be used:

5.1.1.1 Mass calibration as per Section 4.1? [✓] ___ ___

5.1.1.2 Were SIM data acquired for each of the ions listed in Table 7/Method 1668A including interfering ions? [✓] ___ ___

5.2 Were the following criteria met?

5.2.1 The SPB-Octyl column must resolve CB-34 from CB-23, CB-187 from CB-182, and CB-156 and CB-157 must coelute within 2 seconds at the peak maximum. Resolution must have a valley height less than 40 percent of the shorter of the two peaks. [✓] ___ ___

5.2.2 For analysis on a DB-1 (or equivalent) column the chromatographic resolution is evaluated by the analysis of the CS3 continuing calibration standard during both the initial and continuing calibrations. Resolution must have a valley less than 25% for CB-156 and CB-157. [ ] ___ [✓]

5.2.3 The relative ion abundance criteria listed in Table 8 (see analytical method) must be met for all PCB congeners peaks, including the labeled internal standards, clean-up standards, and recovery standards in all solutions. The lower and upper limits of the ion abundance ratios represent a ±15 percent window around the theoretical abundance ratio for each pair of selected ions. [✓] ___ ___

5.2.4 Are the two SIM ions for each homolog within 2 seconds of the corresponding labeled analyte ions? [✓] ___ ___

5.2.5 The relative ion abundance criteria listed in Table 8 (see analytical method) must be met for each PCB congener peak. [✓] ___ ___

5.2.6 For all calibration solutions the signal to noise ratio (S/N) for the GC signal present in every SICP, including the ones for the labeled standards must be ≥ 10. [✓] ___ ___

5.2.7 The percent relative standard deviations (% RSD) for the mean relative response factors (RRF) must be ≤ 20%. [✓] ___ ___

5.2.8 The relative response factor (RRF) for each congener standard must be greater than 0.05. [✓] ___ ___

5.2.9 For all calibration solutions, the retention times (RT) of the congeners must fall with the appropriate RT window established by the window defining mix analysis. In addition, the absolute RT of the of the recovery standards, internal standards and clean-up standards will not change by more than ± 15 seconds between the initial CS3 and the analysis of any other standard. [ ] ___ [✓]

ACTION:

1. If mass calibration criteria as specified in Section 4.1 were not met, make a note in Data Assessment.

2. If the selected monitoring ions specified in Table 7/Method 1668A were not used for data acquisition, the lab must be contacted by the Project Officer for an explanation. If an incorrect ion was used, reject "R" all the associated data.

3. If the 40% percent valley resolution for CBs listed in section 5.2.1 above were not met, quality

positive data "J". Do not qualify non-detects.

4. If the ion abundance ratio for an analyte is outside the limits, flag the results for that analyte "R" (reject).

5. If the ion abundance ratio for an internal or labeled standard falls outside the QC limits flag the associated positive hits with "J". No effect on the non-detects.

6. If the signal to noise ratio (S/N) is below control limits, use professional judgement to determine quality of the data.

7. If the %RSD for each analyte exceeds 20%, flag the associated sample positive results for that specific analyte as estimated ("J"). No effect on the non-detect data.

8. If the DB-1 column was used, did the resolution have a valley of less than 25% for CB-156 and CB-157? If not met, qualify the analytes as estimate ("J"). Do not qualify non-detects.

9. If the RRF < 0.05, flag associate sample positive results for that specific congener as estimate "J".

10. Non compliance of any other criteria specified above should be evaluated using professional judgement.

5.2.10 Spot check response factor calculations and ion ratios. Ensure that the correct quantitation ions for the unlabeled CBs and labeled standards were used. In addition, verify that the appropriate labeled standard was used for each analyte.

ACTION: If calculations were not performed correctly, notify the Project Officer to initiate resubmittals from the laboratory.

## 6.0 System and Laboratory Performance (Calibration Verification)

At the beginning of a 12-hour shift during which analyses are performed, the HR/MS system performance tune is verified prior to analyzing the calibration verification standard CS3. If required, the diluted combined 209-congener standard solutions must also be analyzed at the beginning of the 12-hour period, but after the CS3. The CS3 standard must analyzed at the end of the 12-hour. This closing CS3 standard may also be used as the beginning of the next 12-hour period.

Only if the laboratory meets all performance criteria may samples, blanks, and recovery standards be analyzed.

### 6.1 Calibration Verification

6.1.1 Were the relative ion abundance ratio for each congener in the CS3 standard within their respective criteria? [✓] ___ ___

6.1.2 Were the peaks representing each unlabeled and labeled compound in the verification standard present with signal to noise ratio (S/N) greater or equal to 10? [✓] ___ ___

6.1.3 For each congener, were the per cent recovery within the limit (Table 6/method 1668A)? (Native Toxics/LOC: ~~70-130%~~; Labeled Toxics/LOC/Window-Defining: 50-150% and 60-130% for the cleanup standards) [ ] ✓ ___

80-120%

6.1.4 Were the relative retention time (RRT) of the congeners within the limits defined in Table 2/Method 1668A? Note: RRT should be listed in each sample quant report. [ ] ___ ✓

ACTION: If no to section 6.1.1 - 6.1.4, qualify affected congener with "J" qualifier.

### 6.2 Instrument Sensitivity Test

6.2.1 Project technical specifications may require the laboratory to perform a GC/MS sensitivity test using the CS-0.2 standard. The following guidance is offered:

6.2.2 The test must be demonstrated every 12 hours by analysis of a CS-0.2 standard which must pass the following criteria

6.2.2.1 The absolute RT for the ending recovery standards $^{13}C_{12}$-$CL_4$-CB-52, $^{13}C_{12}$-$CL_5$-CB-101, $^{13}C_{12}$-Cl-CB-138, and $^{13}C_{12}$-$CL_7$-CB-178 must be within 10 seconds of the initial CS3.

6.2.2.2 The signal/noise ratio for the CS-0.2 standard must be at least 10:1 (or 3:1 for di- and nona-PCBs for unlabeled compounds and labeled internal and recovery standards.

6.2.2.3 Ion abundance ratio must be met.

ACTION:

1. If the ion abundance ratio for an analyte is outside the limits, flag the results for that analyte "R" (reject).

2. If the signal noise ratio (S/N) is below control limits, use professional judgement to determine the quality of the data.

3. The RT of the recovery standards from CS3 to the CS-0.2 will indicate the stability of the column during the 12 hours. If these criteria were not met, the estimate all reported values (J) and (UJ) non-detects associated with RT shifts greater than ± 10 seconds.

6.3 Spot check response factor calculations and ion ratios. Ensure that the correct quantitation ions for the unlabeled CBs and labeled standards were used. In addition, verify the appropriate labeled standard was used for each analyte.

## 7.0 Sample Analysis and Identification

NOTE: Any qualifications such as "J" applied to target compounds should be also applied to their associated total congeners concentration column.

7.1 A CB congener or labeled compound is identified in environment samples, blanks, or QC samples when all of the following qualitative criteria are met.

7.1.1 The signals for the two exact m/z ratios in Table 7/**Method 1668A** must be present and must maximize within the same two scans (area count for the m/z should be present in the Quant report) [ ] [✓] [ ]

7.1.2 The signal-to-noise (S/N) ratio for each ion peak at each exact m/z must be ≥2.5 for each congener detected in a sample extract and ≥10 for all congener in the calibration standards (Note: The SN ratio should be available in each sample Quant report) [ ] [✓] [ ]

7.1.3 The relative ion abundance criteria for all CB Congener detected as well as labeled compounds, cleanup and internal standards must be within the limits of Table 8 or within ±15% of the ratio in the midpoint calibration (CS-3) standard or calibration verification (VER), whichever is most recent. [ ] [✓] [ ]

7.1.4 The relative retention time (RRT) for each detected peak must be within the RRT QC limits specified in Table 2 of the method (Note: The RRT values should be present in each sample Quant report). [✓] [ ] [ ]

Note: For native congeners determined by Internal Standard Quantitation, a given congener may fall within more than one RT and mis-identified unless the RRT window are made very narrow, as in Table 2. Therefore, consistency of the RT and RRT with other congeners and the labeled compounds may be required for rigorous congener identification. The RT and RRT values should be available in each sample Quant report.

ACTION: If the identification criteria (section 7.1.1 - 7.1.4) were not met, check sample Quant report to verify the congener is listed as "non-detect".

7.2 Quantitative Determination

7.2.1 Isotope Dilution Quantitation

7.2.1.1 Were the Labeled Toxics/Level of Chlorination (LOC)/Window-Defining Congeners (WDC) and Cleanup standards added to every sample? [✓] ___ ___

ACTION: If no, contact project officer to contact the laboratory. Note problem in data assessment.

Note: Corrections for recovery of CB can be made because the native compound and its Labeled analog exhibit similar effects upon extraction, concentration and Gas Chromatography. Relative response (RR) are used in conjunction with the calibration data to determine the concentrations in the final extract providing the labeled compounds spiking levels are constant.

7.2.1.2 The percent recovery for the Labeled Toxics/LOC/Window Defining Congeners for each sample is ~~25-150%, except 15-150% for $^{13}C_{12}$-2-MoCB and $^{13}C_{12}$-4-MoCB.~~ 30-140% 30 -135% for Cleanup Standards. Was this criteria met? [✓] ___ ___

ACTION: If no, qualify affected native congener with "J". Make a note in the data assessment.

7.2.1.3 The integrated ion current for the labeled compounds, internal standards, and cleanup standards have a signal noise ratio at least 10 times background noise. [✓] ___ ___
ACTION: If not, verify that the sample in question was reanalyzed. If s/n ratio is less than 10, qualify affected native congener with "J".

7.2.1.4 Did the laboratory provide a "sample calculation" for one of the reported value? [✓] ___ ___

ACTION: Check one value and if not in agreement with the reported value, have Project Officer contact laboratory for a sample calculation.

$$C_{ex}\ (ng/ml) = \frac{(A1_n + A2_n)Cl}{(A1_l + A2_l)RR} \qquad RR = \frac{(A1_n + A2_n)C_l}{(A1_l + A2_l)C_n}$$

$C_{ex}$ = Concentration of congener in the extract.
$A1_n$ and $A2_n$ = The areas of the primary and secondary m/z's for the congener.
$C_l$ = Concentration of the labeled compound in the calibration standard.
$C_n$ =Concentration of the native compound in the calibration standard.
RR = Relative Response

7.2.2 Internal Standard Quantitation and Labeled Compound Recovery

7.2.2.1 The concentration in the extract of the native compounds other than those in the Native Toxics/Labeled /LOC standard, in the Labeled cleanup standard and in the Labeled injection internal standard (except the Labeled CB 178) using the response factors determined from the calibration data and the following equations:

$$C_{ex}\ (ng/ml) = \frac{(A1_s + A2_s)C_{is}}{(A1_{is} + A2_{is})RF} \qquad RF = \frac{(A1_s + A2_s)C_{is}}{(A1_{is} + A2_{is})C_s}$$

$C_{ex}$ = Concentration of labeled compound in the extract.
$A1_s$ and $A2_s$ = Areas of the primary and secondary m/z's for the congener.
$A1_{is}$ and $A2_{is}$ = Areas of the primary and secondary m/z's for the internal standard
$C_{is}$ = Concentration of the internal standard.
$C_s$ = Concentration of the compound in the calibration standard.
RF = Response Factor

Note: The internal standard and associated CB congeners can be found in Table 2 of the method.

7.2.2.2 The percent recovery of the Labeled Toxics/LOC/Window-defining CBs and the Labeled cleanup standard CBs are computed using the concentration in the extract determined above and the following equation:

$$\text{Recovery (\%)} = \frac{\text{Concentration found (ng/ml)}}{\text{Concentration spiked (ng/ml)}} \times 100$$

7.2.2.3 The concentration of the native CB in the solid phase is computed using the following equation:

$$\text{Concentration in the solid (ng/kg)} = \frac{(C_{ex} \times V_{ex})}{W_s}$$

$C_{ex}$ = Concentration of the compound in the extract.
$V_{ex}$ = The extract volume in ml.
$W_s$ = The sample dry weight in kg.

7.2.2.4 The concentration of the native CB in the aqueous phase is computed using the following equation:

$$\text{Concentration in the aqueous phase (pg/L)} = 1000 \times \frac{(C_{ex} \times V_{ex})}{V_s}$$

$C_{ex}$ = Concentration of the compound in the extract.
$V_{ex}$ = The extract volume in ml.
$V_s$ = The sample volume in liters.

7.2.2.5 The analyte concentration must be within the calibration range. If not, dilution should have been made to bring the concentration within the calibration range. Was this criterion met? [/] ___ ___

NOTE: When the sample extract is diluted by the factor necessary to bring the concentration within the calibration range, the analyst should adjust the concentration of the Labeled injection internal standard to 100 pg/uL in the extract and analyze an aliquot of the diluted extract.

7.3 Clean-up procedures

Clean-up may not be necessary for relatively clean samples (drinking waters, ground waters etc). If the matrix required clean-up, the laboratory has 6 different procedures to choose from (Section 7.5/Method 1668A). Before using any clean-up procedure, the laboratory must demonstrate that the Initial Precision and Recovery (IPR) requirements of the

method can be met using the clean-up procedure.

Labeled clean-up standards $^{13}C_{12}$-2,4,4-TriCB (CB-28), $^{13}C_{12}$-2,3 3,5,5'-PeCB (CB-111), $^{13}C_{12}$-2,2',3,3'5,5',6-HPCB (CB-178) are added to the sample just before the back extraction with base and acid procedure. This occurs before any recommended clean-up procedures are initiated.

7.3.1 Was the percent recovery of the clean-up standards within the recommended range 30-135%? ☑ ___ ___

ACTION: If no, and the recovery is less than 30%, qualify all data as estimated "J". If recovery is 0 %, qualify all positive data as estimated "J" and reject "R" all non-detects for that sample.
If recovery is > 135, qualify positive results as estimated, "J".

7.3.2 Check the chromatograms that clean-up procedure was needed for each sample. Were any clean-up procedures needed for either water or soil samples? ___ ☑ ___

ACTION: If yes, check extraction log to verify which clean-up procedures if any were performed. The laboratory is not limited to only one procedure.

1. If no clean-up was performed and the chromatograms indicated that some should have been performed. Use professional judgement to assess the effect on the interference on the validity of the data. Document lack of required clean-up for complex samples in Data Assessment.

2. If one type of clean-up was performed, but the chromatograms indicate that additional clean-up should have been utilized. Use professional judgement to assess the effect on the interference on the validity of the data. Document lack of additional clean-up for complex samples in the Data Assessment.

7.3.3 If clean-up procedures were used, did the Laboratory perform clean-up procedures on the Initial Precision and Recovery samples as required by the method? ☐ ___ ___

ACTION: If no, use professional judgement to assess the effect of the interference on the validity of the data. Document lack of IPR documentation for clean-up procedures in the Data Assessment.

## 8.0 Estimated Detection Limits (EMDL)

8.1 Was an EDL calculated using the formula in section 8.2 for CB congeners reported as non-detect? ☑ ___ ___

ACTION: 1. If EDL of an analyte which was not reported as a positive hit is missing, correct manually or contact the Project Officer to request from the laboratory corrections.

8.2 Use the equation below to check EDL calculations:

ALL MATRICES OTHER THAN WATER

$$EDL\ (pg/g) = \frac{2.5 \times Qis \times (Hx^1 + Hx^2) \times D}{(W) \times (His^1 + His^2) \times RR}$$

WATER

$$EDL\ (pg/L) = \frac{2.5 \times Qis \times (Hx^1 + Hx^2) \times D}{(V) \times (His^1 + His^2) \times RR}$$

Where:

$Hx^1$ and $Hx^2$ = peak heights of the noise for both quantitation ions of the non-detect isomer of interest.

$His^1$ and $His^2$ = peak heights of both the quantitation ions of the appropriate internal standards.

D = dilution factor

Qis = quantity (ng) of the appropriate internal standard added to the sample prior to extraction.

RR = Relative response factor from the initial calibration.

V = Volume of sample extracted in liters.

W = Sample dry weight.

NOTE: The validator should check the EDL data to verify that peak heights and not areas were used for this calculation. If the area algorithm was used, the validator should contact the Project Officer to request recalculations from the laboratory.

ACTION: If the spot check calculations yielded EDLs ≤ 15% difference from those reported in Form I, correct manually. If the difference between the validator's value and the Form I's values are > 15% contact the Project Officer to request from the laboratory for an explanation and a copy of the laboratory's calculations.

## 9.0 Method Blanks

9.1 Has a method blank per matrix been extracted and analyzed with each batch of 20 samples? [✓] ___ ___

9.2 If samples of some matrix were analyzed in different events (i.e. different shifts or days) has one blank for each matrix been extracted and analyzed for each event? [ ] ___ ___

9.3 Were the method blanks treated as a sample, i.e. spiked with Labeled Toxics/LOC/Window Defining Mixture, Labeled Internal and Labeled Cleanup standards? [✓] ___ ___

Note: 1 Liter of reagent water is used for aqueous samples, 10 gram sand for soil/sediment samples and 1.0 gram of corn oil for tissue samples.

9.4 Were any CB present in the method blank at a concentration less than the estimate minimum level (EML) of Table 2/Method 1668A or one-third the regulatory compliance limits? [✓] ___ ___

Note: The EML in Table 2 of the method are based on common contamination levels. A laboratory may establish an minimum level (ML) for a CB lower than the EMLs in Table 2. MLs may be established as low as the lowest calibration point. Check project plan regarding compliance limits.

ACTION: 1. If the proper number of method blanks were not analyzed, document in Data Assessment. If the validator feels that the validity of the data is seriously compromised and validation of data without the method blanks would be flawed, then notify the Project Officer. If decision is made to proceed with the validation process, consider the following actions: no action taken on non-detected analytes. If an analyte has a reported concentration that is > 5 times the EML, qualify "J" and all concentrations ≤ 5 times the EML are qualified "R" due to possibility of contamination.

2. A. If the congener concentration in the sample is less than five times the concentration in the blank, flag the congener reported value with a "U" qualifier.

B. If the concentration of the congener in the sample is greater than five times the concentration in the blank, no action is needed.

## 10.0 Labeled Internal and Cleanup Compound Recoveries

10.1 Were the samples spiked with all the labeled compounds as specified in the method? [✓] ___ ___

10.2 Are all labeled compound recoveries within the required limits ? [✓] ___ ___

Note: The percent recovery for the Labeled Toxics/LOC/Window Defining Congeners 30-140% is ~~25-150%, except 15-150% for $^{13}C_{12}$-2-MoCB and $^{13}C_{12}$-4-MoCB~~. 30-135% for Cleanup Standards.

10.3 If not, were samples reanalyzed? [ ] ___ ✓

ACTION: 1. If the labeled compound recovery was below the lower limit, qualify as estimate with "J" the positive data for the associated compound.

2. No action on non-detects if the labeled compound recovery is above the upper limit.

3. If the labeled compound recovery is 0%, notify project officer. At a minimum, qualify positive value as estimate "J" and reject non-detects with "R" qualifier.

Note 1: If a labeled compound recovery is low, and the cleanup standards are not, the recovery problem may be associated with the extraction procedure or related to a particular difficult matrix. In this case, reanalysis may only serve to confirm a "matrix effect".

Note 2: Low recoveries of the labeled compounds and Cleanup standards suggest that losses may be due to the performance of the clean up steps. Re-extraction and reanalysis of the sample may yield better results.

Recalculate the percent recovery for each labeled standard in the sample extract, $Rec_l$, using the formula:

$$\% \, Rec_l = \frac{(A_{l1} + A_{l2}) \times Q_{is} \times 100}{(A_{is1} + A_{is2}) \times RF \times Q_l}$$

$A_{l1} + A_{l2}$ = integrated areas of the two quantitation ions of the appropriate labeled compound.

$A_{is1} + A_{is2}$= integrated areas of the two quantitation ions of the appropriate internal standard.

$Q_l$ = quantity of the appropriate labeled compound

$Q_{is}$ = quantity of the appropriate internal standard injected

RF = Response factor of the labeled compounds as determined by the five-point calibration.

## 11.0 Determination of CBs on a DB-1 Column

11.1 The DB-1 column is optional and is capable of uniquely resolving the congener 156 and 157 that are not resolved on the SPB-octyl column and for resolution of other CB congeners. Was the laboratory required to analyze sample extracts on the DB-1 column? [ ] ✓ ___

Note: The two-column system is capable of resolving a total of approximately 180 CB congeners.

ACTION: If yes, were the WDM, and Cleanup standards added to all samples, standards, blanks, etc? If no, check PO or project plan regarding modifications. [ ] ___ ✓

Note: Window-defining congeners - the beginning and ending congeners at each level of

chlorination are the same as for the SPB-octyl column.

## 12.0 Sample Reanalysis

12.1 The Project Officer will evaluate the need for reanalyzing the samples with qualified data based on site-specific Data Quality Objectives.

12.2 Due to a variety of situations (see below) that may occur during sample analysis, the laboratory is required to reanalyze or re-extract and reanalyze certain samples. If a reanalysis was required but was not performed, contact the Project Officer to initiate reanalysis. List in data assessment all re-extractions and reanalyses and identify the sample data summaries which must be used by the data user (when more than one analysis is submitted for a sample).

Lab must re-extract and/or re-analyzed samples when the following criteria are not met:

1. WDM must be met before any standard, samples, QC samples and required blank are analyzed.

2. Initial calibration criteria as outline in section 5.2.1, 5.2.3 - 5.2.9 above must be met.

3. Calibration verification standard criteria as outline in section 6.1.1 - 6.1.4 above must be met.

4. A method blank was not extracted and analyzed with each batch of samples/instrument.

ACTION: For criteria 1, 2, 3, or 4 notify the Project Officer to discuss possible re-analysis of sample by the laboratory.

## 13.0 Precision and Recovery (PAR)/Laboratory Control Sample (LCS)

The laboratory is required to show initial demonstration of capability, to evaluate and document data quality. Laboratory performance is compared to established performance criteria to determine if results of analyses meet the performance characteristics of the method.

The laboratory must perform and submit data to establish the ability to generate acceptable precision and accuracy.

13.1 Did the laboratory analyzed an Initial Precision and Recovery (IPR) standard containing the Native Toxics/LOC congeners, Labeled Toxics/LOC/WDM and Labeled cleanup standards? [✓] ___ ___

ACTION: If no, contact the Project Officer to request resubmittals from the laboratory.

If data is not available, check the project plan or discuss the issue with the Project Officer. If a decision is made to proceed with validation, use professional judgement. All data at a minimum should be qualified as estimated "J". Technically according to the method, data and system performance is unacceptable for all compounds. Analyses should not have continued as per the method. Document under contract non-compliance in Data Assessment.

13.2 Did the IPR standard deviation (s) and average concentration (x) passed criteria as outlined below? [ ] ___ [✓]

1. %RSD < 40% and 60-140% recovery for Native Toxics/LOC congeners
2. %RSD < 50% and 35-135% recovery for Labeled Toxics/LOC/WDM (20-135% for $^{13}C_{12}$ -2- MoCB and $^{13}C_{12}$ -4- MoCB)
3. %RSD < 45% and 45-120% recovery for Labeled cleanup standards

ACTION: If no, qualify effected congeners as estimate "J"

The laboratory must analyzed an Ongoing Precision and Recovery standard (OPR) periodically, at the beginning of 12 hour shift after the analysis of the CS3 calibration verification (CV), and before the analysis of any sample in each set .

13.3 Was the ~~Ongoing Precision and Recovery (OPR)~~ BCS standard analyzed at the required frequency? [✓] ___ ___

13.4 Did the ~~OPR~~ BCS standard passed the ~~concentration criteria limits in outline below~~ QAPP? [ ] / ___

1. 50-150% recovery for Native Toxics/LOC congeners
2. 30-140% recovery for Labeled Toxics/LOC/WDM (15-140% for $^{13}C_{12}$ -2- MoCB and $^{13}C_{12}$ -4- MoCB)
3. 40-125% recovery for Labeled cleanup standards

ACTION: If no, qualify affected congeners as estimate "J". All samples that do not have a passing OPR standard are potentially affected for that analyte.

Note: The laboratory might use laboratory control sample (LCS) for IPR and laboratory control sample duplicate (LCSD) for OPR.

**The following sections may be incorporated in the validation process on a case by case basis depending upon the requirements of the Project Plan. Sometimes a laboratory will provide data for some of the following sections on a routine basis. If not a requirement of the Project Plan, then professional judgement is needed to qualify data based on additional information.**

## 14.0 Toxicity Equivalency Factor (TEF)

NOTE: Certain CB congeners have been shown to cause toxic responses similar to those cause by 2,3,7,8-tetrachloro-dibenzo-p-dioxin (TCDD), the most potent congener. The concept of toxic equivalency factor (TEF; Reference 3) has been developed to facilitate risk assessment and regulatory control of exposure.

The TEF value concentrations are listed in the following Table 1 (Reference 3)

| Target Analyte | TEF Value |
|---|---|
| CB-77 | 0.0001 |
| CB-81 | 0.0001 |
| CB-105 | 0.0001 |
| CB-114 | 0.0005 |
| CB-118 | 0.0001 |
| CB-123 | 0.0001 |
| CB-126 | 0.1 |
| CB-156/147 | 0.0005 |
| CB-167 | 0.00001 |
| CB-169 | 0.01 |
| CB-189 | 0.0001 |

When calculating the 2,3,7,8-TCDD Toxicity Equivalency of a sample for the above CB congeners, only the positive reported values must be included in the calculations. The Toxicity Equivalency (TEQ) concentration is the sum of each concentration of each individual toxic congener value and multiplied by their respective TEF value.

14.1 Did the lab include EDL values in the TEF adjusted concentration calculations? [✓] ___ ___

ACTION: 1. If yes, the toxicity equivalency calculations were not calculated properly, notify the Project Officer to arrange for laboratory resubmittals.

NOTE: Any qualifications such as "J" applied to target compounds should be also applied to their associated total congener concentration.

## 15.0 Rinsate Blank/Rinse Blank *(Region 2 QA guidelines recommend rinse blanks for all projects)*

15.1 One rinsate blank should be collected for each batch of 20 soil samples or one per day Whichever is more frequent. Were rinsate blanks collected at the above frequency? [✓] ___ ___

15.2 Do any rinsate blanks show the presence of any CB congener at amount above the detection limits (i.e. reported as positive value)? [✓] ___ ___

ACTION: If any qualification is needed due to rinsate blank contamination, follow the guidelines outlined under Method Blanks, section 9, Actions 1 and 2.

## 16.0 Performance Evaluation Sample (PES)

NOTE: This type of sample may not be available at this time. In many cases, laboratories will substitute matrix spike/matrix spike duplicate (MS/MSD). If PEM(s) were not analyzed but MS/MSD data were submitted, skip this section and go to section 17.

16.1 One or more PES is supplied to the Laboratory. The frequency of this QC sample is one per group of 20 environmental samples or one per samples collected over one week period, whichever occurs first (check project plan).

16.2 Was a PES analyzed at the frequency described above? [ ] ✓ ___

16.3 Were the percent recovery of CB congeners within the 50 to 150 percent control limits? [ ] ___ ✓

ACTION: 1. If any CB congener fall outside the 50-150 percent control limit, flag positive and non-detect data as estimate "J". However, if the recovery is below 20%, qualify all associated non-detects "R" and positive hits as "J". Notify the Project Officer. Reanalysis may be initiated.

## 17.0 Matrix Spike (MS) Field Sample

Note: Matrix spike is not required by this method although Labs may routinely perform this analysis as part of internal QA/QC and submit this data as part of the package. Verify requirements with Project Officer.

17.1 Was a matrix spike analyzed at the frequency of one per SDG samples per matrix? [ ] ✓ ___

17.2 Were the percent recovery of the spiking congeners within 60 to 140 percent? [ ] ___ ✓

ACTION: If problems such as interferences are observed, use professional judgement to assess the quality of the data. The 60-140% limits of the matrix spike data may be used to flag data of the spiked sample only. The matrix spike data of the PE blank sample are more important and must be used primarily in data validation.

17.3 Was a matrix spike duplicate analyzed? [ ] ___ ✓

ACTION: No action required. A matrix spike duplicate is not required. Use professional judgement if there is a large difference in concentrations reported between MS and MSD. Qualifications if any, can only be performed on the sample that was used for this criteria.

## 18.0 Environmental Duplicate Samples *(recommended in Region 2 for all Projects)*

NOTE: Do not confuse an environmental duplicate with a matrix spike duplicate. An environmental duplicate is a sample that has been divided into 2 parts (extracted and analyzed as two different samples) or as 2 separate samples from the same location sent by the sampling crew. This sample is not spike with any additional compounds other than those compounds required by the method for analysis of all routine samples.

18.1 For every batch of 20 samples or samples collected over a period of one week, whichever is less, there must be a sample designated as duplicate. Were duplicate samples collected at the above frequency? [✓] ___ ___

18.2 Did results of the duplicate samples agree within ~~25% relative difference~~ >20% RPD for water samples and ~~50%~~ for other type of samples? [ ] ✓ ___

ACTION: The duplicate results can be used in conjunction of other QC data. Use professional judgement.

## 19.0 REFERENCES

They are important references for technical information and are submitted here as part of this method's documentation.

1. Method 1668, Revision A, "Chlorinated Biphenyl Congeners in Water, Soil, sediment, Biosolids and Tissue by HRGC/HRMS, August 20, 2003.

2. EPA Statement of Work for Chlorinated Biphenyl (CB) Congeners, Multi-Media, Multi-Concentration, CBC01.0, May 2005.

3. Van den Berg, Linda Birnbaum, Albetus T.C., "Environmental Health Perspectives 106:12, 775-792, 1998.

# PCB Aroclors

**Laboratory Data Consultants, Inc.**

**7750 El Camino Real, Ste. 2L Carlsbad, CA 92009**

**Phone** 760.634.0437 **Web** www.lab-data.com **Fax** 760.634.0439

Windward Environmental, LLC
200 West Mercer Street, Suite 401
Seattle, WA 98119
ATTN: Ms. Jennifer Parker

October 13, 2011

SUBJECT: Lower Passaic River Restoration Project, Data Validation

Dear Ms. Parker,

Enclosed are the final validation reports for the fractions listed below. This SDG was received on September 28, 2011. Attachment 1 is a summary of the samples that were reviewed for each analysis.

**LDC Project # 26311:**

| SDG # | Fraction |
|---|---|
| L1110328 | Semivolatiles, Polynuclear Aromatic Hydrocarbons, Polychlorinated Biphenyls, Percent Moisture |

The data validation was performed under EPA Level IV guidelines. The analyses were validated using the following documents, as applicable to each method:

- Final Surface Sediment Chemical Analyses and Benthic Invertebrate Toxicity and Bioaccumulation Testing Quality Assurance Project Plan (QAPP) for the Lower Passaic River Restoration Project, October 2009
- Caged Bivalve Study Addendum, March 2011
- USEPA Region II Validation SOP HW-22, (Revision 2, June 2001) for Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry SW-846 method 8270C, modified as necessary to accommodate the QAPP criteria
- USEPA Region II Validation SOP HW-45, (Revision 1, October 2006) for Polychlorinated Biphenyls by Gas Chromatography SW-846 method 8082, modified as necessary to accommodate the QAPP criteria
- USEPA, Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review, June 2008
- USEPA, Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review, January 2010

Please feel free to contact us if you have any questions.

Sincerely,

Stella Cuenco

Stella S. Cuenco
Data Validation Operations Manager/Senior Chemist

V:\LOGIN\Windward\Passaic\26311COV.wpd

Attachment 1

| EDD | LDC #26311 (Windward Environmental, LLC - Seattle WA / Lower Passaic River Restoration Project) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | PO# 2011-0012 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LDC | SDG# | DATE REC'D | (3) DATE DUE | SVOA (8270C | | PAHs (8270C -SIM) | | PCBs (8082) | | % Moist. (2540G) | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Matrix: Water/Tissue | | | | W | T | W | T | W | T | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S |
| A | L1110328 | 09/28/11 | 10/19/11 | 1 | 10 | 1 | 10 | 1 | 10 | 0 | 10 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total | T/SC | | | 1 | 10 | 1 | 10 | 1 | 10 | 0 | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 43 |

For Internal Use Only: Shaded cells indicate Level IV validation (all other cells are Level III validation). These sample counts do not include MS/MSD, and DUPs

26311ST.wpd

# Laboratory Data Consultants, Inc.
# Data Validation Report

| | |
|---|---|
| **Project/Site Name:** | Lower Passaic River Restoration Project |
| **Collection Date** | March 8 through July 18, 2011 |
| **LDC Report Date:** | October 14, 2011 |
| **Matrix:** | Tissue/Water |
| **Parameters:** | Polychlorinated Biphenyls |
| **Validation Level:** | EPA Level IV |
| **Laboratory:** | Alpha Analytical, Inc. |
| **Sample Delivery Group (SDG):** | L1110328 |

**Sample Identification**

LPR6-ECST-Comp01
LPRBG-ECST-Comp01
LPR6-ECST-Comp02
LPR7-ECST-Comp03
LPR7-ECST-Comp04
LPR8-ECST-Comp05
LPR1-GDST-Comp01
LPRBG-GDST-Comp01
LPR2-GDST-Comp02
LPR3-GDST-Comp03
LPR-071811-RB
LPR6-ECST-Comp01MS
LPR6-ECST-Comp01MSD
LPR6-ECST-Comp01DUP

## Introduction

This data review covers 13 tissue samples and one water sample listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8082 for Polychlorinated Biphenyls.

This review follows the Final Surface Sediment Chemical Analyses and Benthic Invertebrate Toxicity and Bioaccumulation Testing Quality Assurance Project Plan (QAPP) for the Lower Passaic River Restoration Project, (October 8, 2009), the Caged Bivalve Study Addendum (March 2, 2011), and USEPA Region II Validation SOP HW-45 (Revision 1, October 2006) for Polychlorinated Biphenyls by Gas Chromatography EPA SW 846 Method 8082A, modified as necessary to accommodate the QAPP criteria.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

NJ Presumptive evidence of presence of the compound at an estimated quantity.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

## I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

## II. GC/ECD Instrument Performance Check

Instrument performance was acceptable unless noted otherwise under initial calibration and continuing calibration sections.

## III. Initial Calibration

Initial calibration of multicomponent compounds were performed for the primary (quantitation) column and confirmation column as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 20.0% for all compounds.

Retention time windows were evaluated and considered technically acceptable.

## IV. Continuing Calibration

Continuing calibration was performed at required frequencies.

The percent differences (%D) of calibration factors in continuing calibration standard mixtures were within the 15.0% QC limits.

The percent difference (%D) of the second source calibration standard were less than or equal to 15.0% for all compounds.

Retention times (RT) of all compounds in the calibration standards were within QC limits.

## V. Blanks

Method blanks were reviewed for each matrix as applicable. No polychlorinated biphenyl contaminants were found in the method blanks.

Sample LPR-071811-RB was identified as a rinsate blank. No polychlorinated biphenyl contaminants were found in this blank.

## VI. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

## VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Results were within QC limits.

## VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

## IX. Regional Quality Assurance and Quality Control

Not applicable.

## X. Florisil Cartridge Check

Florisil cleanup was not required and therefore not performed in this SDG.

## XI. GPC Calibration

GPC cleanup was not required and therefore not performed in this SDG.

## XII. Target Compound Identification

All target compound identifications were within validation criteria.

## XIII. Compound Quantitation and Reported RLs

All compound quantitation and RLs were within validation criteria.

The sample results for detected compounds from the two columns were within 25% relative percent differences (RPD) with the following exceptions:

| Sample | Compound | RPD | Flag | A or P |
|---|---|---|---|---|
| LPR6-ECST-Comp02 | Aroclor-1242 | 39.2 | J (all detects) | A |
| LPR7-ECST-Comp04 | Aroclor-1242 | 37.9 | J (all detects) | A |
| LPR8-ECST-Comp05 | Aroclor-1242 | 50.4 | J (all detects) | A |

The laboratory indicated that the peaks match the retention times for Aroclor-1242 and Aroclor-1254 but area ratios are not typical for these aroclors. Results are considered weathered.

## XIII. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

## XIV. Field Duplicates

No field duplicates were identified in this SDG.

**Lower Passaic River Restoration Project**
**Polychlorinated Biphenyls - Data Qualification Summary - SDG L1110328**

| SDG | Sample | Compound | Flag | A or P | Reason |
|---|---|---|---|---|---|
| L1110328 | LPR6-ECST-Comp02<br>LPR7-ECST-Comp04<br>LPR8-ECST-Comp05 | Aroclor-1242 | J (all detects) | A | Compound quantitation and CRQLs (RPD) |

**Lower Passaic River Restoration Project**
**Polychlorinated Biphenyls - Laboratory Blank Data Qualification Summary - SDG L1110328**

No Sample Data Qualified in this SDG

**Lower Passaic River Restoration Project**
**Polychlorinated Biphenyls - Field Blank Data Qualification Summary - SDG L1110328**

No Sample Data Qualified in this SDG

LDC #: 26311A3b

SDG #: L1110328

Laboratory: Alpha Analytical, Inc.

# VALIDATION COMPLETENESS WORKSHEET

Level IV

Date: 10/5/11

Page: 1 of 1

Reviewer:

2nd Reviewer:

**METHOD:** GC Polychlorinated Biphenyls (EPA SW 846 Method 8082)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

| | Validation Area | | Comments |
|---|---|---|---|
| I. | Technical holding times | A | Sampling dates: 3/8 - 7/18/11 |
| II. | GC/ECD Instrument Performance Check | N | |
| III. | Initial calibration | A | 20% |
| IV. | Continuing calibration/ICV | A | CCV/ICV ≤ 15% |
| V. | Blanks | A | |
| VI. | Surrogate spikes | A | |
| VII. | Matrix spike/Matrix spike duplicates /DUP | A | |
| VIII. | Laboratory control samples | A | LCS/D |
| IX. | Regional quality assurance and quality control | N | |
| Xa. | Florisil cartridge check | N | |
| Xb. | GPC Calibration | N | |
| XI. | Target compound identification | A | |
| XII. | Compound quantitation/RL/LOQ/LODs | SW | |
| XIII. | Overall assessment of data | A | |
| XIV. | Field duplicates | N | |
| XV. | Field blanks | ND | RB =11 |

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples:

Time a AQ

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1 | LPR6-ECST-COMP01 | 11 | LPR-071811RB W | 21 | WG479958-1 | 31 | |
| 2 | LPRBG-ECST-COMP01 | 12 | LPR6-ECST-COMP01MS | 22 | WG481281-1 | 32 | |
| 3 | LPR6ECST-COMP02 | 13 | LPR6-ECST-COMP01MSD | 23 | | 33 | |
| 4 | LPR7-ECST-COMP03 | 14 | LPR6-ECST-COMP01DUP | 24 | | 34 | |
| 5 | LPR7-ECST-COMP04 | 15 | | 25 | | 35 | |
| 6 | LPR8-ECST-COMP05 | 16 | | 26 | | 36 | |
| 7 | LPR1-GDST-COMP01 | 17 | | 27 | | 37 | |
| 8 | LPRBG-GDST-COMP01 | 18 | | 28 | | 38 | |
| 9 | LPR2-GDST-COMP02 | 19 | | 29 | | 39 | |
| 10 | LPR3-GDST-COMP03 | 20 | | 30 | | 40 | |

LDC #: 26311A36

# VALIDATION FINDINGS WORKSHEET
## Compound Quantitation and Reported CRQLs


Reviewer: 1
2nd Reviewer: 2

METHOD: GC

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".
Y N N/A Did the relative percent difference of detected compounds between two columns./detectors ≤25%?

| # | Compound Name | Sample ID | %RPD Between Two Columns/Detectors Limit (≤ 25%) | Qualifications |
|---|---|---|---|---|
| | 3 | Aroclor 1242 | 39.2 | Jdetect/A |
| | 5 | ↓ | 37.9 | ↓ |
| | 6 | ↓ | 50.4 | ↓ |
| | All | lab indicated that Aroclor 1242 and 1254 are considered weathered | | Text |

COMQUA_RPD_25.wpd

LDC #: 26211A36

# VALIDATION FINDINGS WORKSHEET
## Initial Calibration Calculation Verification


Reviewer: [illegible]
2nd Reviewer: [illegible]

**METHOD:** GC ✓ HPLC ____

The calibration Factor (CF), average CF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

CF = A/C
average CF = sum of the CF/number of standards
%RSD = 100 * (S/X)

A = Area of compound,
C = Concentration of compound,
S = Standard deviation of the CF
X = Mean of the CFs

| # | Standard ID | Calibration Date | Compound | Reported CF (100 std) | Recalculated CF (100 std) | Reported Average CF (initial) | Recalculated Average CF (initial) | Reported %RSD | Recalculated %RSD |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 10AL | 6/24/11 | Aroclor 1260-1 (A) | 2.037E5 | 2.037E5 | 1.957E5 | 1.957E5 | 9.19 | 9.18 |
| | | | ↓ (B) | 6.666E5 | 6.666E5 | 6.683E5 | 6.683E5 | 8.43 | 8.43 |
| | | | | | | | | | |
| 2 | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| 3 | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| 4 | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |

Comments: Refer to Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

A = RTX-5
B = RTX-CLP1

LDC #: 26311A3b

# VALIDATION FINDINGS WORKSHEET
## Continuing Calibration Results Verification


Reviewer: n
2nd Reviewer: n

**METHOD:** GC ✓ HPLC ____

The percent difference (%D) of the initial calibration average Calibration Factors (CF) and the continuing calibration CF were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. CF - CF)/ave. CF
CF = A/C

Where: ave. CF = initial calibration average CF
CF = continuing calibration CF
A = Area of compound
C = Concentration of compound

| # | Standard ID | Calibration Date | Compound | Average CF(Ical)/ CCV Conc. | Reported CF/Conc. CCV | Recalculated CF/Conc. CCV | Reported %D | Recalculated %D |
|---|---|---|---|---|---|---|---|---|
| 1 | F407211102 | 7/21/11 | Aroclor 1260-1 (A) | 100 | 871.283 | 871.231 | 12.9 | 12.9 |
| | | | (B) | | 930.011 | 929.972 | 7.0 | 7.0 |
| | F408051101 | 8/5/11 | (A) | | 976.092 | 975.984 | 2.4 | 2.4 |
| 2 | | | (B) | | 1022.584 | 1022.595 | 2.3 | 2.3 |
| | F408051119 | 8/5/11 | (A) | | 978.023 | 978.028 | 2.2 | 2.2 |
| | | | (B) | | 1055.164 | 1055.065 | 5.5 | 5.5 |
| 3 | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| 4 | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 26311A3b

# VALIDATION FINDINGS WORKSHEET
## Surrogate Results Verification



Reviewer: M
2nd reviewer: M

METHOD: ✓ GC ___ HPLC

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
SS = Surrogate Spiked

Sample ID: 1

| Surrogate | Column/Detector | Surrogate Spiked | Surrogate Found | Percent Recovery Reported | Percent Recovery Recalculated | Percent Difference |
|---|---|---|---|---|---|---|
| TCMX | A | 50 | 27.832 | 56 | 56 | 0 |
| ~~DCB~~ TCMX | B | ↓ | 28.617 | 57 | 57 | ↓ |
| ~~TCMX~~ DCB | A | | 23.727 | 47 | 47 | |
| DCB | B | | 24.616 | 49 | 49 | |

Sample ID: _____

| Surrogate | Column/Detector | Surrogate Spiked | Surrogate Found | Percent Recovery Reported | Percent Recovery Recalculated | Percent Difference |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

Sample ID: _____

| Surrogate | Column/Detector | Surrogate Spiked | Surrogate Found | Percent Recovery Reported | Percent Recovery Recalculated | Percent Difference |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

LDC #: 26311A26

# VALIDATION FINDINGS WORKSHEET
## Matrix Spike/Matrix Spike Duplicates Results Verification


Reviewer: M
2nd Reviewer: L

**METHOD:** ✓ GC ___HPLC

The percent recoveries (%R) and relative percent differences (RPD) of the matrix spike and matrix spike duplicate were recalculated for the compounds identified below using the following calculation:

%Recovery = 100 * (SSC - SC)/SA  Where  SSC = Spiked sample concentration  SC = Sample concentration
SA = Spike added

RPD =(({SSCMS - SSCMSD} * 2) / (SSCMS + SSCMSD))*100  MS = Matrix spike  MSD = Matrix spike duplicate

MS/MSD samples: 12/13

| Compound | Spike Added (ug/kg) | | Sample Conc. (ug/kg) | Spike Sample Concentration (ug/kg) | | Matrix spike Percent Recovery | | Matrix Spike Duplicate Percent Recovery | | MS/MSD RPD | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | MS | MSD | --- | MS | MSD | Reported | Recalc. | Reported | Recalc. | Reported | Recalc. |
| Gasoline (8015) | | | | | | | | | | | |
| Diesel (8015) | | | | | | | | | | | |
| Benzene (8021B) | | | | | | | | | | | |
| Methane (RSK-175) | | | | | | | | | | | |
| 2,4-D (8151) | | | | | | | | | | | |
| Dinoseb (8151) | | | | | | | | | | | |
| Naphthalene (8310) | | | | | | | | | | | |
| Anthracene (8310) | | | | | | | | | | | |
| HMX (8330) | | | | | | | | | | | |
| 2,4,6-Trinitrotoluene (8330) | | | | | | | | | | | |
| Aroclor 1260 | 183 | 186 | ND | 120 | 111 | 65 | 65 | 60 | 60 | 8 | 8 |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

Comments: Refer to Matrix Spike/Matrix Spike Duplicates findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 26311A36

# VALIDATION FINDINGS WORKSHEET

## Laboratory Control Sample/Laboratory Control Sample Duplicate Results Verification


Reviewer: A
2nd Reviewer: [illegible]

**METHOD:** ✓ GC __ HPLC

The percent recoveries (%R) and Relative Percent difference (RPD) of the laboratory control sample and laboratory control sample duplicate were recalculated for the compounds identified below using the following calculation:

% Recovery = 100* (SSC-SC)/SA

RPD = I SSCLCS - SSCLCSD I * 2/(SSCLCS + SSCLCSD)

Where: SSC = Spiked sample concentration
SA = Spike added
LCS = Laboratory control sample percent recovery
SC = Concentration
LCSD = Laboratory control sample duplicate percent recovery

LCS/LCSD samples: WG479958-2/3

| Compound | Spike Added (µg/L) | | Spiked Sample Concentration (µg/L) | | LCS Percent Recovery | | LCSD Percent Recovery | | LCS/LCSD RPD | |
|---|---|---|---|---|---|---|---|---|---|---|
| | LCS | LCSD | LCS | LCSD | Reported | Recalc. | Reported | Recalc. | Reported | Recalc. |
| Gasoline (8015) | | | | | | | | | | |
| Diesel (8015) | | | | | | | | | | |
| Benzene (8021B) | | | | | | | | | | |
| Methane (RSK-175) | | | | | | | | | | |
| 2,4-D (8151) | | | | | | | | | | |
| Dinoseb (8151) | | | | | | | | | | |
| Naphthalene (8310) | | | | | | | | | | |
| Anthracene (8310) | | | | | | | | | | |
| HMX (8330) | | | | | | | | | | |
| 2,4,6-Trinitrotoluene (8330) | | | | | | | | | | |
| Aroclor 1260 | 1 | 1 | 0.862 | 0.885 | 86 | 86 | 89 | 89 | 3 | 3 |
| | | | | | | | | | | |

Comments: Refer to Laboratory Control Sample/Laboratory Control Sample Duplicate findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 26311A36

# VALIDATION FINDINGS WORKSHEET
## Sample Calculation Verification


Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: ✓ GC ___ HPLC

Y N N/A Were all reported results recalculated and verified for all level IV samples?
Y N N/A Were all recalculated results for detected target compounds agree within 10% of the reported results?

Concentration= (A)(Fv)(Df) / (RF)(Vs or Ws)(%S/100)

A= Area or height of the compound to be measured
Fv= Final Volume of extract
Df= Dilution Factor
RF= Average response factor of the compound in the initial calibration
Vs= Initial volume of the sample
Ws= Initial weight of the sample
%S= Percent Solid

Example:

Sample ID. 1 Compound Name Aroclor 1262-1

Concentration = 2525368 / 79420388

= 31.797 + 65.26 + 111.461 + 35.879 + 118.336 / 5

= 72.5466 (2) / 5.71

= 25.4 ug/kg

| # | Sample ID | Compound | Reported Concentrations ( ) | Recalculated Results Concentrations ( ) | Qualifications |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

Comments:

Yes NO N/A

PACKAGE COMPLETENESS AND DELIVERABLES

CASE NUMBER: _____ SDG# L1110328

LAB: Alpha Analytical SITE: Lower Passaic River

1.0 Data Completeness and Deliverables

1.1 Has all the data been submitted in CLP deliverable format? [✓] ___ ___

1.2 Have any missing deliverables been received and added to the data package? [✓] ___ ___

ACTION: Call lab for explanation/resubmittal of any missing deliverables. If lab cannot provide them, note the effect on review of the data in the reviewer narrative.

2.0 Cover Letter, SDG Narrative

2.1 Is a laboratory narrative or cover letter present? [✓] ___ ___

2.2 Are the case number and/or SDG number contained in the narrative or cover letter? [✓] ___ ___

3.0 Data Validation Checklist

3.1 Does this data package contain:

Water data? ✓ ___

Waste data? ___ ✓

Soil/solid data? ✓ ___

POLYCHLORINATED BIPHENYLS

1.0 Traffic Reports and Laboratory Narrative

1.1 Are traffic report and chain-of-custody forms present for all samples? [✓] ___ ___

Yes NO N/A

ACTION: If no, contact lab for replacement of missing or illegible copies.

1.2 Do the traffic reports, chain-of-custody forms or SDG narrative indicate any problems with sample receipt, condition of the samples, analytical problems or special circumstances affecting the quality of the data? __ N/A __

ACTION: If any sample analyzed as a soil, other than TCLP, contains 50%-90% water, all data should be qualified as estimated, "J." If a soil sample, other than TCLP, contains more than 90% water, non detects shall be qualified as unusable, "R."

ACTION: If samples were not iced or if the ice was melted upon arrival at the laboratory and the temperature of the cooler was elevated (> 10° C), flag all positive results "J" and all non-detects "UJ".

2.0 Holding Times

2.1 Have any PCB technical holding times, determined from date of collection to date of extraction, been exceeded? __ N/A __

Water and waste samples for PCB analysis must be extracted within 7 days of the date of collection. Extracts must be analyzed within 40 days of the date of extraction. Soils and solid samples must be extracted within 14 days of collection and analyzed within 40 days of extraction.

ACTION: If technical holding times are exceeded, flag all positive results as estimated, "J," and sample quantitation limits "UJ" and document in the narrative that holding times were exceeded. If analyses were done more than 14 days beyond holding time, either on the first analysis or upon re-analysis, the reviewer must use professional judgement to determine the reliability of the data and the effects of additional storage on the sample results. At a minimum, all the data should at least be

Yes NO N/A

qualified "J", but the reviewer may determine that non-detects are unusable,"R." (Table 1)

Table 1. Holding Time Criteria

| Matrix | Preserved | Criteria | Action | |
|---|---|---|---|---|
| | | | Detected compounds | Non-detected compounds |
| Aqueous | No | ≤ 7 days(extraction)<br>≤ 40 days(analysis) | J* | UJ* |
| | No | > 7 days(extraction)<br>> 40 days(analysis) | J | UJ |
| | Yes | ≤ 7 days(extraction)<br>≤ 40 days(analysis) | No qualification | |
| | Yes | > 7 days(extraction)<br>> 40 days(analysis) | J | UJ |
| | Yes/No | > 28 days (gross exceedance) | J | R |
| Non-aqueous | No | ≤ 14days(extraction)<br>≤ 40 days (analysis) | J* | UJ* |
| | No | > 14days(extraction)<br>>40 days(analysis) | J | UJ |
| | Yes | ≤ 14days(extraction)<br>≤ 40 days(analysis) | No qualification | |
| | Yes | > 14days(extraction)<br>> 40 days(analysis) | J | UJ |
| | Yes/No | > 28 days(gross exceedance) | J | R |

* only if cooler temperature exceeds 10°C; no action required if cooler temperature < 10°C.

3.0 Surrogate Recovery (Form II/Equivalent)

3.1 Were the recoveries of tetrachloro-m-xylene (TCMX) and decachlorobiphenyl (DCB) presented on CLP Surrogate Recovery Summary forms (Form II), or equivalent, for each of the following matrices?

a. Water/Waste [/] ___ ___

Yes NO N/A

b. Soil/Solid /tissue [✓] ___ ___

3.2 Are all the PCB samples listed on the appropriate surrogate recovery form for each of the following matrices?

a. Water [✓] ___ ___

b. Waste [ ] ___ [✓]

c. Soil/Solid /tissue [✓] ___ ___

ACTION: Call lab for explanation/resubmittals. If missing deliverables are unavailable, document the effect in the data assessment.

3.3 Are all recovery limits for the surrogates TCMX and DCB between 30-150% for all samples, including MS and MSDs, LCSs and all blanks? [✓] ___ ___

Note: Reviewer shall use lab in-house recovery limits, if available. In-house criteria should be examined for reasonableness.

ACTION: Circle all outliers in red. Follow surrogate criteria, Table 2.

Note: DCB is used when PCBs are determined as Aroclors. DCB is the internal standard when determining PCB congeners and TCMX the surrogate.

3.4 Were surrogate retention times (RT) within the windows established during the initial 5-point analysis? [✓] ___ ___

ACTION: Follow surrogate criteria, Table 2.

Table 2. Surrogate Recovery Criteria

| Criteria | Action | |
|---|---|---|
| | Detected Target Compounds | Non-detected Target Compounds |
| %R > 200% | J | Use professional judgement |

Yes NO N/A

| | | |
|---|---|---|
| 150% < %R ≤ 200% | J | No qualification |
| 30% ≤ %R ≤ 150% | No qualification | |
| 10% ≤ %R < 30% | J | UJ |
| %R < 10% (sample dilution not a factor) | J | R |
| %R < 10% (sample dilution is a factor) | Use professional judgement | |
| RT out of RT window | Use professional judgement | |
| RT within RT window | No qualification | |

3.6 Are there any transcription/calculation errors between raw data and Form II? [ ] / ___

ACTION: If large errors exist, call lab for explanation/resubmittal. Make any necessary corrections and document the effect in data assessments.

4.0 Laboratory Control Sample (LCS)

4.1 Are raw data and percent recoveries present for all Laboratory Control samples as required by Method 8000B (section 8.5) and Method 8082A (section 8.4.2)? [/] ___ ___

Verify that QC check samples were extracted and analyzed by the same procedures used for the actual samples.

ACTION: If any Laboratory Control Sample data are missing, call the lab for explanation/ resubmittals. Make note in the data assessment.

NOTE: For aqueous samples, an additional QC check sample must be prepared and analyzed when any analyte in a matrix spike fails the required acceptance criteria (see section 5.3 below).

Yes NO N/A

The additional QC check sample must contain each analyte that failed in the MS analysis.

Note: When the results for matrix spike analysis indicates a problem due to sample matrix effects, the LCS results are used to verify the laboratory can perform the analysis in a clean sample.

4.2 Were Laboratory Control Samples analyzed at the required concentration as specified in Method 8000B(sec 8.5) for all analytes as specified in Table 3. [✓] ___ ___

Note: Use lab in-house criteria, if available.

ACTION: If Laboratory Control Samples were not analyzed at the required concentration or the required frequency, make note in the data assessment and use professional judgement to determined the affect on the data.

4.3 Were the LCS recoveries within the percent recoveries as specified in Table 3. 40-140% [✓] ___ ___

Table 3. LCS Criteria

| Compound | % Recovery |
|---|---|
| Aroclor 1016 | 50-150 |
| Aroclor 1260 | 50-150 |
| Tetrachloro-m-xylene (surrogate) | 30-150 |
| decachlorobiphenyl (surrogate) | 30-150 |

4.4 If no, were Laboratory Control Samples re-analyzed? [ ] ___ ✓

ACTION: If QC check samples were not re-analyzed, or a general system problem is indicated by repeated failure to meet the QC acceptance criteria specified in the method, make note in the data assessment and use Table 4 recovery actions criteria.

Yes NO N/A

Table 4. LCS Recovery Actions

| Criteria | Action | |
|---|---|---|
| | Detected Associated Compounds | Non-Detected Compounds |
| %R > Upper Acceptance Limit | J | No qualification |
| %R < Lower Acceptance Limit | J | R |
| Lower Acceptance Limit ≤ %R ≤ Upper Acceptance Limit | No qualifications | |

5.0 Matrix Spikes (Form III/Equivalent)

5.1 Are all data for one matrix spike and matrix duplicate (unspiked) pair (MS/Dup) or matrix spike/matric spike duplicate (MS/MSD)present and complete for each matrix (Method 8082A Section 8.4.1)? [/] ___ ___

NOTE: For soil and waste samples showing detectable amounts of target analytes, the lab may substitute replicate samples in place of the matrix spike (see Method 8000B-40, section 8.5.3).

5.2 Have MS/Dup or MS/MSD results been summarized on modified CLP Form III? [/] ___ ___

ACTION: If any data are missing take action as specified in section 3.2 above.

5.3 Were matrix spikes analyzed at the required frequency for each of the following matrices? (One MS/Dup, MS/MSD must be performed for every 20 samples of similar matrix or concentration level. Laboratories analyzing one to ten samples per month are required to analyze at least one MS per month (Method 8000B-39 (section 8.5)).

a. Water [ ] [/] ___

| | Yes | NO | N/A |
|---|---|---|---|
| b. Waste | [ ] | | ✓ |
| c. Soil/Solid/tissue | [✓] | | |

ACTION: If any MS/Dup or MS/MSD data are missing, take the action specified in 3.2 above.

5.4 Were Laboratory Control Samples analyzed for all analytes as specified in Table 5, or did the lab use the optional QC acceptance criteria i.e., in-house criteria? [✓]

List the criteria used and make note in data assessment.

Criteria used 40-140%, RPD ≤50

Table 5. MS/MSD Criteria

| Compound | Percent Recovery QC Limits | RPD |
|---|---|---|
| Aroclor 1016 | 29-135 | 0-15 |
| Aroclor 1260 | 29-135 | 0-20 |

5.5 Was the matrix spike prepared at the proper spike concentration? (Method 8000B, section 8.5.1-8.5.2) [✓]

For aqueous organic extractable, the spike concentration should be prepared according options in: Method 8000B-40, (section 8.5.1 and 8.5.2).

5.6 Were the matrix spike and matrix spike duplicate recovery and RPD limits met as specified in Table 5. Note: No qualification of the data is necessary on MS and MSD data alone. Use professional judgement to use the MS and MSD results in conjunction with other QC criteria to determine the need for some qualification of the data. If any MS and MSD, percent recovery, or RPD results in the Arcolor fraction is out of specification (Table 5), qualify data to include the consideration of the existence interference in the raw data. In some instances it may be determined that only the replicate or spiked samples are affected. Alternatively, the data may suggest that the laboratory is having a systematic problem with one or more analytes, thereby affecting all associated samples. Use professional judgement to determine the need for qualifications of detects of non-spiked compounds.

Yes NO N/A

[✓] ___ ___

Table 6. MS/MSD Actions for Analysis

| Criteria | Action | |
|---|---|---|
| | Detected Associated Compounds | Non-Detected Compounds |
| %R or RPD > Upper Acceptance Limit | J | No qualification |
| 20% ≤ %R < Lower Acceptance Limit | J | UJ |
| %R < 20% | J | Use professional judgement |
| Lower Acceptance Limit ≤ %R ≤ Upper Acceptance Limit | No qualifications | |

6.0 Blanks (Form IV/Equivalent)

6.1 Was reagent blank data reported on CLP equivalent Method Blank Summary form(s) (Form IV)? [✓] ___ ___

6.2 Frequency of Analysis: Has a reagent blank been analyzed for every 20 (or less) samples of similar matrix or concentration or each extraction batch? [✓] ___ ___

Note: Method blank should be analyzed, either after the calibration standard or at any time during the analytical shift.

ACTION: If any blank data are missing, take action as specified above (section 3.2) . If blank data is not available, reject (R) all associated positive data. However, using professional judgement, the data reviewer may substitute field blank data for missing method blank data.

6.3 Chromatography: review the blank raw data - chromatograms, quant reports or data system

Yes NO N/A

printouts.

Is the chromatographic performance (baseline stability) for each instrument acceptable for PCBs? [X] ___ ___

7.0 Contamination

NOTE: "Water blanks", "distilled water blanks" and "drilling water blanks" are validated like any other sample and are not used to qualify the data. Do not confuse them with the other QC blanks discussed below.

7.1 Do any method/instrument/reagent/cleanup blanks have positive results for PCBs? When applied as described below, the contaminant concentration in these blanks are multiplied by the sample Dilution Factor and corrected for % moisture when necessary. ___ [X] ___

7.2 Do any field/rinse blanks have positive PCB results? ___ [X] ___

ACTION: Prepare a list of the samples associated with each of the contaminated blanks. (Attach a separate sheet.)

NOTE: All field blank results associated to a particular group of samples (may exceed one per case or one per day) may be used to qualify data. Blanks may not be qualified because of contamination in another blank. Field blanks must be qualified for surrogate, or calibration QC problems.

ACTION: Follow the directions in Table 7 below to qualify sample results due to contamination. Use the largest value from all the associated blanks.

Table 7. Blank Contamination Criteria

| Blank Type | Blank Result | Sample Result | Action for Samples |
|---|---|---|---|

Yes NO N/A

| | | | |
|---|---|---|---|
| Method, Clean up, Instrument, Field | Detects | Not detected | No qualification |
| | < CRQL | < CRQL | Report CRQL value with a U |
| | | ≥ CRQL | No qualification |
| | > CRQL | < CRQL | Report CRQL value with a U |
| | | ≥ CRQL and < blank contamination | Report the concentration for the sample with a U |
| | | ≥ CRQL and ≥ blank contamination | No qualification |
| | = CRQL | < CRQL | Report CRQL value with a U |
| | | ≥ CRQL | No qualification |
| | Gross contamination | Detects | Qualify results as unusable R |

Note: Analytes qualified "U" for blank contamination are treated as "hits" when qualifying for calibration criteria.

Note: When applied as described in Table 7 above, the contaminant concentration in the blank is multiplied by the sample dilution factor.

NOTE: If gross blank contamination exists(e.g., saturated peaks, "hump-o-grams," "junk" peaks), all affected positive compounds in the associated samples should be qualified as unusable "R", due to interference. Non-detected pesticide target compounds do not require qualification unless the contamination is so high that it interferes with the analyses of non-detected compounds.

7.3 Are there field/rinse/equipment blanks associated with every sample? ✓ ___ ___

ACTION: For low level samples, note in data assessment that there is no associated field/rinse/equipment blank. Exception: samples taken from a drinking water tap do not have associated field blanks.

Yes NO N/A

8.0 Gas Chromatography with Electron Capture Detector (GC/ECD) Instrument Performance Check (CLP Form VI and Form VII Equivalent)

8.1 Was the proper gas chromatographic capillary column used for the analysis of PCBs? [✓] ___ ___

Action: Check raw data, instrument logs, or contact the lab to determine what type of columns were used. (Method 8082, section 4.2)

8.2 Indicate the specific type of narrow bore or wide bore (.53 mm ID, fused silica GC columns, such as DB-608 and DB-1701 or equivalent).

column 1: _____

column 2: _____

ACTION: Note any changes to the suggested materials in section 8.1 above in the data assessment. Also note the impact (positive or negative) such changes have on the analytical results.

9.0 Calibration and GC Performance

9.1 Are the following Gas Chromatograms and Data Systems Printouts for both columns present for all samples, blanks, MS, replicates?

a. Samples [✓] ___ ___

b. All blanks [✓] ___ ___

c. Matrix spike samples [✓] ___ ___

d. 5 pt. initial calibration standards [✓] ___ ___

e. calibration verification standards [✓] ___ ___

f. Laboratory Control samples (LCS) [✓] ___ ___

ACTION: If no, take action specified in 3.2 above.

9.2 Are data summary forms (containing calibration factors or response factors) for the initial 5

Yes NO N/A

pt. calibration and daily calibration verification standards present and complete for each column and each analytical sequence? [/] ___ ___

Note: Calibration Aroclor mixtures other than 1016/1260 may be used (as per approved project QA plan)

NOTE: If internal standard calibration procedure is used (Method 8000B-15(section 7.4.2.2)), then response factors must be used for %RSD calculations and compound quantitation. If, external standard calibration procedures are used (Method 8000B-16 (section 7.4.2.1)), then calibration factors must be used. The internal standard approach is highly recommended for PCB congener analysis.

ACTION: If any data are missing or it cannot be determined how the laboratory calculated calibration factors or response factors, contact the lab for explanation/resubmittals. Make necessary corrections and note any problems in the data assessment.

9.3 Are there any transcription/calculation errors between raw data and data summary forms? ___ [/] ___

ACTION: If large errors exist, call lab for explanation/resubmittal, make necessary corrections and document the effect in data assessments.

9.4 Are standard retention time (RT) windows for each PCB peak of interest presented on modified CLP summary forms? [/] ___ ___

ACTION: If any data are missing, or it cannot be determined how RT windows were calculated, call the lab for explanation/resubmittals. Note any problems in the data assessment.

NOTE: Retention time windows for all PCBs are established using retention times from three calibration standards analyzed during the entire analytical sequence (Method 8000B, section 7.6). Best results are obtained

Yes NO N/A

using retention times which span the entire sequence; i.e., using the calibration verification/continuing calibration standards analyzed every 12 hours.

9.5 Were RT windows on the confirmation column established using three standards as described above? [✓] ___ ___

NOTE: RT windows for the confirmation column should be established using a 3 pt. calibration, preferably spanning the entire analytical sequence as described in 9.4 above. If RT windows on one column are tighter than the other, this may result in false negatives when attempting to identify compounds in the samples.

ACTION: Note potential problems, if any, in the data assessment.

9.6 Do all standard retention times in each level of the initial 5 pt. calibrations for PCBs fall within the windows established during the initial calibration sequence? [✓] ___ ___

ACTION i: If no, all samples in the entire analytical sequence are potentially affected. Check to see if three standard spanning the entire sequence were used to obtained RT windows. If the lab used three standards from the 5 pt., RT windows may be too tight. If so, RT windows should be recalculated as per Method 8081B-15 (section 7.4.6).

ii. Alternatively, check to see if the chromatograms contain peaks within an expanded window surrounding the expected retention times.

If no peaks are found and the surrogates are visible, non-detects are valid. If peaks are present but cannot be discerned through pattern recognition or by using revised RT windows, qualify all positive results and non-detects as unusable, "R".

9.7 Has the linearity criteria for the initial calibration standards been satisfied for both

Yes NO N/A

columns? (% RSD for the calibration factors (CFs) for the three to five major peaks of each of the Aroclor compounds must be < 20.0%). ✓ ___ ___

ACTION: If no, follow Table 8 criteria.

Table 8. Initial Calibration CF Action for Aroclor Analysis

| Criteria | Action | |
|---|---|---|
| | Detected Associated Compounds | Non-Detected Associated Compounds |
| % RSD > 20% | J | UJ |
| % RSD within allowable limits | No qualifications | |

9.8 Does the calibration verification/continuing calibration standard contain the PCB peaks of interest, analyzed on each working day, prior to sample analyses (Method 8082, sections 7.6.2)? ✓ ___ ___

9.9 Has a calibration verification/continuing calibration standard been analyzed after every 10 samples and at the end of each analytical sequence (Method 8082A, section 7.6.2). ✓ ___ ___

ACTION: If no, take action as specified in section 3.2 above.

9.10 Has the percent difference (%D) between the Calibration Factor (CF) of each of the three to five peaks used to identify the Aroclor in the CCV and the CF from these peaks in the initial calibration exceeded ± 15%. ___ ✓ ___

9.11 Has a new 5 pt. initial calibration curve been generated for those PCB analytes which failed in the calibration verification/continuing calibration standard (8000B, section 7.7.3), and all samples which followed the out-of-control

Yes NO N/A

calibration verification/standard continuing calibration Standard? [ ] ___ ✓

ACTION: If the %D for any analyte exceeded the ± 15% criterion and the instrument was not recalibrated for those analytes, qualify positive results for all associated samples (those which followed the out-of-control standard) "J" and sample quantitation limits "UJ". (see Table 9)

9.12 Have retention time (RT) windows been properly calculated for each analyte of interest (Method 8000B, section 7.6), using RTs from the associated calibration verification/continuing standard? [✓] ___ ___

ACTION: If no, take action specified in section 3.2 above

9.13 Do all standard retention times for each calibration verification/continuing calibration standard fall within the windows established during the initial calibration sequence? [✓] ___ ___

9.14 Do all standard retention times for each mid-concentration standard (analyzed after every 10 samples) fall within the <u>daily</u> RT windows. [✓] ___ ___

ACTION: For any multi-response analytes, retention time windows should be used but analyst and reviewer should rely primarily on pattern recognition or use paragraph B below. If the answer to either 9.13 or 9.14 above is no, check the chromatograms of all samples which followed the last in-control standard. If samples were not re-analyzed, all samples analyzed after the last in-control standard must be evaluated using professional judgement.

(A) For non-detected target compounds, check to see if the sample chromatograms contain any peaks that are close to the expected RT window of the Arcolor of interest. If no peaks are present, no qualification of data is necessary. If peaks are present close th RT window of the Aroclor of interest, qualify the non-detected values as presumptively present "N".

Yes NO N/A

(B) For detected compounds in the affected samples, if peaks within the RT window, no qualification necessary. If peaks are close to the expected RT window of the Aroclor of interest, the reviewer can examine the data package for the presence of three or more standards the Aroclor of interest that were run within the analytical sequence during which the sample was analyzed. If three or more such standards are present, the RT window can be reevaluated using the Mean Retention Times of the standards. If the peaks in the affectd sample fall within the revised window, qualify the detected target compounds "NJ". If the reviewer cannot do anything with the data to resolve the problem of concern, qualify all non-detects as unusable "R". (Table 9)

9.15 Has no more than 12 hours elapsed from the injection of the opening CCV and the end of the analytical sequence sequence (closing CCV). (Table 9) [✓] ___ ___

Table 9. CCV Criteria

| Criteria | Action | |
|---|---|---|
| | Detected Associated Compounds | Non-Detected Associated Compounds |
| RT out of RT window | Use professional judgement (Sec 9.14) | |
| %D not within +/- 15% | J | UJ |
| Time elapsed greater than section 9.15 criteria. | R | |
| %D, time elapsed, RT are all within acceptable limits. | No qualifications | |

9.16 Are there any transcription/calculation errors between raw data and data summary forms? ___ [✓] ___

ACTION: If large errors exists, call lab for explanation/resubmittal, make any necessary corrections and document the effect in data assessments under "Conclusions".

10.0 Analytical Sequence Check (Form VIII-PEST/Equivalent)

10.1 Have all samples been listed on CLP Form VIII or equivalent, and are separate forms present for each column? [✓] ___ ___

Yes NO N/A

ACTION: If no, take action specified in 3.2 above.

10.2 Was the proper analytical sequence followed for each initial calibration and subsequent analyses? [✓] ___ ___

ACTION: If no, use professional judgement to determine the severity of the effect on the data and qualify it accordingly. Generally, the effect is negligible unless the sequence was grossly altered or the calibration was also out of limits.

10.3 Were the TCMX/DCB surrogate RTs for the samples within the mean surrogate RT from the initial calibration? [✓] ___ ___

Action: If no, see "Action" in section 9.14 above

11.0 Extraction Techniques for Sample Preparation

Method 8082A permits a variety of extraction techniques to be used for sample preparation. Check which extraction procedure was used?

1. Aqueous samples:

   1. Separatory funnel (Method 3510) [✓] ___ ___
   2. Continuous liquid-liquid extraction (Method 3520) [ ] ___ ✓
   3. Solid phase extraction (Method 3535) [ ] ___ ✓
   4. Other [ ] ___ ___

2. Solid samples:

   1. Soxhlet (Method 3540) [ ] ___ ✓
   2. Automated Soxhlet (Method 3541) [ ] ___ ✓
   3. Pressurized fluid (Method 3545) [ ] ___ ✓
   4. Microwave extraction (Method 3546) [ ] ___ ✓
   5. Ultrasonic extraction (Method 3550) [ ] ___ ✓

Yes NO N/A

6. Supercritical fluid (Method 3562) [ ] ___ ✓

7. Other [ ] ___ ✓

11.1 Extract Cleanup - Efficiency Verification (Form IX/Equivalent)

11.1.1 Method 8082 (section 7.2) references method 3660 (sulfur) and 3665A (sulfuric acid) to use for cleaning extracts. Were one or both method used? [ ] ___ ✓

ACTION: If no, take action specified in 3.2 above. If data suggests cleanup was not performed, make note in the data assessment.

NOTE: Method 3620A, Florisil, may be used per approved project QA plan. The method does not list which analytes and surrogate(s) to use to verify column efficiency. The reviewer must check project plan to verify method used as well as the correct PCB list. If not stated or available, use the CLP listing or accept what the laboratory used.

11.2 Are all samples listed on modified CLP PCBs Florisil/Cartridge Check Form? [ ] ___ ✓

ACTION: If no, take action specified in 3.2 above.

11.3 Was GPC Cleanup (method 3640A) performed? [✓] ___ ___

NOTE: GPC cleanup is not required and is optional. The reviewer should check Project Plan to verify requirement.

11.4 Were the same PCB analytes used in calibration used to check the efficiency of the cleanup procedures? [ ] ___ ✓

11.5 Are percent recoveries (% R) of the PCBs and surrogate compounds used to check the efficiency of the cleanup procedures within lab's in-house QC limits (use 70-130% if not available). [ ] ___ ✓

Yes NO N/A

70-130% for GPC calibration? [ ] ___ ✓

Qualify only the analyte(s) which fail the recovery criteria as follows:

ACTION: If % R are < 70%, qualify positive results "J" and quantitation limits "UJ". Non-detects should be qualified "R" if zero %R was obtained for PCBs. Use professional judgement to qualify positive results if recoveries are greater than the upper limit.

12.0 PCB Identification

12.1 Has CLP Form X or equivalent, showing retention time data for positive results on the two GC columns, been completed for every sample in which a PCB was detected? [✓] ___ ___

ACTION: If no, take action specified in 3.2 above, or compile a list comparing the retention times for all sample hits on the two columns.

12.2 Are there any transcription/calculation errors between raw data and data summary forms (initial calibration summaries, calibration verification summaries, analytical sequence summaries, GPC and cleanup verification forms)? ___ [✓] ___

ACTION: If large errors exist, call lab for explanation/resubmittal, make necessary corrections and note error in the data assessment.

12.3 Are retention times (RT) of sample compounds within the established RT windows for both columns/analyses? [✓] ___ ___

ACTION: Qualify as unusable (R) all positive results which were not confirmed by second GC column analysis. Also qualify "R", unusable, all positive results not within RT windows unless associated standard compounds are similarly biased. The reviewer should use professional judgement to assign an appropriate quantitation limit.

Yes NO N/A

12.4 Check chromatograms for false negatives, especially if RT windows on each column were established differently.
Were there any false negatives? ___ [/] ___

ACTION: Use professional judgement to decide if the compound should be reported. If there is reason to believe that peaks outside retention RT windows should be reported, make corrections to data summary forms (Form I) and note in data assessment.

12.5 Was GC/MS confirmation provided when sample concentration was sufficient (> 10 ug/ml) in the final extract? [ ] ___ /

ACTION: Indicate with red pencil which Form I results were confirmed by GC/MS and also note in data assessment. GC/MS confirmation is an option, see section 7.10 of Method 8082A-20. If GC/MS confirmation is not available, follow action in section 3.2.

12.6 Is the percent difference (%D) calculated for the positive sample results on the two GC columns
RPD <25.0%? [ ] / ___

NOTE: The method requires quantitation from one column. The second column is to confirm the presence of an analyte. It is the reviewer's responsibility to verify from the project plan what the lab was required to report. If the lab was required to report concentrations from both columns, continue with validation for % Difference. If required, but not reported, either contact the lab for results or calculate the concentrations from the calibration. If not required, skip this section. Document actions in Data Assessment.

ACTION: If the reviewer finds neither column shows interference for the positive hits, the data should be qualified as follows:

| % Difference | Qualifier |
|---|---|

Yes NO N/A

| | |
|---|---|
| 0-25% | none |
| 26-70% | "J" |
| 71-100% | "NJ" |
| 101-200% (No Interference) | "R" |
| 101-200% (Interference detected) | "NJ" |
| >50% (PCBs value is <CRQL) | "U" |
| >200% | "R" |

Note: The lower of the two values is reported on Form I. If using professional judgement,the reviewer determines that he higher result was more acceptable, the reviewer should replace the value and indicate the reason for the change in the data assessment.

13.0 Compound Quantitation and Reported Detection Limits

13.1 Are there any transcription/calculation errors in Form I results? Check at least two positive values. Were any errors found? ___ [X] ___

NOTE: Single-peak PCBs results can be checked for rough agreement between quantitative results obtained on the two GC columns. The reviewer should use professional judgement to decide whether a much larger concentration obtained on one column versus the other indicates the presence of an interfering compound. If an interference is suspected, the lower of the two values should be reported and qualified according to section 12.6 above. This necessitates a determination of an estimated concentration on the confirmation column. The narrative should indicate that the presence of interferences has led to the quantitation of the second column confirmation results.

13.2 Are the EDLs (Estimated Detection Limits) adjusted to reflect sample dilutions and, for soils, % moisture? [X] ___ ___

ACTION: If errors are large, call lab for explanation/resubmittal, make any necessary corrections and document effect in data assessments.

Yes NO N/A

to determine the proper identification of field duplicates.

# PCDD/PCDF

**LABORATORY DATA CONSULTANTS, INC.**
7750 El Camino Real, Suite 2L Carlsbad, CA 92009 Phone: 760/634-0437 Fax: 760/634-0439

Windward Environmental, LLC
200 West Mercer Street, Suite 401
Seattle, WA 98119
ATTN: Ms. Jennifer Parker

September 28, 2011

SUBJECT: Lower Passaic River Restoration Project, Data Validation

Dear Ms. Parker,

Enclosed are the final validation reports for the fractions listed below. These SDGs were received on September 12, 2011. Attachment 1 is a summary of the samples that were reviewed for each analysis.

**LDC Project # 26203:**

| SDG # | Fraction |
|---|---|
| K1106643 | Metals, Butyltins |
| A3380 | Polychlorinated Biphenyls as Congeners Dioxins/Dibenzofurans |

The data validation was performed under EPA Level III/IV guidelines. The analyses were validated using the following documents, as applicable to each method:

- Final Surface Sediment Chemical Analyses and Benthic Invertebrate Toxicity and Bioaccumulation Testing Quality Assurance Project Plan (QAPP) for the Lower Passaic River Restoration Project, October 2009
- Caged Bivalve Study Addendum, March 2011
- USEPA Region II Validation SOP HW-2, (Revision 13, September 2006) for Metals
- USEPA, Contract Laboratory Program National Functional Guidelines for Inorganic Data Review, October 2004
- USEPA, Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review, June 2008
- USEPA Region II Validation SOP HW-25, (Revision 3, September 2006) forTetra-through Octochlorinated Dioxins and Furans by Isotope Dilution, modified as necessary to accommodate the QAPP criteria
- USEPA Region II Validation SOP HW-46, (Revision 1, September 2008) for Chlorinated Biphenyls Congeners in Water, Soil, Sediment, and Tissue, modified as necessary to accommodate the QAPP criteria

Please feel free to contact us if you have any questions.

Sincerely,

Stella S. Cuenco
Data Validation Operations Manager/Senior Chemist

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DL/CD 1555 Pages

Attachment 1

EDD

# LDC #26203 (Windward Environmental, LLC - Seattle WA / Lower Passaic River Restoration Project)

PO# 2011-0012

| LDC | SDG# | DATE REC'D | (3) DATE DUE | Pest. (1699M) | | PCB Cong (1668B) | | Dioxin (1613B) | | Butyltin (Krone) | | Metals (6010B) | | Metals (6020) | | Se (7742) | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Matrix: | Water/Tissue | | | W | T | W | T | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S |
| A | K1106643 | 09/12/11 | 10/03/11 | - | - | - | - | - | - | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | | | | | | | | | | | | | | | | | | |
| B | A3380 | 09/12/11 | 10/03/11 | - | - | 1 | 0 | 1 | 0 | - | - | - | - | - | - | - | - | | | | | | | | | | | | | | | | | | |
| C | B1A8699 | 09/12/11 | 10/03/11 | 1 | 10 | - | - | - | - | - | - | - | - | - | - | - | - | | | | | | | | | | | | | | | | | | |
| Total | A/SC | | | 1 | 10 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 17 |

For Internal Use Only: Shaded cells indicate Level IV validation (all other cells are Level III validation). These sample counts do not include MS/MSD

26203ST.wpd

**LDC Report#** 26203B21

# Laboratory Data Consultants, Inc.
# Data Validation Report

| | |
|---|---|
| **Project/Site Name:** | Lower Passaic River Restoration Project |
| **Collection Date:** | July 18, 2010 |
| **LDC Report Date:** | September 21, 2011 |
| **Matrix:** | Water |
| **Parameters:** | Dioxins/Dibenzofurans |
| **Validation Level:** | EPA Level IV |
| **Laboratory:** | Analytical Perspectives |
| **Sample Delivery Group (SDG):** | A3380 |

**Sample Identification**

LPR-071811-RB

## Introduction

This data review covers one water sample listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 1613B for Polychlorinated Dioxins/Dibenzofurans.

This review follows the Final Surface Sediment Chemical Analyses and Benthic Invertebrate Toxicity and Bioaccumulation Testing Quality Assurance Project Plan (QAPP) for the Lower Passaic River Restoration Project, (October 8, 2009), the Caged Bivalve Study Addendum (March 2, 2011) and USEPA Region II Validation SOP HW-25 (Revision 3, September 2006) for Tetra- through Octachlorinated Dioxins and Furans by Isotope Dilution, modified as necessary to accommodate the QAPP criteria.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

NJ Presumptive evidence of presence of the compound at an estimated quantity.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

## I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

## II. HRGC/HRMS Instrument Performance Check

Instrument performance was checked at the required daily frequency.

Retention time windows were established for all homologues.

The chromatographic resolution between 2,3,7,8-TCDD and the peaks representing any other unlabeled TCDD isomers was resolved with a valley of less than or equal to 10%.

The chromatographic resolution between 2,3,7,8-TCDF and the peaks representing any other unlabeled TCDF isomers was resolved with a valley of less than or equal to 40%.

The static resolving power was at least 10,000 (10% valley definition).

## III. Initial Calibration

A five point initial calibration was performed as required by the method.

Percent relative standard deviations (%RSD) were less than or equal to 10.0% for all unlabeled compounds and less than or equal to 20.0% for all labeled compounds.

The ion abundance ratios for all PCDDs and PCDFs were within method criteria.

The minimum S/N ratio was greater than or equal to 10 for each unlabeled compound and labeled compound.

## IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

All of the continuing calibration concentrations were within the method limits.

The ion abundance ratios for all PCDDs and PCDFs were within method criteria.

## V. Blanks

Method blanks were reviewed for each matrix as applicable. No polychlorinated dioxin/dibenzofuran contaminants were found in the method blanks.

Sample LPR-071811-RB was identified as a rinsate blank. No polychlorinated dioxin/dibenzofuran contaminants were found.

## VI. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were not performed since the associated sample is a rinsate blank.

## VII. Batch Control Samples (BCS)

Batch control samples were reviewed for each matrix as applicable. Percent differences (%D) were within QC limits with the following exceptions:

| BCS ID (Associated Samples) | Compound | %R (Limits) | Affected Compounds | Flag | A or P |
|---|---|---|---|---|---|
| BCS3_8878_DF_SA (All samples in SDG A3380) | $^{13}$C-OCDD<br>$^{13}$C-OCDF | 33 (≤30)<br>31 (≤30) | OCDD<br>OCDF | J (all detects)<br>UJ (all non-detects)<br>J (all detects)<br>UJ (all non-detects) | P |
| BCS3_8878_DF_SB (All samples in SDG A3380) | $^{13}$C-OCDD<br>$^{13}$C-OCDF | 33 (≤30)<br>31 (≤30) | OCDD<br>OCDF | J (all detects)<br>UJ (all non-detects)<br>J (all detects)<br>UJ (all non-detects) | P |

## VIII. Regional Quality Assurance and Quality Control

Not applicable.

## IX. Internal Standards

All internal standard recoveries (%R) were within validation criteria.

All internal standard ion abundance ratios were within method criteria.

## X. Target Compound Identifications

All target compound identifications were within validation criteria.

## XI. Compound Quantitation and RLs

All compound quantitation and RLs were within validation criteria.

## XII. System Performance

The system performance was acceptable.

## XIII. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

## XIV. Field Duplicates

No field duplicates were identified in this SDG.

**Lower Passaic River Restoration Project**
**Dioxins/Dibenzofurans - Data Qualification Summary - SDG A3380**

| SDG | Sample | Compound | Flag | A or P | Reason |
|---|---|---|---|---|---|
| A3380 | LPR-071811-RB | OCDD<br>OCDF | J (all detects)<br>UJ (all non-detects)<br>J (all detects)<br>UJ (all non-detects) | P | Batch control samples (%D) |

**Lower Passaic River Restoration Project**
**Dioxins/Dibenzofurans - Laboratory Blank Data Qualification Summary - SDG A3380**

No Sample Data Qualified in this SDG

**Lower Passaic River Restoration Project**
**Dioxins/Dibenzofurans - Field Blank Data Qualification Summary - SDG A3380**

No Sample Data Qualified in this SDG

LDC #: 26203B21 **VALIDATION COMPLETENESS WORKSHEET** Date: 9/16/11
SDG #: A3380 Level IV Page: 1 of 1
Laboratory: Analytical Perspectives Reviewer: R
2nd Reviewer: CL

**METHOD:** HRGC/HRMS Dioxins/Dibenzofurans (EPA Method 1613B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

| | Validation Area | | Comments |
|---|---|---|---|
| I. | Technical holding times | A | Sampling dates: 7/18/11 |
| II. | HRGC/HRMS Instrument performance check | A | |
| III. | Initial calibration | A | 10/20% |
| IV. | Routine calibration ~~/ICV~~ | A | QC limits |
| V. | Blanks | A | |
| VI. | Matrix spike/Matrix spike duplicates | N | |
| VII. | Laboratory control samples | SW | BCS |
| VIII. | Regional quality assurance and quality control | N | |
| IX. | Internal standards | A | |
| X. | Target compound identifications | A | |
| XI. | Compound quantitation and ~~GRQLs~~ RLs | A | |
| XII. | System performance | A | |
| XIII. | Overall assessment of data | A | |
| XIV. | Field duplicates | N | |
| XV. | Field blanks | ND | RB = 1 |

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples:

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1 | LPR-071811-RB W | 11 | MB1_8578 | 21 | | 31 | |
| 2 | | 12 | | 22 | | 32 | |
| 3 | | 13 | | 23 | | 33 | |
| 4 | | 14 | | 24 | | 34 | |
| 5 | | 15 | | 25 | | 35 | |
| 6 | | 16 | | 26 | | 36 | |
| 7 | | 17 | | 27 | | 37 | |
| 8 | | 18 | | 28 | | 38 | |
| 9 | | 19 | | 29 | | 39 | |
| 10 | | 20 | | 30 | | 40 | |

Notes:

# VALIDATION FINDINGS WORKSHEET

**METHOD:** HRGC/HRMS Dioxins/Dibenzofurans (EPA Method 1613B)

| | | | | |
|---|---|---|---|---|
| A. 2,3,7,8-TCDD | F. 1,2,3,4,6,7,8-HpCDD | K. 1,2,3,4,7,8-HxCDF | P. 1,2,3,4,7,8,9-HpCDF | U. Total HpCDD |
| B. 1,2,3,7,8-PeCDD | G. OCDD | L. 1,2,3,6,7,8-HxCDF | Q. OCDF | V. Total TCDF |
| C. 1,2,3,4,7,8-HxCDD | H. 2,3,7,8-TCDF | M. 2,3,4,6,7,8-HxCDF | R. Total TCDD | W. Total PeCDF |
| D. 1,2,3,6,7,8-HxCDD | I. 1,2,3,7,8-PeCDF | N. 1,2,3,7,8,9-HxCDF | S. Total PeCDD | X. Total HxCDF |
| E. 1,2,3,7,8,9-HxCDD | J. 2,3,4,7,8-PeCDF | O. 1,2,3,4,6,7,8-HpCDF | T. Total HxCDD | Y. Total HpCDF |

Notes:

LDC #: 26203B21

# VALIDATION FINDINGS WORKSHEET
## Laboratory Control Samples (LCS)

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

**METHOD:** HRGC/HRMS Dioxins/Dibenzofurans (EPA Method 1613B)
Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a LCS required?
Y N N/A Was a LCS analyzed every 20 samples for each matrix or whenever a sample extraction was performed?
Y N N/A Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?

| # | Date | Lab ID/Reference | Compound | %D LCS %R (Limits) | LCSD %R (Limits) | RPD (Limits) | Associated Samples | Qualifications |
|---|---|---|---|---|---|---|---|---|
| | | BLS3-8878-DF-SA | 13C-HCDD | 33 (≤30) | ( ) | ( ) | All | J/UJ/P (G) |
| | | | 13C-OCDF | 31 ( ) | ( ) | ( ) | | (Q) |
| | | | | ( ) | ( ) | ( ) | | |
| | | SB | 13C-OCDD | 33 ( ) | ( ) | ( ) | | |
| | | | 13C-OCDF | 32 ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
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| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |

LDC #: 26203B21

# VALIDATION FINDINGS WORKSHEET
## Initial Calibration Calculation Verification


Reviewer: K
2nd Reviewer: 9

**METHOD:** HRGC/HRMS Dioxins/Dibenzofurans (EPA Method 1613B)

The Relative Response Factor (RRF), average RRF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

$RRF = (A_x)(C_{is})/(A_{is})(C_x)$ $A_x$ = Area of compound, $A_{is}$ = Area of associated internal standard
average RRF = sum of the RRFs/number of standards $C_x$ = Concentration of compound, $C_{is}$ = Concentration of internal standard
%RSD = 100 * (S/X) S = Standard deviation of the RRFs, X = Mean of the RRFs

| # | Standard ID | Calibration Date | Compound (Reference Internal Standard) | Reported Average RRF (initial) | Recalculated Average RRF (initial) | Reported RRF (C23 std) | Recalculated RRF (C23 std) | Reported %RSD | Recalculated %RSD |
|---|---|---|---|---|---|---|---|---|---|
| 1 | IAL | 3/31/11 | 2,3,7,8-TCDF ($^{13}$C-2,3,7,8-TCDF) | 1.11 | 1.10 | 1.06 | 1.06 | 3.8 | 3.8 |
| | | | 2,3,7,8-TCDD ($^{13}$C-2,3,7,8-TCDD) | 1.13 | 1.13 | 1.11 | 1.11 | 2.4 | 2.4 |
| | | | 1,2,3,6,7,8-HxCDD ($^{13}$C-1,2,3,6,7,8-HxCDD) | 1.06 | 1.06 | 1.06 | 1.06 | 1.5 | 1.4 |
| | | | 1,2,3,4,6,7,8-HpCDD ($^{13}$C-1,2,4,6,7,8,-HpCDD) | 1.04 | 1.04 | 1.05 | 1.04 | 1.3 | 1.3 |
| | | | OCDF ($^{13}$C-OCDF) | 0.99 | 0.99 | 1.01 | 1.01 | 2.4 | 2.4 |
| 2 | | | 2,3,7,8-TCDF ($^{13}$C-2,3,7,8-TCDF) | | | | | | |
| | | | 2,3,7,8-TCDD ($^{13}$C-2,3,7,8-TCDD) | | | | | | |
| | | | 1,2,3,6,7,8-HxCDD ($^{13}$C-1,2,3,6,7,8-HxCDD) | | | | | | |
| | | | 1,2,3,4,6,7,8-HpCDD ($^{13}$C-1,2,4,6,7,8,-HpCDD) | | | | | | |
| | | | OCDF ($^{13}$C-OCDF) | | | | | | |
| 3 | | | 2,3,7,8-TCDF ($^{13}$C-2,3,7,8-TCDF) | | | | | | |
| | | | 2,3,7,8-TCDD ($^{13}$C-2,3,7,8-TCDD) | | | | | | |
| | | | 1,2,3,6,7,8-HxCDD ($^{13}$C-1,2,3,6,7,8-HxCDD) | | | | | | |
| | | | 1,2,3,4,6,7,8-HpCDD ($^{13}$C-1,2,4,6,7,8,-HpCDD) | | | | | | |
| | | | OCDF ($^{13}$C-OCDF) | | | | | | |

Comments: Refer to Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 26203B21

# VALIDATION FINDINGS WORKSHEET
## Routine Calibration Results Verification


Reviewer: N
2nd Reviewer: Q

**METHOD:** HRGC/HRMS Dioxins/Dibenzofurans (EPA Method 1613B)

The percent difference (%D) of the initial calibration average Relative Response Factors (RRFs) and the continuing calibration RRFs were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. RRF - RRF)/ave. RRF
RRF = $(A_x)(C_{is})/(A_{is})(C_x)$

Where: ave. RRF = initial calibration average RRF
RRF = continuing calibration RRF
$A_x$ = Area of compound, $A_{is}$ = Area of associated internal standard
$C_x$ = Concentration of compound, $C_{is}$ = Concentration of internal standard

| # | Standard ID | Calibration Date | Compound (Reference Internal Standard) | Average RRF (initial) | Reported RRF (CC) | Recalculated RRF (CC) | Reported %D | Recalculated %D |
|---|---|---|---|---|---|---|---|---|
| 1 | 110804S10 | 8/4/11 | 2,3,7,8-TCDF ($^{13}$C-2,3,7,8-TCDF) | 1.11 | 1.10 | 1.10 | 0 | 1 |
| | | | 2,3,7,8-TCDD ($^{13}$C-2,3,7,8-TCDD) | 1.13 | 0.98 | 0.98 | 13 | 13 |
| | | | 1,2,3,6,7,8-HxCDD ($^{13}$C-1,2,3,6,7,8-HxCDD) | 1.06 | 1.01 | 1.01 | 4 | 4 |
| | | | 1,2,3,4,6,7,8-HpCDD ($^{13}$C-1,2,4,6,7,8,-HpCDD) | 1.04 | 1.00 | 1.00 | 4 | 4 |
| | | | OCDF ($^{13}$C-OCDF) | 0.99 | 0.95 | 0.95 | 4 | 4 |
| 2 | | | 2,3,7,8-TCDF ($^{13}$C-2,3,7,8-TCDF) | | | | | |
| | | | 2,3,7,8-TCDD ($^{13}$C-2,3,7,8-TCDD) | | | | | |
| | | | 1,2,3,6,7,8-HxCDD ($^{13}$C-1,2,3,6,7,8-HxCDD) | | | | | |
| | | | 1,2,3,4,6,7,8-HpCDD ($^{13}$C-1,2,4,6,7,8,-HpCDD) | | | | | |
| | | | OCDF ($^{13}$C-OCDF) | | | | | |
| 3 | | | 2,3,7,8-TCDF ($^{13}$C-2,3,7,8-TCDF) | | | | | |
| | | | 2,3,7,8-TCDD ($^{13}$C-2,3,7,8-TCDD) | | | | | |
| | | | 1,2,3,6,7,8-HxCDD ($^{13}$C-1,2,3,6,7,8-HxCDD) | | | | | |
| | | | 1,2,3,4,6,7,8-HpCDD ($^{13}$C-1,2,4,6,7,8,-HpCDD) | | | | | |
| | | | OCDF ($^{13}$C-OCDF) | | | | | |

Comments: Refer to Routine Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 26203B21

# VALIDATION FINDINGS WORKSHEET
## Sample Calculation Verification


Reviewer: K
2nd reviewer: [illegible]

**METHOD:** HRGC/HRMS Dioxins/Dibenzofurans (EPA Method 1613B)

Y N N/A Were all reported results recalculated and verified for all level IV samples?
Y N N/A Were all recalculated results for detected target compounds agree within 10.0% of the reported results?

Concentration = $\frac{(A_x)(I_s)(DF)}{(A_{is})(RRF)(V_o)(\%S)}$

| | | |
|---|---|---|
| $A_x$ | = | Area of the characteristic ion (EICP) for the compound to be measured |
| $A_{is}$ | = | Area of the characteristic ion (EICP) for the specific internal standard |
| $I_s$ | = | Amount of internal standard added in nanograms (ng) |
| $V_o$ | = | Volume or weight of sample extract in milliliters (ml) or grams (g). |
| RRF | = | Relative Response Factor (average) from the initial calibration |
| Df | = | Dilution Factor. |
| %S | = | Percent solids, applicable to soil and solid matrices only. |

Example:

Sample I.D. NB, _____:

Conc. = (_____)(_____)(_____) / (_____)(_____)(_____)(_____)

=

| # | Sample ID | Compound | Reported Concentration ( ) | Calculated Concentration ( ) | Qualification |
|---|---|---|---|---|---|
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YES NO N/A

PACKAGE COMPLETENESS AND DELIVERABLES

CASE NUMBER: A3380
LAB: Analytical Perspectives
SITE: Lower Passaic River

1.0 Data Completeness and Deliverables

1.1 Does the Traffic Report or Field Chain of Custody list all samples? [✓] ___ ___

1.2 Is the Case Narrative present? [✓] ___ ___

1.3 Are the Case Number and SDG numbers contained in the case narrative? [✓] ___ ___

1.4 Do the Traffic Reports, Field Chain of Custody or Lab Case Narrative indicate problems with sample receipt, sample condition, analytical problems, or other comments affecting the quality of the data? ___ [✓] ___

ACTION: Use professional judgement to evaluate the effect of the noted problems on the quality of the data.

ACTION: As per region II requirements, if any sample analyzed as a soil, contains 50% to 90% water, all data shall be flagged as estimated "J". If a soil sample Contains more than 90% water, then qualify positive hits "J", and non detects "UJ".

ACTION: If sample cooler temperature was greater than 10 C, then flag all positive hits "J" And non detects "UJ".

2.0 Reporting Requirements and Deliverables

2.1 All deliverables must be clearly labeled with the Case number and the associated sample/traffic number. Missing or illegible or incorrectly labeled items must be identified. The Project Officer must immediately be contacted and requested to ask laboratory to submit the missing or incorrect items.

2.2 The following forms were taken from the CLP SOW, DFLM01.1 and should be specified in the Project Plan. Laboratories will not always use the exact CLP format for the forms. A comparison of CLP forms must be made against the Laboratory's version. Some information may not be found on the exact form as the CLP version but may be located on another form. As long as the information is present and accessible, it is not a problem. Are these forms (CLP or lab's version) present?

a. Sample Data Summary (Form I CDD-1) [✓] ___ ___

b. CDD/CDF Toxicity Equivalency Factor (Form I, CDD-2) [✓] ___ ___

c. Second Column Confirmation Summary (Form I, CDD-3) [ ] ___ [✓]

d. Total Homologue Concentration Summary (Form II CDD) [✓] ___ ___

e. CDD/CDF Spiked Sample Summary (Form III CDD-1) [✓] ___ ___

f. CDD/CDF Duplicate Sample Summary (Form III CDD-2) [✓] ___ ___

| | YES | NO | N/A |
|---|---|---|---|
| g. CDD/CDF Method Blank Summary (Form IV-CDD) | ✓ | | |
| h. CDD/CDF Window Defining Mix Summary (Form V-CDD-1) | ✓ | | |
| I. Chromatographic Resolution Summary (Form V CDD-2) | ✓ | | |
| j. CDD/CDF Analytical Sequence Summary (Form V CDD-3) | ✓ | | |
| k. Initial Calibration (Form VI. CDD-1, CDD-2) | ✓ | | |
| l. Continuing Calibration (Form VII, CDD-1. Form VII, CDD-2) | ✓ | | |

ACTION: If forms are missing, contact the Project Officer to confirm which forms if any were specified in the Project Plan. If the forms are required, inform the Project Officer or obtain written permission to contact the lab for explanation/resubmittal. If the lab cannot provide missing deliverables, assess the effect on the validity of the data. Note in the Data Assessment.

2.3 GC/MS Displays
Are the following GC/MS displays present?

| | YES | NO | N/A |
|---|---|---|---|
| a. Standard and sample SIM chromatograms. SIM and TIC chromatograms must list date and time of analysis: the file name: sample number; and instrument I.D. number | ✓ | | |
| b. Percent peak resolution valley | ✓ | | |
| c. Window Defining Mixture raw data | ✓ | | |
| d. SIM mass chromatograms must display quantitation ion. confirmation ion, and polychlorinated diphenylether ion. where applicable. | ✓ | | |
| e. Integrated area and peak height must be listed for all peaks 2.5 times above background | ✓ | | |

ACTION: If deliverables are missing, contact the Project Officer to request explanation/resubmittals or obtain written permission to contact the lab for explanation/resubmittal. If the lab cannot provide missing deliverables, assess the effect on the validity of the data. Note in the Data Assessment.

2.4 Are the following Chain of Custody Records and in-house Laboratory Control Documents present?

| | YES | NO | N/A |
|---|---|---|---|
| a. Chain of Custody Records | ✓ | | |
| b. Sample Shipment Records | ✓ | | |
| c. Sample log-in sheets | ✓ | | |
| d. GC/MS Standard and Sample Run Log in chronological order | ✓ | | |
| e. Sample Extraction Log | ✓ | | |

ACTION: If deliverables are missing, contact the Project Officer to request explanation/resubmittals

YES NO N/A

or obtain written permission to contact the lab for explanation/resubmittal. If the lab cannot provide missing deliverables, assess the effect on the validity of the data. Note in the Data Assessment.

2.5 Was the sample data package paginated and one sided? [✓] ___ ___

ACTION: If no, document difficulties of reviewing data caused by lack of pagination in Data Assessment.

3.0 Holding Times

3.1 Have samples been analyzed within proper holding times?

a. For aqueous samples, 30 days from VTSR to extraction? [✓] ___ ___

b. For soil/sediment samples, 30 days from VTSR to extraction? [ ] ___ ✓

c. For fish and tissue samples, one (1) year from VTSR to extraction? [ ] ___ ✓

d. For all samples 45 days from time of extraction to time of analysis? [✓] ___ ___

ACTION: If holding times are exceeded, flag all positive hits as estimated ("J"), and non-detects as estimated "UJ". Holding time criteria do not apply to PE samples.
If holding times are grossly exceeded (e.g. by greater than two times the specified Technical holding times), either on the first analysis or upon reanalysis, flag positive hits as estimated "J", and flag non-detects as unusable "R".

Note: The data reviewer must note whether or not technical and contractual holding times were met.

4.0 Instrument Performance

4.1 Mass Calibration - Mass calibration of the MS must be performed prior to analyzing calibration solutions, blanks, samples, and QC samples. A static resolving power of at least 10,000 (10% valley definition) must be demonstrated at appropriate masses before any analysis is performed. Static resolving power checks must be performed at the beginning and at the end of each 12 hour period of operation. Include in the narrative, minimum required resolving power of 10000 was obtained for perfluorokerosene (PFK) ion 380.9760. This is done by first measuring peak width at 5% of the maximum. This should not exceed 100 ppm. i.e., it should not exceed 0.038, for ion 380.9760. Resolving power, then is calculated using the formula,

Resolving Power = $m/\Delta m$ = 380.9760/0.038 = 10025.

NOTE: The mass calibration is generally not reported. Improper mass calibration may be detected by examining ion abundance ratios for initial and continuing calibration standards. If the mass calibration is not properly performed, the standards will uot have ion abundance ratios within criteria.

4.2 Window Defining Solution/ Isomer Specificity Test Standards

The Window Defining Solution must contain the first and the last isomers of each homologue CDD/CDF, (the labeled and internal standards are optional). The solution also should contain a series of other TCDD analytes for the purpose of documenting the chromatographic resolution.

4.2.1 For analyses on a DB-5 (or equivalent) GC column, the chromatographic resolution is evaluated by the analysis of Isomer Specificity Test Standards at the beginning

YES NO N/A

of every 12 hour period. Was this performed accordingly? [✓] ___ ___

ACTION: If the Isomer Specificity Test Standards was not analyzed at the required frequency, use professional judgement to determine the effect on the quality of the data. Document in Data Assessment under contract non-compliance.

4.2.2 Were all peaks labeled and identified on the Selected Ion Current Profiles (SICPs)? [✓] ___ ___

4.2.3 Did the absolute retention time of the internal standards $^{13}C_{12}$-1,2,3,4-TCDD exceed 25.0 minutes on the DB-5 column and 15.0 minutes on the DB-225 column? (Method 1613B, Section 10.2.4) [___] ___ [✓]

4.2.4 Are the relative retention times of native and labeled CDD's and CDF's within the limits given in Table 2 of the method. (Method 1613B, Section 15.4.1.2) [___] ___ [✓]

ACTION: If no for sections 4.2.2, 4.2.3 and 4.2.4, assess the effect on the validity of the data. Note in the Data Assessment.

4.2.5 For DB-5 or equivalent, (Method 1613B, Section 15.4.2.2) the peak separation between the unlabeled 2,3,7,8-TCDD and the peaks representing any other TCDD analyte shall be resolved with a valley of ≤ 25 percent.
Was this criteria met? [✓] ___ ___

% Valley = (x/y) x (100)

Y = The peak height of 2,3,7,8-TCDD analyte

X = The distance from the baseline to the bottom of the valley between the adjacent peaks.

ACTION: If the percent valley criteria are not met, qualify all positive data "J". Do not qualify non-detects.

4.2.6 Is the last eluting tetra chlorinated congener (1,2,8,9-TCDD) and the first eluting penta chlorinated congener (1,3,4,6,8-PeCDF) separated properly, since they elute within 15 seconds of each other? [✓] ___ ___

ACTION: If one of the congener is missing, report that in the Data Assessment.

## 5.0 Initial 5-Point Calibration

The initial calibration standard solutions (CS1-CS5) must be analyzed prior to any sample analysis. However, initial calibration should be analyzed when the CS3 Calibration Verification (VER) or Isomer Specificity Test Standard do not meet performance criteria. The initial calibration standards must be analyzed on the same instrument using the same GC/MS conditions that were used to analyze the Window Defining Solution and the Isomer Specificity Test Standards.

Was the initial calibration performed at the frequency specified above? [✓] ___ ___

5.1 The method allows the Laboratory to perform quantitative analysis by isotope dilution and internal standard, or to combine calibration solutions.

1. Isotope Dilution: performed for the fifteen 2,3,7,8-substituted CDDs and CDFs unlabeled analytes with labeled analytes added to the samples prior to extraction and for 1,2,3,7,8,9- HXCDD and OCDF (see sections 5.2.8 and 5.2.9). The relative response (RR) is calculated and the percent

YES NO N/A

coefficient of variation must be ≤ 20% over the 5 point range (1613B sec. 10.5.4) to use the average relative response for quantitation, otherwise a calibration curve must be used..

2. Calibration by Internal Standard: performed for non-2,3,7,8 substituted compounds having no labeled analytes in this method and for measurement of labeled compounds for intra laboratory statistics.. The response factor (RF) is calculated and the percent coefficient of variation must be ≤ 35% over the 5 point range (1613B sec. 10.6.3) to use the average response factor for quantitation, otherwise a calibration curve must be used.

3. Combined Calibration: performed by using solutions containing unlabeled, labeled compounds and internal standards. The requirements of each of the above methods are used. This method allows the laboratory to produce a single set of curves for isotope dilution and internal standard method.

5.1.1 The following MS/DS conditions must be used:

5.1.1.1 Mass calibration as per Section 4.1? [✓] ___ ___

5.1.1.2 Were SIM data acquired for each of the ions listed in Table 8, including interfering ions? (see analytical method) [✓] ___ ___

5.2 Were the following GC criteria met?

5.2.1 The chromatographic resolution between the 2,3,7,8-TCDD and the peaks representing any other unlabeled TCDD isomers must be resolved with a valley of ≤ 25 percent on the primary analysis (DB-5) column (1613B sec. 15.4.2.2). [✓] ___ ___

5.2.2 The chromatographic resolution between the 2.3.7,8-TCDF and the peaks representing any other unlabeled TCDF isomers must be resolved with a valley of ≤ 25 percent on the confirmation (DB-225 or SP2330) analysis column. [ ] ___ [✓]

5.2.3 For all calibration solutions, the relative retention time of peaks representing an unlabeled 2,3,7,8- substituted CDD or CDF must be within the limits given in table 2 of the Method. The retention times of the peaks representing non-2.3,7,8- substituted CDD or CDF's must fall within the retention time windows established by the Window Defining Solution. In addition, the absolute retention times of internal standards, $^{13}C_{12}$1,2,3,4-TCDD and $^{13}C_{12}$1.2,3,7,8.9-HxCDD shall not change by more than 15 seconds between the CS3 analysis and the analysis of any other standard. [ ] ___ [✓]

5.2.4 Are the two SIM ions for each homolog must maximize simultaneously and within 2 seconds of the correspouding labeled analyte ions?(1613B sec. 16.1) [✓] ___ ___

5.2.5 The relative ion abundance criteria for CDDs/CDFs listed in Table 9 (see analytical method) must be met. [✓] ___ ___

5.2.6 For all calibration solutions the signal to noise ratio (S/N) for the GC signal present in every SICP. including the ones for the labeled standards must be ≥ 10. [✓] ___ ___

5.2.7 The percent relative standard deviations (% RSD) for the mean response factors (RRF) from the 17 unlabeled standards must be ≤ 20%, and those for the 15 labeled reference compounds must be ≤ 35%. 10/20% [✓] ___ ___

YES NO N/A

5.2.8 Labeled analyte 1,2,3,7,8,9-HxCDD is used as an internal standard in this method, and can not be used to quantitate corresponding unlabeled analyte. The unlabeled 1,2,3,7,8,9-HxCDD must be quantitated using the average of the responses of the labeled analytes of 1,2,3,4,7,8-HxCDD and 1,2,3,6,7,8-HxCDD. The concentration of the unlabeled 1,2,3,7,8,9-HxCDD is corrected for the average recovery of the other HxCDD's. Was the unlabeled 1,2,3,7,8,9-HxCDD quantitated correctly? [ ] — /

5.2.9 The labeled analog of OCDF is not added to the sample because of a potential interference. Unlabeled OCDF is quantitated against the labeled OCDD. The concentration of the unlabeled OCDF is corrected for the recovery of the labeled OCDD. Was the unlabeled OCDF correctly quantitated against the labeled OCDD. [ ] — /

ACTION:

1. If mass calibration criteria as specified in Section 4.1 was not met, note in Data Assessment.

2. If the selected monitoring ions specified in Table 8 were not used for data acquisition, the lab must be contacted by the Project Officer for an explanation. If an incorrect ion was used, reject "R" all the associated data.

3. If the 25% percent valley for TCDD requirement was not met, quality positive data "J". Do not qualify non-detects. The tetra and penta (dioxins and furans) are affected. Heptas. Hexas and Octas are not affected.

4. If the ion abundance ratio for an analyte is outside the limits, flag the results for that analyte "R" (reject).

5. If the ion abundance ratio for an internal or labeled standard falls outside the QC limits flag the associated positive hits with "J". No effect on the non-detects.

6. If the signal to noise ratio (S/N) is below control limits, use professional judgement to determine quality of the data.

7. If the %RSD for each unlabeled analyte exceeds 20%, or the %RSD for each labeled analyte exceeds 35%, flag the associated sample positive results for that specific analyte as estimated ("J"). No effect on the non-detect data.

8. If 1,2,3,7,8,9-HxCDD was not calculated using the correct HxCDD response (average) factor, either manually recalculate the values for all standards and samples or contact Project Officer to request resubmittals from the laboratory.

9. If OCDF was not calculated using the correct response factor (OCDD), either manually recalculate the values for all standards and data or contact Project Officer to request resubmittals from the laboratory.

10. Non compliance of any other criteria specified above should be evaluated using professional judgement.

5.2.10 Spot check response factor calculations and ion ratios. Ensure that the correct quantitation ions for the unlabeled CDDs/CDFs and labeled standards were used. In addition, verify that the appropriate labeled standard was used for each analyte.

To recalculate the response factor, use the equation:

YES NO N/A

For target compounds (unlabeled analytes with corresponding labeled analytes):

$$RR = \frac{(A_{n1} + A_{n2}) \times Q_l}{(A_{l1} + A_{l2}) \times Q_n}$$

For labeled analytes. Internal standards and cleanup standard listed in Table 6 of method 1613:

$$RF = \frac{(A_{l1} + A_{l2}) \times Q_{is}}{(A_{is1} + A_{is2}) \times Q_l}$$

Note: There is only one m/z for $^{37}Cl_4$2.3.7.8-TCDD.

$A_{n1} + A_{n2}$ = integrated areas of the two quantitation ions of analytes of interest. (Target analyte, unlabeled compounds)

$A_{l1} + A_{l2}$ = integrated areas of the two quantitation ions of the appropriate labeled analytes compound.

$A_{is1} + A_{is2}$= integrated areas of the two quantitation ions of the appropriate internal standard.

$Q_n$ = quantity of the unlabeled PCDD/PCDF analyte injected [pg]

$Q_l$ = quantity of the appropriate labeled analytes compound [pg]

$Q_{is}$ = quantity of the appropriate internal standard injected [pg]

ACTION: If calculations were not performed correctly, notify the Project Officer to initiate resubmittals from the laboratory.

## 6.0 System and Laboratory Performance (Calibration Verification and Isomer Specificity Test Standard)

At the beginning of a 12 hour shift during which analyses are performed, GC/MS system performance and calibration are verified for all unlabeled and labeled compounds. For these tests the calibration verification (VER) standard and the isomer specificity test standards shall be used to verify all performance criteria.

Only if the laboratory meets all performance criteria may samples, blanks, and precision and recovery standards be analyzed.

### 6.1 Calibration Verification

6.1.1 Was the relative ion abundance for CDDs/CDFs listed in Table 9 of the analytical method met? (Method 1613B, Section 15.3.2) [✓] ___ ___

6.1.2 Were the peaks representing each unlabeled and labeled compound in the verification standard present with signal to noise ratio (S/N) of ≥ 10? (Method 1613B, Section 15.3.3) [✓] ___ ___

6.1.3 For each compound, was the concentration within the limit in Table 6 of the method? (Method 1613B, Section 15.3.5) [✓] ___ ___

6.1.4 Were the absolute retention time of the internal standards $^{13}C_{12}$-1.2,3,4- TCDD and $^{13}C_{12}$1.2,3.7.8,9- HxCDD within ± 15 seconds of the retention times obtained during calibration? (Method 1613B, Section 15.4.1.1) [✓] ___ ___

| | YES | NO | N/A |
|---|---|---|---|
| 6.1.5 Were the relative retention times of the unlabeled and labeled CDDs and CDFs within the limits given by Table 2 of the method? (Method 1613B, Section 15.4.2.2) | [ ] | | ✓ |

6.2 Isomer Specificity Test Standard

| | | | |
|---|---|---|---|
| 6.2.1 Was the chromatographic resolution between 2,3,7,8-TCDD and the peaks representing any other unlabeled TCDD isomers resolved with a valley of ≤ 25 percent on the primary analysis (DB-5) column? (Method 1613B, Section 15.4.2.2) | ✓ | | |
| 6.2 Was the chromatographic resolution between 2,3,7,8- TCDF and the peaks representing any other unlabeled TCDF isomers resolved with a valley of ≤ 25 percent on the confirmation (DB-225 or SP2330) analysis. | [ ] | | ✓ |

ACTION:

1. If the ion abundance ratio for an analyte is outside the limits, flag the results for that analyte "R" (reject).

2. If the signal noise ratio (S/N) is below control limits, use professional judgement to determine the quality of the data.

3. If an analyte concentration fell outside the acceptance criteria listed in Table 6 of the method.

   A. If the acceptance criteria for each unlabeled analyte and/or for each labeled analyte exceeds the range, flag the associated sample positive results for that specific analyte as estimated ("J"). No effect on the non-detect data.

   B. If the acceptance criteria for each unlabeled analyte and/or for each labeled analyte is below the range, flag the associated sample positive results as well as non-detects for that specific analyte as estimated ("J").

   C. If the acceptance criteria for each unlabeled analyte and/or for each labeled analyte is excessively below, ≤ 10% of the range, at the minimum, flag the associated sample positive results as well as non-detects for that specific analyte as estimated ("J"). However the validator may use professional judgement to accept or reject positive data and non-detects.

4. If the 25 percent valley for TCDD and TCDF requirement was not met, qualify positive data "J". Do not qualify non-detects. The tetras and pentas (dioxin and furans) are affected. Heptas, Hexas and Octas are not affected.

5. Non compliance of any other criteria specified above, in the method should be evaluated using professional judgement.

6.3 Spot check response factor calculations and ion ratios. Ensure that the correct quantitation ions for the unlabeled CDDs/CDFs and labeled standards were used. In addition, verify the appropriate labeled standard was used for each analyte.

7.0 Sample Data

NOTE: Any qualifications such as "J" applied to target compounds should be also applied to their associated total congeners concentration column.

7.1 Were the following MS/DS conditions used?

| | | YES | NO | N/A |
|---|---|---|---|---|
| 7.1.1 | SIM data were acquired for each of the ions listed in Table 8 (see analytical method) including diphenylether interfering ions. | [ ] | | ✓ |
| 7.2 | Were the following identification criteria met? | | | |
| 7.2.1 | For the 2,3,7,8 substituted analytes found present and the corresponding labeled compound or internal standard in the sample extract, must show relative retention times at the peak height within the limits given in Table 2. (Method 1613B, Section 16.4) | [ ] | | ✓ |
| 7.2.2 | For non-2,3,7,8 substituted compounds (tetra through octa) found present, the retention time must be within the window established by the Window Defining Solution, for the corresponding homologue (Method 1613B, Section 16.4) | [ ] | | ✓ |
| 7.2.3 | All specified ions listed in Table 8 for each isomer found present and the associated labeled compounds must be present in the SICP. The two SIM ions for the analyte, the labeled compound, and the internal standard must maximize simultaneously.(± 2 sec.) (Method 1613B, Section 16.1) | [ ] | | ✓ |
| 7.2.4 | The integrated ion current for each characteristic ion of the analyte identified as positive, must be at least 2.5 times background noise and must not have saturated the detector. (Method 1613B, Section 16.2) | [ ] | | ✓ |
| 7.2.5 | The integrated ion current for the labeled compounds, internal standards, and cleanup standard characteristic ions must be at least 10 times background noise. (Method 1613B, Section 16.2) | [ ] | | ✓ |
| 7.2.6 | The relative ion abundance criteria for all CDDs/CDFs found present must be within the limits of Table 9, or ± 10% of the ratio in the midpoint CS3 calibration or calibration verification (VER) whichever is most recent. | [ ] | | ✓ |
| 7.2.7 | The relative retention time of the unlabeled 2,3,7,8-substituted PCDD or PCDF must be within the limits given in Table 2 (Method 1613B, Section 16.4). | [ ] | | ✓ |
| 7.2.8 | The relative ion abundance criteria for the labeled compounds, cleanup, and internal standard must be met (Table 9 - Method 1613B). | [ ] | | ✓ |
| 7.2.9 | The analyte concentration must be within the calibration range. If not, dilution should have been made to bring the concentration within the calibration range. Was this criterion met? | [ ] | | ✓ |

NOTE: The analytical method clearly states that samples containing analytes having concentrations higher than 10 times the upper MCLs should be analyzed using a less sensitive, high resolution GC/low resolution MS method.

| | | | | |
|---|---|---|---|---|
| 7.2.10 | The identification of a GC peak as a PCDF can only be made if no signal having a S/N ≥ 2.5 is detected at the same time in the corresponding polychlorinated diphenylether (PCDPE) channel. Was the above condition met? | ✓ | | |

ACTION: 1. If the selected monitoring ions specified in Table 3 were not used for data acquisition, the lab must be contacted by the Project Officer for an explanation. If an incorrect ion was used, reject "R" all the associated data.

YES NO N/A

2. If the retention time of an analyte falls outside the retention time windows established by the associated Window Defining Mixture take the following action:

   A. If the analyte has a corresponding labeled analyte and is within 2 seconds of the labeled analyte, no action taken on positive data or non-detects.

   B. If the analyte has a corresponding labeled analyte and is outside 2 seconds of the labeled analyte, use professional judgement to determine qualifications for positive data or non-detects. At a minimum, "J" or "JN" positive data.

   C. If the analyte does not have a corresponding labeled analyte and is outside 2 seconds of the matching unlabeled analyte from the associated calibration, use professional judgement to determine qualifications for positive data or non-detects. At a minimum, "J" or "JN" positive data.

   D. If analyte meets identification criteria (7.2.2, 7.2.4, 7.2.5, 7.2.7) but does not meet ion abundance ratio criteria (7.2.8) and is not a labeled analog, the sample must be reanalyzed on a confirmation column. If confirmation analysis was not perform, reject "R" the failing analyte.

3. If the criteria listed in section 7.2.4 and 7.2.5 are not met but all other criteria are met, qualify all positive data of the specific analyte with "J".

4. If the analytes reported positive do not meet criteria for section 7.2.6, reject "R" all positive data for these analytes. Change the positive values to EMPC (Estimated Maximum Possible Concentration). Flag "J"

5. If the labeled compounds, internal standards and cleanup standards do not meet ion abundance criteria section 7.2.6, and 7.2.7, (Table 8 - analytical method) but they meet all other criteria, flag all corresponding data with "J".

6. If the lab reported values exceeding the calibration range flag those values with "J".

7. If peak deflections >50% are visible qualify particular compound with "J".

8. If PCDF was detected but an interfering PCDPE was also detected (see Section 7.2.9) and concentration not corrected for the interference, cross out the PCDF data. The reported value of PCDF is changed to EMPC.

9. If the lab did not monitor for PCDPEs, qualify all positive furan data "JN".

7.2.10 Spot check calculations for positive data and verify that the same labeled compounds used to calculate RFs were used to calculate concentration and EMPC. Ensure that the proper CDDs/CDFs and labeled compounds were used.

To recalculate the concentration of individual CDD/CDF analytes in the sample use the following equation:

All Matrices other than water

$$Cn\ (pg/g) = \frac{(A_{n1} + A_{n2}) \times Q_l}{W \times (A_{l1} + A_{l2}) \times RR}$$

Water

$$Cn\ (pg/L) = \frac{(A_{n1} + A_{n2}) \times Q_l}{}$$

YES NO N/A

$V \times (A_{11} + A_{12}) \times RR$

Where:

$A_{n1} + A_{n2}$ = integrated areas of the two quantitation ions of analyte of interest. (Target analyte)

$A_{l1} + A_{l2}$ = integrated areas of the two quantitation ions of the appropriate labeled analyte compound.

W = Weight (g) of sample extracted

V = Volume (L) of sample extracted

$Q_l$ = Quantity (pg) of the appropriate labeled compound added to the sample prior to extraction.

RR = Calculated relative response from initial calibration. (see section 5.2.10)

ACTION: If the spot check calculations yielded positive hit concentrations with ≤ 15% Difference from those reported in Form I, correct manually. If the difference between the validator's value and the form 1's values are > 15% contact the Project Officer to request from the laboratory for an explanation and a copy of the laboratory's calculations.

7.3 Clean-up procedures

Clean-up may not be necessary for relatively clean samples (drinking waters, ground waters etc). If the matrix required clean-up, the laboratory has 4 different procedures to choose from. Before using any clean-up procedure, the laboratory must demonstrate that the Initial Precision and Recovery requirements of the method can be met using the clean-up procedure.

A labeled clean-up standard $^{37}Cl_4$2,3,7,8-TCDD is added to the sample just before the back extraction with base and acid procedure. This occurs before any recommended clean-up procedures are initiated.

7.3.1 Was the percent recovery of the clean-up standard within the recommended range listed on Table 6 of the Analytical method? [✓] ___ ___

ACTION: If no, and the recovery is less than 25%, qualify all data as estimated "J". If recovery is 0 %, qualify all positive data as estimated "J" and reject "R" all non-detects for that sample.

7.3.2 Check the chromatograms that clean-up procedure was needed for each sample. Were any clean-up procedures needed for either water or soil samples? ___ [✓] ___

ACTION: If yes, check extraction log to verify which clean-up procedures if any were performed. The laboratory is not limited to only one procedure.

1. If no clean-up was performed and the chromatograms indicated that some should have been performed. Use professional judgement to assess the effect on the interference on the validity of the data. Document lack of required clean-up for complex samples in Data Assessment.

2. If one type of clean-up was performed, but the chromatograms indicate that additional clean-up should have been utilized. Use professional judgement to assess the effect on the interference on the validity of the data. Document lack of additional clean-up for complex samples in Data Assessment.

7.3.3 If clean-up procedures were used, did the Laboratory perform clean-up procedures on the

YES NO N/A

Initial Precision and Recovery samples as required by the method? [ ] ___ ✓

ACTION: If no, Use professional judgement to assess the effect of the interference on the validity of the data. Document lack of IPR documentation for clean-up procedures in Data Assessment.

8.0 Estimated Detection Limits (EDL) *If required for the project*

8.1 Was an EDL calculated for each 2,3,7,8-substituted analyte that was not identified regardless of whether other non-2,3,7,8 substituted analytes were present? [✓] ___ ___

ACTION: 1. If EDL or EMPC of an analyte which was not reported as a positive hit is missing, correct manually or contact the Project Officer to request from the laboratory corrections.

8.2 Use the equation below to check EDL calculations:

ALL MATRICES OTHER THAN WATER

$$EDL\ (pg/g) = \frac{2.5 \times Qis \times (Hx^1 + Hx^2) \times D}{W \times (His^1 + His^2) \times RR}$$

WATER

$$EDL\ (pg/L) = \frac{2.5 \times Qis \times (Hx^1 + Hx^2) \times D}{V \times (His^1 + His^2) \times RR}$$

Where:

$Hx^1$ and $Hx^2$ = peak heights of the noise for both quantitation ions of the 2,3,7,8-substituted isomer of interest.

$His^1$ and $His^2$ = peak heights of both the quantitation ions of the appropriate internal standards.

D = dilution factor

Qis, RR, W and V are previously defined.

NOTE: The validator should check the EDL data to verify that peak heights and not areas were used for this calculation. If the area algorithm was used, the validator should contact the Project Officer to request recalculations from the laboratory.

ACTION: If the spot check calculations yielded EDLs or EMPCs with $\leq$ 15% Difference from those reported in Form I, correct manually. If the difference between the validator's value and the Form I's values are > 15% contact the Project Officer to request from the laboratory for an explanation and a copy of the laboratory's calculations.

9.0 Estimated Maximum Possible Concentration (EMPC) *If required for the project*

9.1 Was an EMPC calculated for 2,3,7,8-substituted analytes that had S/N ratio for the quantitation and confirmation ions greater than 2.5, but did not meet all the identification criteria? [ ] ___ ✓

9.2 Use the equation below to check EMPC calculations:

YES NO N/A

All Matrices other than water

$$\text{EMPC (pg/g)} = \frac{(A_{n1} + A_{n2}) \times Q_i \times D}{W \times (A_{l1} + A_{l2}) \times RR}$$

Water:

$$\text{EMPC (pg/L)} = \frac{(A_{n1} + A_{n2}) \times Q_i \times D}{V \times (A_{l1} + A_{l2}) \times RR}$$

Action: 1. If EDL or EMPC of an analyte which was not reported as a positive hit is missing, correct manually or contact the Project Officer to request from the laboratory corrections.

2. If the spot check calculations yielded EDLs or EMPCs with ≤ 15% Difference from those reported in Form I, correct manually. If the difference between the validator's value and the Form I's values are > 15% contact the Project Officer to request from the laboratory for an explanation and a copy of the laboratory's calculations.

3. If EDLs or EMPCs for the most toxic analytes (TEF ≥ 0.05) are above reporting limits, contact the project office to recommend sample reanalysis.

## 10.0 Method Blanks

10.1 Has a method blank per matrix been extracted and aualyzed with each batch of 20 samples? [✓] ___ ___

10.2 If samples of some matrix were analyzed in different events (i.e. different shifts or days) has one blank for each matrix been extracted and analyzed for each event? [✓] ___ ___

10.3 Acceptable method blanks must not contain any signal of 2,3,7,8-TCDD, or 2,3,7,8-TCDF, equivalent to a minimum levels listed in Table 2 or above one third the regulatory compliance level.. Was this criteria met? (Method 1613B, Section 9.5.2) [✓] ___ ___

10.4 For other 2,3,7,8- substituted CDD/CDF isomers of each homologue, the allowable concentration in the method blank is less than minimum level listed in Table 2 (< 5 ng/Kg for soils and 50 pg/L for waters). Was this criteria met? [✓] ___ ___

ACTION: 1. If the proper number of method blanks were not analyzed, document in Data Assessment. If the validator feels that the validity of the data is seriously compromised and validation of data without the method blanks would be flawed then notify the Project Officer. If decision is made to proceed with the validation process, consider the following actions: no action taken on non-detected analytes. If an analyte has a reported concentration that is > 5 times the EDL, qualify "J" and all concentrations ≤ 5 times the EDL are qualified "R" due to possibility of contamination.

2. If the method blank is contaminated with 2,3,7,8-TCDD, 2,3,7,8-TCDF, 1,2,3,7,8-PeCDD, 1,2,3,7,8-PeCDF or 2,3,4,7,8-PeCDF at a concentration higher than the minimum levels in Table 2, reject all contaminant compound positive data for the associated samples "R" and notify the Project Officer to initiate reanalysis.

3. A. If the method blank is contaminated with any of the analytes mentioned in Action # 2 at a concentration of less than the minimum levels in Table 2 specified in the method or of any other 2,3,7,8-substituted analytes at any concentration and the concentration in the sample is less than five times the concentration in the blank, transfer the sample results to the EMPC/EDL column and cross-out the value in

YES NO N/A

the concentration column in order to present the data as a non-detect.

B. If the concentration in the sample is higher than five times the contamination concentration in the blank, no action is needed.

11.0 Labeled Compound Recoveries

11.1 Were the samples spiked with all the labeled compounds as specified in the method? [✓] ___ ___

11.2 Have labeled compounds' recoveries been within the required limits? [✓] ___ ___

11.3 If not, were samples reanalyzed? [ ] ___ ___

ACTION: 1. If the labeled compound recovery was below 25 percent, reject "R" all associated non-detect data (EMPC/EDL) and flag with "J" the positive data for the associated compound.

2. If the labeled compound recovery is above the upper limit (150 percent) flag associated positive data with "J". No effect on non-detects.

3. If the labeled compound recovery is less than 10%, qualify positive hits and non-detects associated with the failed labeled compound "R" (Reject). When highly toxic analytes (TEF$\geq$ 0.05) are affected, notify Project Officer to initiate reanalysis.

Recalculate the percent recovery for each labeled standard in the sample extract, $Rec_l$, using the formula:

$$\% Rec_l = \frac{(A_{l1} + A_{l2}) \times Q_{is} \times 100}{(A_{is1} + A_{is2}) \times RF \times Q_l}$$

$A_{l1} + A_{l2}$ = integrated areas of the two quantitation ions of the appropriate labeled compound.

$A_{is1} + A_{is2}$ = integrated areas of the two quantitation ions of the appropriate internal standard.

$Q_l$ = quantity of the appropriate labeled compound

$Q_{is}$ = quantity of the appropriate internal standard injected

RF was defined, previously.

12.0 Internal Standard Area Response

There is no method criterion for the Internal Standard area response. However, because it is very critical in determining instrument sensitivity, the Internal Standard area response should be checked for every sample. The two standards $^{13}C_{12}$1,2,3,4-TCDD and $^{13}C_{12}$1.2.3.7.8.9-HxCDD are referred to as Internal Standards in this method. In other Dioxin methods, the two standards are called Recovery Standards.

12.1 Are the internal standard areas for every sample and blank within the upper and lower limits of each associated initial calibration CS3?

Area upper limit= +100% of internal standard area.
Area lower limit= -50% of internal standard area. [✓] ___ ___

12.2 Is the retention time of each internal standard within 15 seconds of the associated initial calibration CS3 standard? [✓] ___ ___

YES NO N/A

ACTION: 1. If the internal standard area is outside the upper or lower limits, flag all related positive and non-detect data (EMPC/EDL) with "J" regardless whether the lab's labeled compound recoveries met specifications or not.

2. If extremely low area counts (<25%) are reported, flag all associated non-detect data as unusable "R" and the positive data "J".

3. If the retention time of the internal standards differs by more than 15 seconds from the initial calibration CS3, use professional judgement to determine the effect on the results. A time shift of more than 15 seconds may cause certain analytes to elute outside the retention time window established by the GC window defining/column performance check solution. A constant shift could be also the result of a leak.

NOTE: Action 1 and 2 are recommendations only since this criterion is not a method requirement. These guidelines are based on other methods, previously validated data packages and Region II recommendations. If method blanks have low area responses as well as the samples, the validator should seriously consider qualifying the data for this criterion. Action 3 is a method requirement.

## 13.0 Second Column Confirmation

13.1 Any sample in which 2,3,7,8-TCDF is identified on a DB-5 column, must have a confirmation analysis (Method 1613B, section 16.5). Was a second column confirmation performed? [ ] / ___

13.2 Was the sample extract reanalyzed on a 30 m DB-225, fused silica capillary column, for 2,3,7,8-TCDF using the GC/MS conditions given in Section 10.1.1 of the analytical method? [ ] ___ /

NOTE: The concentration of 2,3,7,8-TCDF obtained from the primary column (DB-5) should only be used for qualification, due to better QC data associated with the primary column. Also note that the confirmation and quantitation of 2,3,7,8-TCDF may be accomplished on a SP-2330 GC column.

ACTION: If confirmation is missing, use professional judgement, or contact the Project Officer for assistance.

13.3 Did the second column meet the calibration and linearity specification in Sections 5.0 and 6.0 above? [ ] ___ /

ACTION: If no, refer to section 5.0 and 6.0 for appropriate action.

13.4 Was the % D of the quantitation results of the two columns less than 50? [ ] ___ /

ACTION: Note in data assessment the differences, use professional judgement to decide which column data to report for TCDF. No other action is needed since this is not a method requirement but a technical recommendation.

## 14.0 Sample Reanalysis

14.1 The Project Officer will evaluate the need for reanalyzing the samples with qualified data based on site-specific Data Quality Objectives.

14.2 Due to a variety of situations (see below) that may occur during sample analysis, the laboratory is required to reanalyze or re-extract and reanalyze certain samples. If a reanalysis was required but was not performed, contact the Project Officer to initiate reanalysis. List in data assessment all re-extractions and reanalyses

YES NO N/A

and identify the CDD/CDF sample data summaries which must be used by the data user (when more than one analysis is submitted for a sample).

Lab must re-extract and/or re-analyzed samples when the following criteria are not met:

1. Contaminated method blank at concentrations above the minimum levels (Table 2)

2. Labeled compound recoveries outside acceptable ranges listed on Table 6 of Analytical method.

3. Exceedance of calibration range by an analyte (dilution or re-extract using a smaller aliquot).

4. Recovery of labeled compounds outside acceptable limits listed on Table 6 of the Analytical method in a diluted sample (re-extracted using a smaller aliquot).

ACTION: For criteria 1, 2, or 3, notify the Project Officer to discuss possible re-analysis of sample by the laboratory.

For criteria 4, If the calibration was verified and the re-extracted sample still does not meet labeled recovery requirements, then the method does not apply to the sample. The results are not reportable for regulatory purposes (Method 1613B, section 18.4.4). Notify the Project Officer of problem to initiate re-analysis of sample using a different method. Document in Data Assessment.

## 15.0 Precision and Recovery (PAR)

The laboratory is required to show initial demonstration of capability, to evaluate and document data quality. Laboratory performance is compared to established performance criteria to determine if results of analyses meet the performance characteristics of the method.

The laboratory must perform and submit data to establish the ability to generate acceptable precision and accuracy.

15.1 Did the laboratory analyzed an Initial Precision and Recovery (IPR) standard as outlined in section 9.2 required by the analytical method? [✓] ___ ___

ACTION: If no, contact the Project Officer to request resubmittals from the laboratory.

If data is not available, discuss with the Project Officer the feasibility of continuing with validation. If a decision is made to proceed with validation, use professional judgement. All data at a minimum should be qualified as estimated "J". Technically according to the method, data and system performance is unacceptable for all compounds. Analyses should not have continued as per the method. Document under contract non-compliance in Data Assessment.

15.2 Did the IPR standard deviation (s) and average concentration (x) passed criteria as outlined in Table 6 of the method? [ ] ___ ✓

ACTION: If no, refer to action from section 15.1.

The laboratory must analyzed an Ongoing Precision and Recovery standard (OPR) periodically, at the beginning of 12 hour shift after the analysis of the CS3 calibration verification (VER), and before the analysis of any sample in each set .

15.3 Was the ~~Ongoing~~ BCS ~~Precision and Recovery (OPR)~~ standard analyzed at the required frequency? [✓] ___ ___

15.4 Did the ~~OPR~~ BCS standard passed the concentration criteria limits in ~~Table 6 of the method~~ QAPP? [ ] ✓ ___

YES NO N/A

ACTION: If no, refer to action from section 15.1. All samples that do not have a passing OPR standard are potentially affected for that analyte.

The following sections may be incorporated in the validation process on a case by case basis depending upon the requirements of the Project Plan. Sometimes a laboratory will provide data for some of the following sections on a routine basis. If not a requirement of the Project Plan, then professional judgement is needed to qualify data based on additional information.

16.0 Isomer Specificity and Toxicity Equivalency Factor (TEF)

NOTE: The TEF value concentrations can be found in the DFLM01.1 Statement of Work for Dioxin Analysis Form I PCDD-2.

When calculating the 2,3,7,8-TCDD Toxicity Equivalency of a sample only those 2,3,7,8 substituted isomers that were positively identified in the sample must be included in the calculations. The sum of the TEF adjusted concentration is used to determine when a second column confirmation is required to achieve analyte specificity.

16.1 Did the lab include EMPC or EDL values in the toxicity equivalency calculations? [✓] ___ ___

16.2 Were all samples, whose toxicity equivalency exceeded the required values were reanalyzed on a confirmation column to establish analyte specificity? [ ] ✓ ___

ACTION: 1. If yes, the toxicity equivalency calculations were not calculated properly, notify the Project Officer to arrange for laboratory resubmittals.

2. If the toxicity equivalency exceeded the required limits (0.7 µg/Kg for soil/ sediment, 7 ng/L for aqueous and 7 µg/Kg for chemical waste samples), and the lab failed to reanalyze the samples on a specific secondary column, notify Project Officer. Reanalysis may be initiated.

NOTE: Any qualifications such as "J" applied to target compounds should be also applied to their associated total congeners concentration.

17.0 Rinsate Blank *(Region 2 QA guidelines recommend rinse blanks for all projects)*

17.1 One rinsate blank should be collected for each batch of 20 soil samples or one per day whichever is more frequent. Were rinsate blanks collected at the above frequency? [✓] ___ ___

17.2 Do any rinsate blanks show the presence of 2,3,7,8-TCDD, 2,3,7,8-TCDF, and 1,2,3,7,8-PeCDD at amounts > .5 µg/L or any other analyte at levels > 1 µg/L? [ ] ✓ ___

ACTION: If any rinsate blank was found to be contaminated with any of the CDDs/CDFs notify the Project Officer to discuss what proper action must be taken.

If any qualification is needed due to rinsate blank contamination, follow the guidelines outlined under Method Blanks, section 10, Actions 2 and 3.

18.0 Field Blanks

18.1 The field blanks are PEM samples (blind blanks) supplied to Laboratory at the frequency of one field blank per 20 samples or one per samples collected over a period of one week, which ever comes first. A typical "field blank" will consist of uncontaminated soil. The field blanks are used to monitor possible cross contamination of samples in the field and in the laboratory.

Were the following conditions met?

YES NO N/A

18.2 Acceptable field blanks must not contain any signal of 2,3,7,8-TCDD, 2,3,7,8-TCDF, 1,2,3,7,8-PeCDD and 1,2,3,7,8-PeCDF equivalent to a concentration of > 20 ng/Kg. [ ] ___ ✓

18.3 For other 2,3,7,8 substituted CDD/CDF analytes of each homologue the allowable concentration in the field blank is less than the upper MCLs listed in the method. [ ] ___ ✓

ACTION: When the field blank is found to be contaminated with target compounds, apply the same action as described for the Method Blank, section 10, Actions 2 and 3.

NOTE: Ask Project Officer to verify that the PEM blank (field blank) did not contain any CDD/CDF analytes and ask their assistance in the evaluation of the PEM field blank.

## 19.0 PEM Interference Fortified Blanks

NOTE: This type of blank may not be available at this time. In many cases, laboratories will substitute matrix spike/matrix spike duplicate (MS/MSD). If a PEM Interference Fortified blank(s) were not analyzed but MS/MSD data were submitted, skip this section and go onto to section 21.

19.1 One known blank usually an interference fortified soil/sediment sample is supplied to the Laboratory. The frequency of this QC sample is one per group of 20 environmental samples or one per samples collected over one week period, whichever occurs first. The sample is spiked by the laboratory with the appropriate volume of the matrix spiking solution and then extracted and analyzed with other samples.

19.2 Was a fortified PEM blank analyzed at the frequency described above? [ ] ✓ ___

19.3 Was the percent recovery of 2,3,7,8-TCDD and other 2,3,7,8-substituted compounds within the 50 to 150 percent control limits? [ ] ___ ✓

ACTION: 1. If the recovery of a 2,3,7,8-substituted analytes falls outside the 50-150 percent control limit, flag all positive and non-detect data of the same and related analytes in the same homolog series with "J". However, if the recovery is below 20%, qualify all associated non-detects "R" and positive hits as "J". Notify the Project Officer. Reanalysis may be initiated.

2. If no fortified PEM blank was analyzed, use professional judgement to assess data validity.

## 20.0 Matrix Spike (MS) Field Sample

Note: Matrix spike is not required by this method although Labs may routinely perform this analysis as part of internal QA/QC and submit this data as part of the package. Verify requirements with Project Officer.

20.1 Was a matrix spike analyzed at the frequency of one per SDG samples per matrix? [ ] ✓ ___

20.2 Was the percent recovery of 2,3,7,8-TCDD and other 2,3,7,8-substituted CDDs/CDFs within 60 to 140 percent? [ ] ___ ✓

ACTION: If problems such as interferences are observed, use professional judgement to assess the quality of the data. The 60-140% limits of the matrix spike data may be used to flag data of the spiked sample only. The matrix spike data of the PE blank sample are more important and must be used primarily in data validation.

20.3 Was a matrix spike duplicate analyzed as per section 11.1 and 11.2? [ ] ___ ✓

YES NO N/A

ACTION: No action required. A matrix spike duplicate is not required. Use professional judgement if there is a large difference in concentrations reported between MS and MSD. Qualifications if any, can only be performed on the sample that was used for this criteria.

21.0 Environmental Duplicate Samples *(recommended in Region 2 for all Projects)*

NOTE: Do not confuse an euvironmental duplicate with a matrix spike duplicate. An environmental duplicate is a sample that has been divided into 2 parts (extracted and analyzed as two different samples) or as 2 separate samples from the same location sent by the sampling crew. This sample is not spike with any additional compounds other than those compounds required by the method for analysis of all routine samples.

21.1 For every batch of 20 samples or samples collected over a period of one week, whichever is less, there must be a sample designated as duplicate. Were duplicate samples collected at the above frequency? [ ] / ___

21.2 Did results of the duplicate samples agree within 25% relative difference for 2,3,7,8-substituted analytes and 50% for the rest of the analytes? >20% [ ] ___ /

ACTION: The duplicate results can be used in conjunction of other QC data. Use professional judgement.

22.0 REFERENCES

The following references are cited in Method 1613. They are important references for technical information and are submitted here as part of this method's documentation.

1. "Analytical Procedures and Quality Assurance Plan for the Determination of PCDD/PCDF in Fish", USEPA Environmental Research Laboratory, 6201 Congdon Boulevard, Duluth, NH 55804, April 1988.

2. Barnes, Donald G., Kutz, Frederick W., and Bottimore, David P., "Update of Toxicity Equivalency Factors (TEFs) for Estimating Risks Associated with Exposure to Mixtures of Chlorinated Dibenzo-p-dioxins and dibenzofurans (CDDs/CDFs)", Risk Assessment Forum, USEPA, Washington, DC 20460, February 1989.

3. Lamparski, L.L., and Nestrick, T.J., "Determination of Tetra-, Hexa-, Hepta-, and Octachlorodibenzo-p-dioxin Isomers in Particulate Samples at Parts per Trillion Levels". Analytical Chemistry, 52: 2045-2054, 1980.

4. "Measurment of 2,3,7,8-Tetrachlorinated Dibenzo-p-dioxin (TCDD) and 2,3,7,8-Tetrachlorinated Dibenzofurans (TCDF) in Pulp, Sludges, Process Samples and Waste-waters from Pulp and Paper Mills", Wright State University, Dayton, OH 45435. June 1988.

5. Method 1613-Revision B- Tetra through Octa- chlorinated Dioxins and Furans by Isotope Dilution HRGC/HRMS, USEPA, Washington, DC, 20460, October 1994

6. "Method 613--2,3,7,8-tetrachlorodibenzo-p-dioxin". 40 CFR 136 (49 FR 43234), October 26, 1984. Section 4.1.

7. "NCASI Procedures for the Preparation and Isomer Specific Analysis of Pulp and Paper Industry Samples for 2,3,7,8 TCDD and 2,3,7,8 TCDF". National Council of the Paper Industry for Air and Stream Improvement, 260 Madison Avenue, New York, NY 10016. Technical Bulletin No.551, Pre-release Copy, July 1988.

8. Provost, L.P., and Elder, R.S., "Interpretation of Percent Recovery Data", American Laboratory, 15: 56-83, 1983

**LABORATORY DATA CONSULTANTS, INC.**
7750 El Camino Real, Suite 2L Carlsbad, CA 92009 Phone: 760/634-0437 Fax: 760/634-0439

Windward Environmental, LLC
200 West Mercer Street, Suite 401
Seattle, WA 98119
ATTN: Ms. Jennifer Parker

September 29, 2011

SUBJECT: Lower Passaic River Restoration Project, Data Validation

Dear Ms. Parker,

Enclosed are the final validation reports for the fractions listed below. These SDGs were received on September 12, 2011. Attachment 1 is a summary of the samples that were reviewed for each analysis.

**LDC Project # 26234:**

| SDG # | Fraction |
|---|---|
| A3406 | Polychlorinated Biphenyls as Congeners<br>Dioxins/Dibenzofurans |

The data validation was performed under EPA Level IV guidelines. The analyses were validated using the following documents, as applicable to each method:

- Final Surface Sediment Chemical Analyses and Benthic Invertebrate Toxicity and Bioaccumulation Testing Quality Assurance Project Plan (QAPP) for the Lower Passaic River Restoration Project, October 2009
- Caged Bivalve Study Addendum, March 2011
- USEPA Region II Validation SOP HW-25, (Revision 3, September 2006) forTetra-through Octochlorinated Dioxins and Furans by Isotope Dilution, modified as necessary to accommodate the QAPP criteria
- USEPA Region II Validation SOP HW-46, (Revision 1, September 2008) for Chlorinated Biphenyls Congeners in Water, Soil, Sediment, and Tissue, modified as necessary to accommodate the QAPP criteria

Please feel free to contact us if you have any questions.

Sincerely,

Stella Cuenco

Stella S. Cuenco
Data Validation Operations Manager/Senior Chemist

L:\Windward\Passaic\26234COV.wpd

Attachment 1

# EDD LDC #26234 (Windward Environmental, LLC - Seattle WA / Lower Passaic River Restoration Project) PO# 2011-0012

| LDC | SDG# | DATE REC'D | (3) DATE DUE | PCB Cong (1668B) | | Dioxin (1613B) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Matrix: Water/Tissue | | | | W | T | W | T | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S |
| A | A3406 | 09/13/11 | 10/04/11 | 0 | 10 | 0 | 10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total | A/SC | | | 0 | 10 | 0 | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 20 |

For Internal Use Only: Shaded cells indicate Level IV validation (all other cells are Level III validation). These sample counts do not include MS/MSD, and DUPs

# Laboratory Data Consultants, Inc.
# Data Validation Report

| | |
|---|---|
| **Project/Site Name:** | Lower Passaic River Restoration Project |
| **Collection Date:** | March 8 through June 8, 2011 |
| **LDC Report Date:** | September 30, 2011 |
| **Matrix:** | Tissue |
| **Parameters:** | Dioxins/Dibenzofurans |
| **Validation Level:** | EPA Level IV |
| **Laboratory:** | Analytical Perspectives |
| **Sample Delivery Group (SDG):** | A3406 |

**Sample Identification**

LPR6-ECST-Comp01
LPRBG-ECST-Comp01
LPR6-ECST-Comp02
LPR7-ECST-Comp03
LPR7-ECST-Comp04
LPR8-ECST-Comp05
LPR1-GDST-Comp01
LPRBG-GDST-Comp01
LPR2-GDST-Comp02
LPR3-GDST-Comp03
LPR6-ECST-Comp02DUP

## Introduction

This data review covers 11 tissue samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 1613B for Polychlorinated Dioxins/Dibenzofurans.

This review follows the Final Surface Sediment Chemical Analyses and Benthic Invertebrate Toxicity and Bioaccumulation Testing Quality Assurance Project Plan (QAPP) for the Lower Passaic River Restoration Project, (October 8, 2009), the Caged Bivalve Study Addendum (March 2, 2011) and USEPA Region II Validation SOP HW-25 (Revision 3, September 2006) for Tetra- through Octachlorinated Dioxins and Furans by Isotope Dilution, modified as necessary to accommodate the QAPP criteria.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

NJ Presumptive evidence of presence of the compound at an estimated quantity.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

## I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

## II. HRGC/HRMS Instrument Performance Check

Instrument performance was checked at the required daily frequency.

Retention time windows were established for all homologues.

The chromatographic resolution between 2,3,7,8-TCDD and the peaks representing any other unlabeled TCDD isomers was resolved with a valley of less than or equal to 10%.

The chromatographic resolution between 2,3,7,8-TCDF and the peaks representing any other unlabeled TCDF isomers was resolved with a valley of less than or equal to 40%.

The static resolving power was at least 10,000 (10% valley definition).

## III. Initial Calibration

A five point initial calibration was performed as required by the method.

Percent relative standard deviations (%RSD) were less than or equal to 10.0% for all unlabeled compounds and less than or equal to 20.0% for all labeled compounds.

The ion abundance ratios for all PCDDs and PCDFs were within method criteria.

The minimum S/N ratio was greater than or equal to 10 for each unlabeled compound and labeled compound.

## IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

All of the routine calibration percent differences (%D) between the initial calibration RRF and the routine calibration RRF were less than or equal to 20.0% for unlabeled compounds and less than or equal to 30.0% for labeled compounds with the following exceptions:

| Date | Compound | Concentration (Limits) | Associated Samples | Affected Compound | Flag | A or P |
|---|---|---|---|---|---|---|
| 8/19/11 | 1,2,3,4,6,7,8-HpCDF | 56.4 ng/ml (45-55) | LPR8-ECST-Comp05<br>LPR1-GDST-Comp01<br>LPRBG-GDST-Comp01<br>LPR2-GDST-Comp02<br>LPR3-GDST-Comp03 | 1,2,3,4,6,7,8-HpCDF<br>Total HpCDF | J (all detects)<br>J (all detects) | P |

The ion abundance ratios for all PCDDs and PCDFs were within method criteria.

## V. Blanks

Method blanks were reviewed for each matrix as applicable. No polychlorinated dioxin/dibenzofuran contaminants were found in the method blanks with the following exceptions:

| Method Blank ID | Extraction Date | Compound | Concentration | Associated Samples |
|---|---|---|---|---|
| MB1_8929 | 8/15/11 | 1,2,3,7,8,9-HxCDD<br>OCDD<br>1,2,3,4,6,7,8-HpCDF<br>OCDF<br>Total TCDD<br>Total HxCDD<br>Total HpCDD<br>Total HxCDF<br>Total HpCDF | 0.0913 pg/g<br>0.196 pg/g<br>0.0262 pg/g<br>0.0564 pg/g<br>0.0576 pg/g<br>0.0913 pg/g<br>0.0327 pg/g<br>0.028 pg/g<br>0.0262 pg/g | All samples in SDG A3406 |

Sample concentrations were compared to concentrations detected in the method blanks. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated method blanks with the following exceptions:

| Sample | Compound | Reported Concentration | Modified Final Concentration |
|---|---|---|---|
| LPR6-ECST-Comp01 | 1,2,3,7,8,9-HxCDD | 0.127 pg/g | 0.127U pg/g |
| LPRBG-ECST-Comp01 | 1,2,3,7,8,9-HxCDD<br>1,2,3,4,6,7,8-HpCDF<br>OCDF | 0.0873 pg/g<br>0.0863 pg/g<br>0.105 pg/g | 0.0873U pg/g<br>0.0863U pg/g<br>0.105U pg/g |
| LPR6-ECST-Comp02 | 1,2,3,7,8,9-HxCDD | 0.128 pg/g | 0.128U pg/g |
| LPR6-ECST-Comp02DUP | 1,2,3,7,8,9-HxCDD | 0.121 pg/g | 0.121U pg/g |
| LPR7-ECST-Comp03 | 1,2,3,7,8,9-HxCDD | 0.119 pg/g | 0.119U pg/g |
| LPR7-ECST-Comp04 | 1,2,3,7,8,9-HxCDD | 0.108 pg/g | 0.108U pg/g |
| LPR8-ECST-Comp05 | 1,2,3,7,8,9-HxCDD | 0.113 pg/g | 0.113U pg/g |
| LPR1-GDST-Comp01 | 1,2,3,7,8,9-HxCDD | 0.109 pg/g | 0.109U pg/g |
| LPRBG-GDST-Comp01 | 1,2,3,7,8,9-HxCDD<br>1,2,3,4,6,7,8-HpCDF<br>OCDF<br>Total HpCDF | 0.123 pg/g<br>0.0289 pg/g<br>0.0634 pg/g<br>0.0289 pg/g | 0.123U pg/g<br>0.0289U pg/g<br>0.0634U pg/g<br>0.0289U pg/g |

| Sample | Compound | Reported Concentration | Modified Final Concentration |
|---|---|---|---|
| LPR2-GDST-Comp02 | 1,2,3,7,8,9-HxCDD | 0.112 pg/g | 0.112U pg/g |
| LPR3-GDST-Comp03 | 1,2,3,7,8,9-HxCDD | 0.107 pg/g | 0.107U pg/g |

Sample LPR-071811-RB (from SDG A3380) was identified as a rinsate blank. No polychlorinated dioxin/dibenzofuran contaminants were found.

## VI. Matrix Spike/Matrix Spike Duplicates

Matrix spike and matrix spike duplicate analyses were not required in the QAPP, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Results were within QC limits.

## VII. Laboratory Control Samples (LCS) and Standard Reference Material (SRM)

Batch control samples were reviewed for each matrix as applicable. Percent differences (%D) and relative percent differences (RPD) were within QC limits.

The percent differences (%D) of the standard reference material (SRM) were within the QC limits for all compounds.

## VIII. Regional Quality Assurance and Quality Control

Not applicable.

## IX. Internal Standards

All internal standard recoveries (%R) were within validation criteria.

All internal standard ion abundance ratios were within method criteria.

## X. Target Compound Identifications

All target compound identifications were within validation criteria.

## XI. Compound Quantitation and RLs

All compound quantitation and RLs were within validation criteria with the following exceptions:

| Sample | Compound | Flag | A or P |
|---|---|---|---|
| All samples in SDG A3406 | All compounds reported by the lab as estimated maximum possible concentration (EMPC) | EMPC-J | A |

## XII. System Performance

The system performance was acceptable.

## XIII. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

## XIV. Field Duplicates

No field duplicates were identified in this SDG.

## Lower Passaic River Restoration Project
## Dioxins/Dibenzofurans - Data Qualification Summary - SDG A3406

| SDG | Sample | Compound | Flag | A or P | Reason |
|---|---|---|---|---|---|
| A3406 | LPR8-ECST-Comp05<br>LPR1-GDST-Comp01<br>LPRBG-GDST-Comp01<br>LPR2-GDST-Comp02<br>LPR3-GDST-Comp03 | 1,2,3,4,6,7,8-HpCDF<br>Total HpCDF | J (all detects)<br>J (all detects) | P | Continuing calibration (Concentration) |
| A3406 | LPR6-ECST-Comp01<br>LPRBG-ECST-Comp01<br>LPR6-ECST-Comp02<br>LPR7-ECST-Comp03<br>LPR7-ECST-Comp04<br>LPR8-ECST-Comp05<br>LPR1-GDST-Comp01<br>LPRBG-GDST-Comp01<br>LPR2-GDST-Comp02<br>LPR3-GDST-Comp03<br>LPR6-ECST-Comp02DUP | All compounds reported by the lab as estimated maximum possible concentration (EMPC) | EMPC-J | A | Compound quantitation and RLs (EMPC) |

## Lower Passaic River Restoration Project
## Dioxins/Dibenzofurans - Laboratory Blank Data Qualification Summary - SDG A3406

| SDG | Sample | Compound | Modified Final Concentration | A or P |
|---|---|---|---|---|
| A3406 | LPR6-ECST-Comp01 | 1,2,3,7,8,9-HxCDD | 0.127U pg/g | A |
| A3406 | LPRBG-ECST-Comp01 | 1,2,3,7,8,9-HxCDD<br>1,2,3,4,6,7,8-HpCDF<br>OCDF | 0.0873U pg/g<br>0.0863U pg/g<br>0.105U pg/g | A |
| A3406 | LPR6-ECST-Comp02 | 1,2,3,7,8,9-HxCDD | 0.128U pg/g | A |
| A3406 | LPR6-ECST-Comp02DUP | 1,2,3,7,8,9-HxCDD | 0.121U pg/g | A |
| A3406 | LPR7-ECST-Comp03 | 1,2,3,7,8,9-HxCDD | 0.119U pg/g | A |
| A3406 | LPR7-ECST-Comp04 | 1,2,3,7,8,9-HxCDD | 0.108U pg/g | A |
| A3406 | LPR8-ECST-Comp05 | 1,2,3,7,8,9-HxCDD | 0.113U pg/g | A |
| A3406 | LPR1-GDST-Comp01 | 1,2,3,7,8,9-HxCDD | 0.109U pg/g | A |
| A3406 | LPRBG-GDST-Comp01 | 1,2,3,7,8,9-HxCDD<br>1,2,3,4,6,7,8-HpCDF<br>OCDF<br>Total HpCDF | 0.123U pg/g<br>0.0289U pg/g<br>0.0634U pg/g<br>0.0289U pg/g | A |
| A3406 | LPR2-GDST-Comp02 | 1,2,3,7,8,9-HxCDD | 0.112U pg/g | A |

| SDG | Sample | Compound | Modified Final Concentration | A or P |
|---|---|---|---|---|
| A3406 | LPR3-GDST-Comp03 | 1,2,3,7,8,9-HxCDD | 0.107U pg/g | A |

**Lower Passaic River Restoration Project**
**Dioxins/Dibenzofurans - Field Blank Data Qualification Summary - SDG A3406**

No Sample Data Qualified in this SDG

LDC #: 26234A21 **VALIDATION COMPLETENESS WORKSHEET** Date: 9/21/11
SDG #: A3406 Level IV Page: 1 of 1
Laboratory: Analytical Perspectives Reviewer:
2nd Reviewer:

**METHOD:** HRGC/HRMS Dioxins/Dibenzofurans (EPA Method 1613B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

| | Validation Area | | Comments |
|---|---|---|---|
| I. | Technical holding times | A | Sampling dates: 3/8 - 6/8/11 |
| II. | HRGC/HRMS Instrument performance check | A | |
| III. | Initial calibration | A | 10/20% |
| IV. | Routine calibration/~~ICV~~ | SW | method limits |
| V. | Blanks | SW | |
| VI. | Matrix spike/Matrix spike duplicates / DUP | N/A | |
| VII. | Laboratory control samples | A | BCS, SRM |
| VIII. | Regional quality assurance and quality control | N | |
| IX. | Internal standards | A | |
| X. | Target compound identifications | A | |
| XI. | Compound quantitation and CRQLs | SW | EMPC-J |
| XII. | System performance | A | |
| XIII. | Overall assessment of data | A | |
| XIV. | Field duplicates | N | |
| XV. | Field blanks | ND | RB = LPR-071811-RB (A3380) |

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: tissue

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1 | LPR6-ECST-Comp01 | 11 | LPR6-ECST-Comp02DUP | 21 | MB1-8929 | 31 | |
| 2 | LPRBG-ECST-Comp01 | 12 | | 22 | | 32 | |
| 3 | LPR6-ECST-Comp02 | 13 | | 23 | | 33 | |
| 4 | LPR7-ECST-Comp03 | 14 | | 24 | | 34 | |
| 5 | LPR7-ECST-Comp04 | 15 | | 25 | | 35 | |
| 6 | LPR8-ECST-Comp05 | 16 | | 26 | | 36 | |
| 7 | LPR1-GDST-Comp01 | 17 | | 27 | | 37 | |
| 8 | LPRBG-GDST-Comp01 | 18 | | 28 | | 38 | |
| 9 | LPR2-GDST-Comp02 | 19 | | 29 | | 39 | |
| 10 | LPR3-GDST-Comp03 | 20 | | 30 | | 40 | |

Notes:

# VALIDATION FINDINGS WORKSHEET

**METHOD:** HRGC/HRMS Dioxins/Dibenzofurans (EPA Method 1613B)

| | | | | |
|---|---|---|---|---|
| A. 2,3,7,8-TCDD | F. 1,2,3,4,6,7,8-HpCDD | K. 1,2,3,4,7,8-HxCDF | P. 1,2,3,4,7,8,9-HpCDF | U. Total HpCDD |
| B. 1,2,3,7,8-PeCDD | G. OCDD | L. 1,2,3,6,7,8-HxCDF | Q. OCDF | V. Total TCDF |
| C. 1,2,3,4,7,8-HxCDD | H. 2,3,7,8-TCDF | M. 2,3,4,6,7,8-HxCDF | R. Total TCDD | W. Total PeCDF |
| D. 1,2,3,6,7,8-HxCDD | I. 1,2,3,7,8-PeCDF | N. 1,2,3,7,8,9-HxCDF | S. Total PeCDD | X. Total HxCDF |
| E. 1,2,3,7,8,9-HxCDD | J. 2,3,4,7,8-PeCDF | O. 1,2,3,4,6,7,8-HpCDF | T. Total HxCDD | Y. Total HpCDF |

Notes:

LDC #: 26234A21

# VALIDATION FINDINGS WORKSHEET
## Routine Calibration


Reviewer: K
2nd Reviewer: a

**METHOD:** HRGC/HRMS Dioxins/Dibenzofurans (EPA Method 1613B)
Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a routine calibration performed at the beginning of each 12 hour period?
Y N N/A Were all concentrations within method QC limits for unlabeled and labeled compounds?
Y N N/A Did all routine calibration standards meet the Ion Abundance Ratio criteria?

| # | Date | Standard ID | Compound | conc (limits) ~~Finding %D~~ | Finding Ion Abundance Ratio | Associated Samples | Qualifications |
|---|---|---|---|---|---|---|---|
| | 8/9/11 | 110819S27 | O | 56.4 ng/mL (45-55) | | 6-10 | Jdets/P (O, Y) |
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| | PCDDs | Selected ions (m/z) | Ion Abundance Ratio | | PCDFs | Selected ions (m/z) | Ion Abundance Ratio |
|---|---|---|---|---|---|---|---|
| | Tetra- | M/M+2 | 0.65-0.89 | | Tetra- | M/M+2 | 0.65-0.89 |
| | Penta- | M+2/M+4 | 1.32-1.78 | | Penta- | M+2/M+4 | 1.32-1.78 |
| | Hexa- | M+2/M+4 | 1.05-1.43 | | Hexa- | M+2/M+4 | 1.05-1.43 |
| | Hexa-$^{13}$C-HxCDF (IS) only | M/M+2 | 0.43-0.59 | | Hexa-$^{13}$C-HxCDF (IS) only | M/M+2 | 0.43-0.59 |
| | Hepta-$^{13}$C-HpCDF (IS) only | M/M+2 | 0.37-0.51 | | Hepta-$^{13}$C-HpCDF (IS) only | M/M+2 | 0.37-0.51 |
| | Hepta- | M+2/M+4 | 0.88-1.20 | | Hepta- | M+2/M+4 | 0.88-1.20 |
| | Octa- | M+2/M+4 | 0.76-1.02 | | Octa- | M+2/M+4 | 0.76-1.02 |

LDC #: 26234A21

# VALIDATION FINDINGS WORKSHEET
## Blanks


Reviewer: M
2nd Reviewer: G

**METHOD:** HRGC/HRMS Dioxins/Dibenzofurans (EPA Method 1613B)
Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were all samples associated with a method blank?
Y N N/A Was a method blank performed for each matrix and whenever a sample extraction was performed?
Y N N/A Was the method blank contaminated?

**Blank extraction date:** 8/15/11 **Blank analysis date:** 8/19/11
**Conc. units:** pg/g **Associated samples:** All (UB)

| Compound | Blank ID | Sample Identification | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| [redacted] | MB1_8929 | 5x | 1 | 2 | 3 | 11 | 4 | 5 | 6 | 7 | 8 |
| E | 0.0913 | 0.4565 | 0.127 | 0.0873* | 0.128 | 0.121 | 0.119 | 0.108* | 0.113 | 0.109 | 0.123* |
| G | 0.196 | 0.98 | | | | | | | | | |
| O | 0.0262 | 0.131 | | 0.0863 | | | | | | | 0.0289 |
| Q | 0.0564* | 0.282 | | 0.105 | | | | | | | 0.0634* |
| R | 0.0576 | 0.288 | | | | | | | | | |
| T | 0.0913 | 0.4565 | | | | | | | | | |
| U | 0.0327 | 0.1635 | | | | | | | | | |
| X | 0.028 | 0.14 | | | | | | | | | |
| Y | 0.0262 | 0.131 | | | | | | | | | 0.0289 |
| | | | | | | | | | | | |
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*EMPC

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
All contaminants within five times the method blank concentration were qualified as not detected, "U".

LDC #: 26234A21

# VALIDATION FINDINGS WORKSHEET
## Blanks


Reviewer: R
2nd Reviewer: A

**METHOD:** HRGC/HRMS Dioxins/Dibenzofurans (EPA Method 1613B)

Cont'd

| Compound | Blank ID | Sample Identification | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| [redacted] | MB1_8929 | 5x | 9 | 10 | | | | | | | |
| E | 0.0913 | 0.4565 | 0.112 | 0.107 | | | | | | | |
| G | 0.196 | 0.98 | | | | | | | | | |
| O | 0.0262 | 0.131 | | | | | | | | | |
| Q | 0.0564* | 0.282 | | | | | | | | | |
| R | 0.0576 | 0.288 | | | | | | | | | |
| T | 0.0913 | 0.4565 | | | | | | | | | |
| U | 0.0327 | 0.1635 | | | | | | | | | |
| X | 0.028 | 0.14 | | | | | | | | | |
| Y | 0.0262 | 0.131 | | | | | | | | | |
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LDC #: 26284A21

# VALIDATION FINDINGS WORKSHEET
## Initial Calibration Calculation Verification


Reviewer: R
2nd Reviewer: A

**METHOD:** HRGC/HRMS Dioxins/Dibenzofurans (EPA Method 1613B)

The Relative Response Factor (RRF), average RRF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

$RRF = (A_x)(C_{is})/(A_{is})(C_x)$ $A_x$ = Area of compound, $A_{is}$ = Area of associated internal standard
average RRF = sum of the RRFs/number of standards $C_x$ = Concentration of compound, $C_{is}$ = Concentration of internal standard
%RSD = 100 * (S/X) S = Standard deviation of the RRFs, X = Mean of the RRFs

| # | Standard ID | Calibration Date | Compound (Reference Internal Standard) | Reported Average RRF (initial) | Recalculated Average RRF (initial) | Reported RRF (CS3 std) | Recalculated RRF (CS3 std) | Reported %RSD | Recalculated %RSD |
|---|---|---|---|---|---|---|---|---|---|
| 1 | ICAL | 3/31/11 | 2,3,7,8-TCDF ($^{13}$C-2,3,7,8-TCDF) | 1.11 | 1.10 | 1.06 | 1.06 | 3.8 | 3.8 |
| | | | 2,3,7,8-TCDD ($^{13}$C-2,3,7,8-TCDD) | 1.13 | 1.13 | 1.11 | 1.11 | 2.4 | 2.4 |
| | | | 1,2,3,6,7,8-HxCDD ($^{13}$C-1,2,3,6,7,8-HxCDD) | 1.06 | 1.06 | 1.06 | 1.06 | 1.5 | 1.4 |
| | | | 1,2,3,4,6,7,8-HpCDD ($^{13}$C-1,2,4,6,7,8,-HpCDD) | 1.04 | 1.04 | 1.05 | 1.04 | 1.3 | 1.3 |
| | | | OCDF ($^{13}$C-OCDF) | 0.99 | 0.99 | 1.01 | 1.01 | 2.4 | 2.4 |
| 2 | | | 2,3,7,8-TCDF ($^{13}$C-2,3,7,8-TCDF) | | | | | | |
| | | | 2,3,7,8-TCDD ($^{13}$C-2,3,7,8-TCDD) | | | | | | |
| | | | 1,2,3,6,7,8-HxCDD ($^{13}$C-1,2,3,6,7,8-HxCDD) | | | | | | |
| | | | 1,2,3,4,6,7,8-HpCDD ($^{13}$C-1,2,4,6,7,8,-HpCDD) | | | | | | |
| | | | OCDF ($^{13}$C-OCDF) | | | | | | |
| 3 | | | 2,3,7,8-TCDF ($^{13}$C-2,3,7,8-TCDF) | | | | | | |
| | | | 2,3,7,8-TCDD ($^{13}$C-2,3,7,8-TCDD) | | | | | | |
| | | | 1,2,3,6,7,8-HxCDD ($^{13}$C-1,2,3,6,7,8-HxCDD) | | | | | | |
| | | | 1,2,3,4,6,7,8-HpCDD ($^{13}$C-1,2,4,6,7,8,-HpCDD) | | | | | | |
| | | | OCDF ($^{13}$C-OCDF) | | | | | | |

Comments: Refer to Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 26231A21

# VALIDATION FINDINGS WORKSHEET
## Routine Calibration Results Verification


Reviewer: M
2nd Reviewer: Q

**METHOD:** HRGC/HRMS Dioxins/Dibenzofurans (EPA Method 1613B)

The percent difference (%D) of the initial calibration average Relative Response Factors (RRFs) and the continuing calibration RRFs were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. RRF - RRF)/ave. RRF
RRF = $(A_x)(C_{is})/(A_{is})(C_x)$

Where: ave. RRF = initial calibration average RRF
RRF = continuing calibration RRF
$A_x$ = Area of compound, $A_{is}$ = Area of associated internal standard
$C_x$ = Concentration of compound, $C_{is}$ = Concentration of internal standard

| # | Standard ID | Calibration Date | Compound (Reference Internal Standard) | Average RRF (initial) | Reported RRF (CC) | Recalculated RRF (CC) | Reported %D | Recalculated %D |
|---|---|---|---|---|---|---|---|---|
| 1 | 11081951 8Z | 8/19/11 | 2,3,7,8-TCDF ($^{13}$C-2,3,7,8-TCDF) | 1.11 | 1.19 | 1.19 | 8 | 8 |
| | | | 2,3,7,8-TCDD ($^{13}$C-2,3,7,8-TCDD) | 1.13 | 1.11 | 1.11 | 3 | 2 |
| | | | 1,2,3,6,7,8-HxCDD ($^{13}$C-1,2,3,6,7,8-HxCDD) | 1.06 | 1.14 | 1.14 | 8 | 8 |
| | | | 1,2,3,4,6,7,8-HpCDD ($^{13}$C-1,2,4,6,7,8,-HpCDD) | 1.04 | 1.10 | 1.10 | 5 | 5 |
| | | | OCDF ($^{13}$C-OCDF) | 0.99 | 1.05 | 1.05 | 5 | 6 |
| 2 | 11081952 7 | 8/19/11 | 2,3,7,8-TCDF ($^{13}$C-2,3,7,8-TCDF) | 1.11 | 1.26 | 1.26 | 14 | 13 |
| | | | 2,3,7,8-TCDD ($^{13}$C-2,3,7,8-TCDD) | 1.13 | 1.18 | 1.18 | 4 | 5 |
| | | | 1,2,3,6,7,8-HxCDD ($^{13}$C-1,2,3,6,7,8-HxCDD) | 1.06 | 1.21 | 1.21 | 14 | 14 |
| | | | 1,2,3,4,6,7,8-HpCDD ($^{13}$C-1,2,4,6,7,8,-HpCDD) | 1.04 | 1.15 | 1.15 | 10 | 10 |
| | | | OCDF ($^{13}$C-OCDF) | 0.99 | 1.08 | 1.08 | 9 | 9 |
| 3 | | | 2,3,7,8-TCDF ($^{13}$C-2,3,7,8-TCDF) | | | | | |
| | | | 2,3,7,8-TCDD ($^{13}$C-2,3,7,8-TCDD) | | | | | |
| | | | 1,2,3,6,7,8-HxCDD ($^{13}$C-1,2,3,6,7,8-HxCDD) | | | | | |
| | | | 1,2,3,4,6,7,8-HpCDD ($^{13}$C-1,2,4,6,7,8,-HpCDD) | | | | | |
| | | | OCDF ($^{13}$C-OCDF) | | | | | |

Comments: Refer to Routine Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 26234A21

# VALIDATION FINDINGS WORKSHEET
## Sample Calculation Verification


Reviewer: AC
2nd reviewer: [illegible]

**METHOD:** HRGC/HRMS Dioxins/Dibenzofurans (EPA Method 1613B)

Y N N/A Were all reported results recalculated and verified for all level IV samples?
Y N N/A Were all recalculated results for detected target compounds agree within 10.0% of the reported results?

Concentration = $\frac{(A_x)(I_s)(DF)}{(A_{is})(RRF)(V_o)(\%S)}$

| | | |
|---|---|---|
| $A_x$ | = | Area of the characteristic ion (EICP) for the compound to be measured |
| $A_{is}$ | = | Area of the characteristic ion (EICP) for the specific internal standard |
| $I_s$ | = | Amount of internal standard added in nanograms (ng) |
| $V_o$ | = | Volume or weight of sample extract in milliliters (ml) or grams (g). |
| RRF | = | Relative Response Factor (average) from the initial calibration |
| Df | = | Dilution Factor. |
| %S | = | Percent solids, applicable to soil and solid matrices only. |

Example:

Sample I.D. 1, A:

Conc. = $\frac{3.81e5)(2000)(1)}{(3.11e7)(1.14)(10.11)(\ )}$

= 2.13 pg/g

| # | Sample ID | Compound | Reported Concentration ( ) | Calculated Concentration ( ) | Qualification |
|---|---|---|---|---|---|
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YES NO N/A

PACKAGE COMPLETENESS AND DELIVERABLES

CASE NUMBER: A3406
LAB: Analytical Perspectives
SITE: Lower Passaic River

1.0 Data Completeness and Deliverables

| | | YES | NO | N/A |
|---|---|---|---|---|
| 1.1 | Does the Traffic Report or Field Chain of Custody list all samples? | ✓ | | |
| 1.2 | Is the Case Narrative present? | ✓ | | |
| 1.3 | Are the Case Number and SDG numbers contained in the case narrative? | ✓ | | |
| 1.4 | Do the Traffic Reports, Field Chain of Custody or Lab Case Narrative indicate problems with sample receipt, sample condition, analytical problems, or other comments affecting the quality of the data? | | ✓ | |

ACTION: Use professional judgement to evaluate the effect of the noted problems on the quality of the data.

ACTION: As per region II requirements, if any sample analyzed as a soil, contains 50% to 90% water, all data shall be flagged as estimated "J". If a soil sample Contains more than 90% water, then qualify positive hits "J", and non detects "UJ".

ACTION: If sample cooler temperature was greater than 10 C, then flag all positive hits "J" And non detects "UJ".

2.0 Reporting Requirements and Deliverables

2.1 All deliverables must be clearly labeled with the Case number and the associated sample/traffic number. Missing or illegible or incorrectly labeled items must be identified. The Project Officer must immediately be contacted and requested to ask laboratory to submit the missing or incorrect items.

2.2 The following forms were taken from the CLP SOW, DFLM01.1 and should be specified in the Project Plan. Laboratories will not always use the exact CLP format for the forms. A comparison of CLP forms must be made against the Laboratory's version. Some information may not be found on the exact form as the CLP version but may be located on another form. As long as the information is present and accessible, it is not a problem. Are these forms (CLP or lab's version) present?

| | YES | NO | N/A |
|---|---|---|---|
| a. Sample Data Summary (Form I CDD-1) | ✓ | | |
| b. CDD/CDF Toxicity Equivalency Factor (Form I, CDD-2) | ✓ | | |
| c. Second Column Confirmation Summary (Form I, CDD-3) | | | ✓ |
| d. Total Homologue Concentration Summary (Form II CDD) | ✓ | | |
| e. CDD/CDF Spiked Sample Summary (Form III CDD-1) | ✓ | | |
| f. CDD/CDF Duplicate Sample Summary (Form III CDD-2) | ✓ | | |

| | YES | NO | N/A |
|---|---|---|---|
| g. CDD/CDF Method Blank Summary (Form IV-CDD) | ✓ | | |
| h. CDD/CDF Window Defining Mix Summary (Form V-CDD-1) | ✓ | | |
| I. Chromatographic Resolution Summary (Form V CDD-2) | ✓ | | |
| j. CDD/CDF Analytical Sequence Summary (Form V CDD-3) | ✓ | | |
| k. Initial Calibration (Form VI. CDD-1, CDD-2) | ✓ | | |
| l. Continuing Calibration (Form VII, CDD-1, Form VII, CDD-2) | ✓ | | |

ACTION: If forms are missing, contact the Project Officer to confirm which forms if any were specified in the Project Plan. If the forms are required, inform the Project Officer or obtain written permission to contact the lab for explanation/resubmittal. If the lab cannot provide missing deliverables, assess the effect on the validity of the data. Note in the Data Assessment.

2.3 GC/MS Displays
Are the following GC/MS displays present?

| | YES | NO | N/A |
|---|---|---|---|
| a. Standard and sample SIM chromatograms. SIM and TIC chromatograms must list date and time of analysis: the file name: sample number; and instrument I.D. number | ✓ | | |
| b. Percent peak resolution valley | ✓ | | |
| c. Window Defining Mixture raw data | ✓ | | |
| d. SIM mass chromatograms must display quantitation ion. confirmation ion, and polychlorinated diphenylether ion. where applicable. | ✓ | | |
| e. Integrated area and peak height must be listed for all peaks 2.5 times above background | ✓ | | |

ACTION: If deliverables are missing, contact the Project Officer to request explanation/resubmittals or obtain written permission to contact the lab for explanation/resubmittal. If the lab cannot provide missing deliverables, assess the effect on the validity of the data. Note in the Data Assessment.

2.4 Are the following Chain of Custody Records and in-house Laboratory Control Documents present?

| | YES | NO | N/A |
|---|---|---|---|
| a. Chain of Custody Records | ✓ | | |
| b. Sample Shipment Records | ✓ | | |
| c. Sample log-in sheets | ✓ | | |
| d. GC/MS Standard and Sample Run Log in chronological order | ✓ | | |
| e. Sample Extraction Log | ✓ | | |

ACTION: If deliverables are missing, contact the Project Officer to request explanation/resubmittals

YES NO N/A

or obtain written permission to contact the lab for explanation/resubmittal. If the lab cannot provide missing deliverables, assess the effect on the validity of the data. Note in the Data Assessment.

2.5 Was the sample data package paginated and one sided? [✓] ___ ___

ACTION: If no. document difficulties of reviewing data caused by lack of pagination in Data Assessment.

3.0 Holding Times

3.1 Have samples been analyzed within proper holding times?

a. For aqueous samples, 30 days from VTSR to extraction? [ ] ___ [✓]

b. For soil/sediment samples, 30 days from VTSR to extraction? [ ] ___ [✓]

c. For fish and tissue samples, one (1) year from VTSR to extraction? [✓] ___ ___

d. For all samples 45 days from time of extraction to time of analysis? [✓] ___ ___

ACTION: If holding times are exceeded. flag all positive hits as estimated ("J"). and non-detects as estimated "UJ". Holding time criteria do not apply to PE samples.
If holding times are grossly exceeded (e.g. by greater than two times the specified Technical holding times), either on the first analysis or upon reanalysis, flag positive hits as estimated "J", and flag non-detects as unusable "R".

Note: The data reviewer must note whether or not technical and contractual holding times were met.

4.0 Instrument Performance

4.1 Mass Calibration - Mass calibration of the MS must be performed prior to analyzing calibration solutions, blanks. samples. and QC samples. A static resolving power of at least 10,000 (10% valley definition) must be demonstrated at appropriate masses before any analysis is performed. Static resolving power checks must be performed at the beginning and at the end of each 12 hour period of operation. Include in the narrative, minimum required resolving power of 10000 was obtained for perfluorokerosene (PFK) ion 380.9760. This is done by first measuring peak width at 5% of the maximum. This should not exceed 100 ppm. i.e., it should not exceed 0.038, for ion 380.9760. Resolving power, then is calculated using the formula,

Resolving Power = $m/\Delta m$ = 380.9760/0.038 = 10025.

NOTE: The mass calibration is generally not reported. Improper mass calibration may be detected by examining ion abundance ratios for initial and continuing calibration standards. If the mass calibration is not properly performed, the standards will not have ion abundance ratios within criteria.

4.2 Window Defining Solution/ Isomer Specificity Test Standards

The Window Defining Solution must contain the first and the last isomers of each homologue CDD/CDF, (the labeled and internal standards are optional). The solution also should contain a series of other TCDD analytes for the purpose of documenting the chromatographic resolution.

4.2.1 For analyses on a DB-5 (or equivalent) GC column, the chromatographic resolution is evaluated by the analysis of Isomer Specificity Test Standards at the beginning

YES NO N/A

of every 12 hour period. Was this performed accordingly? [✓] ___ ___

ACTION: If the Isomer Specificity Test Standards was not analyzed at the required frequency, use professional judgement to determine the effect on the quality of the data. Document in Data Assessment under contract non-compliance.

4.2.2 Were all peaks labeled and identified on the Selected Ion Current Profiles (SICPs)? [✓] ___ ___

4.2.3 Did the absolute retention time of the internal standards $^{13}C_{12}$-1,2,3,4-TCDD exceed 25.0 minutes on the DB-5 column and 15.0 minutes on the DB-225 column? (Method 1613B, Section 10.2.4) [ ] ___ [✓]

4.2.4 Are the relative retention times of native and labeled CDD's and CDF's within the limits given in Table 2 of the method. (Method 1613B, Section 15.4.1.2) [ ] ___ [✓]

ACTION: If no for sections 4.2.2, 4.2.3 and 4.2.4, assess the effect on the validity of the data. Note in the Data Assessment.

4.2.5 For DB-5 or equivalent, (Method 1613B, Section 15.4.2.2) the peak separation between the unlabeled 2,3,7,8-TCDD and the peaks representing any other TCDD analyte shall be resolved with a valley of ≤ 25 percent.
Was this criteria met? [✓] ___ ___

% Valley = (x/y) x (100)

Y = The peak height of 2,3,7,8-TCDD analyte

X = The distance from the baseline to the bottom of the valley between the adjacent peaks.

ACTION: If the percent valley criteria are not met, qualify all positive data "J". Do not qualify non-detects.

4.2.6 Is the last eluting tetra chlorinated congener (1,2,8,9-TCDD) and the first eluting penta chlorinated congener (1,3,4,6,8-PeCDF) separated properly, since they elute within 15 seconds of each other? [✓] ___ ___

ACTION: If one of the congener is missing, report that in the Data Assessment.

## 5.0 Initial 5-Point Calibration

The initial calibration standard solutions (CS1-CS5) must be analyzed prior to any sample analysis. However, initial calibration should be analyzed when the CS3 Calibration Verification (VER) or Isomer Specificity Test Standard do not meet performance criteria. The initial calibration standards must be analyzed on the same instrument using the same GC/MS conditions that were used to analyze the Window Defining Solution and the Isomer Specificity Test Standards.

Was the initial calibration performed at the frequency specified above? [✓] ___ ___

5.1 The method allows the Laboratory to perform quantitative analysis by isotope dilution and internal standard, or to combine calibration solutions.

1. Isotope Dilution: performed for the fifteen 2,3,7,8-substituted CDDs and CDFs unlabeled analytes with labeled analytes added to the samples prior to extraction and for 1,2,3,7,8,9- HXCDD and OCDF (see sections 5.2.8 and 5.2.9). The relative response (RR) is calculated and the percent

YES NO N/A

coefficient of variation must be ≤ 20% over the 5 point range (1613B sec. 10.5.4) to use the average relative response for quantitation, otherwise a calibration curve must be used..

2. Calibration by Internal Standard: performed for non-2,3,7,8 substituted compounds having no labeled analytes in this method and for measurement of labeled compounds for intra laboratory statistics.. The response factor (RF) is calculated and the percent coefficient of variation must be ≤ 35% over the 5 point range (1613B sec. 10.6.3) to use the average response factor for quantitation, otherwise a calibration curve must be used.

3. Combined Calibration: performed by using solutions containing unlabeled, labeled compounds and internal standards. The requirements of each of the above methods are used. This method allows the laboratory to produce a single set of curves for isotope dilution and internal standard method.

5.1.1 The following MS/DS conditions must be used:

5.1.1.1 Mass calibration as per Section 4.1? [✓] ___ ___

5.1.1.2 Were SIM data acquired for each of the ions listed in Table 8, including interfering ions? (see analytical method) [✓] ___ ___

5.2 Were the following GC criteria met?

5.2.1 The chromatographic resolution between the 2,3,7,8-TCDD and the peaks representing any other unlabeled TCDD isomers must be resolved with a valley of ≤ 25 percent on the primary analysis (DB-5) column (1613B sec. 15.4.2.2). [✓] ___ ___

5.2.2 The chromatographic resolution between the 2,3,7,8-TCDF and the peaks representing any other unlabeled TCDF isomers must be resolved with a valley of ≤ 25 percent on the confirmation (DB-225 or SP2330) analysis column. [ ] ___ [✓]

5.2.3 For all calibration solutions, the relative retention time of peaks representing an unlabeled 2,3,7,8- substituted CDD or CDF must be within the limits given in table 2 of the Method. The retention times of the peaks representing non-2,3,7,8- substituted CDD or CDF's must fall within the retention time windows established by the Window Defining Solution. In addition, the absolute retention times of internal standards. $^{13}C_{12}$1,2,3,4-TCDD and $^{13}C_{12}$1,2,3,7,8,9-HxCDD shall not change by more than 15 seconds between the CS3 analysis and the analysis of any other standard. [ ] ___ [✓]

5.2.4 Are the two SIM ions for each homolog must maximize simultaneously and within 2 seconds of the corresponding labeled analyte ions?(1613B sec. 16.1) [✓] ___ ___

5.2.5 The relative ion abundance criteria for CDDs/CDFs listed in Table 9 (see analytical method) must be met. [✓] ___ ___

5.2.6 For all calibration solutions the signal to noise ratio (S/N) for the GC signal present in every SICP. including the ones for the labeled standards must be ≥ 10. [✓] ___ ___

5.2.7 The percent relative standard deviations (% RSD) for the mean response factors (RRF) from the 17 unlabeled standards must be ≤ 20%, and those for the 15 labeled reference compounds must be ≤ 35%. 10/20% [✓] ___ ___

YES NO N/A

5.2.8 Labeled analyte 1,2,3,7,8,9-HxCDD is used as an internal standard in this method, and can not be used to quantitate corresponding unlabeled analyte. The unlabeled 1,2,3,7,8,9-HxCDD must be quantitated using the average of the responses of the labeled analytes of 1,2,3,4,7,8-HxCDD and 1,2,3,6,7,8-HxCDD. The concentration of the unlabeled 1,2,3,7,8,9-HxCDD is corrected for the average recovery of the other HxCDD's. Was the unlabeled 1,2,3,7,8,9-HxCDD quantitated correctly? [ ] ___ ___

5.2.9 The labeled analog of OCDF is not added to the sample because of a potential interference. Unlabeled OCDF is quantitated against the labeled OCDD. The concentration of the unlabeled OCDF is corrected for the recovery of the labeled OCDD. Was the unlabeled OCDF correctly quantitated against the labeled OCDD. [ ] ___ ___

ACTION:

1. If mass calibration criteria as specified in Section 4.1 was not met, note in Data Assessment.

2. If the selected monitoring ions specified in **Table 8** were not used for data acquisition, the lab must be contacted by the Project Officer for an explanation. If an incorrect ion was used, reject "R" all the associated data.

3. If the 25% percent valley for TCDD requirement was not met, quality positive data "J". Do not qualify non-detects. The tetra and penta (dioxins and furans) are affected. Heptas, Hexas and Octas are not affected.

4. If the ion abundance ratio for an analyte is outside the limits, flag the results for that analyte "R" (reject).

5. If the ion abundance ratio for an internal or labeled standard falls outside the QC limits flag the associated positive hits with "J". No effect on the non-detects.

6. If the signal to noise ratio (S/N) is below control limits, use professional judgement to determine quality of the data.

7. If the %RSD for each unlabeled analyte exceeds 20%, or the %RSD for each labeled analyte exceeds 35%, flag the associated sample positive results for that specific analyte as estimated ("J"). No effect on the non-detect data.

8. If 1,2,3,7,8,9-HxCDD was not calculated using the correct HxCDD response (average) factor, either manually recalculate the values for all standards and samples or contact Project Officer to request resubmittals from the laboratory.

9. If OCDF was not calculated using the correct response factor (OCDD), either manually recalculate the values for all standards and data or contact Project Officer to request resubmittals from the laboratory.

10. Non compliance of any other criteria specified above should be evaluated using professional judgement.

5.2.10 Spot check response factor calculations and ion ratios. Ensure that the correct quantitation ions for the unlabeled CDDs/CDFs and labeled standards were used. In addition, verify that the appropriate labeled standard was used for each analyte.

To recalculate the response factor, use the equation:

YES NO N/A

For target compounds (unlabeled analytes with corresponding labeled analytes):

$$RR = \frac{(A_{n1} + A_{n2}) \times Q_l}{(A_{l1} + A_{l2}) \times Q_n}$$

For labeled analytes. Internal standards and cleanup standard listed in Table 6 of method 1613:

$$RF = \frac{(A_{l1} + A_{l2}) \times Q_{is}}{(A_{is1} + A_{is2}) \times Q_l}$$

Note: There is only one m/z for $^{37}Cl_4$2.3.7.8-TCDD.

$A_{n1} + A_{n2}$ = integrated areas of the two quantitation ions of analytes of interest. (Target analyte, unlabeled compounds)

$A_{l1} + A_{l2}$ = integrated areas of the two quantitation ions of the appropriate labeled analytes compound.

$A_{is1} + A_{is2}$= integrated areas of the two quantitation ions of the appropriate internal standard.

$Q_n$ = quantity of the unlabeled PCDD/PCDF analyte injected [pg]

$Q_l$ = quantity of the appropriate labeled analytes compound [pg]

$Q_{is}$ = quantity of the appropriate internal standard injected [pg]

ACTION: If calculations were not performed correctly, notify the Project Officer to initiate resubmittals from the laboratory.

## 6.0 System and Laboratory Performance (Calibration Verification and Isomer Specificity Test Standard)

At the beginning of a 12 hour shift during which analyses are performed, GC/MS system performance and calibration are verified for all unlabeled and labeled compounds. For these tests the calibration verification (VER) standard and the isomer specificity test standards shall be used to verify all performance criteria.

Only if the laboratory meets all performance criteria may samples, blanks, and precision and recovery standards be analyzed.

### 6.1 Calibration Verification

6.1.1 Was the relative ion abundance for CDDs/CDFs listed in Table 9 of the analytical method met? (Method 1613B, Section 15.3.2) [✓] ___ ___

6.1.2 Were the peaks representing each unlabeled and labeled compound in the verification standard present with signal to noise ratio (S/N) of ≥ 10? (Method 1613B, Section 15.3.3) [✓] ___ ___

6.1.3 For each compound, was the concentration within the limit in Table 6 of the method? (Method 1613B, Section 15.3.5) [✗] ✓ ___

6.1.4 Were the absolute retention time of the internal standards $^{13}C_{12}$-1.2,3,4- TCDD and $^{13}C_{12}$1.2,3.7.8,9- HxCDD within ± 15 seconds of the retention times obtained during calibration? (Method 1613B, Section 15.4.1.1) [✓] ___ ___

| | YES | NO | N/A |
|---|---|---|---|
| 6.1.5 Were the relative retention times of the unlabeled and labeled CDDs and CDFs within the limits given by Table 2 of the method? (Method 1613B, Section 15.4.2.2) | [ ] | | ✓ |
| 6.2 Isomer Specificity Test Standard | | | |
| 6.2.1 Was the chromatographic resolution between 2,3,7,8-TCDD and the peaks representing any other unlabeled TCDD isomers resolved with a valley of ≤ 25 percent on the primary analysis (DB-5) column? (Method 1613B, Section 15.4.2.2) | ✓ | | |
| 6.2 Was the chromatographic resolution between 2,3,7,8- TCDF and the peaks representing any other unlabeled TCDF isomers resolved with a valley of ≤ 25 percent on the confirmation (DB-225 or SP2330) analysis. | [ ] | | ✓ |

ACTION:

1. If the ion abundance ratio for an analyte is outside the limits, flag the results for that analyte "R" (reject).

2. If the signal noise ratio (S/N) is below control limits, use professional judgement to determine the quality of the data.

3. If an analyte concentration fell outside the acceptance criteria listed in Table 6 of the method.

   A. If the acceptance criteria for each unlabeled analyte and/or for each labeled analyte exceeds the range, flag the associated sample positive results for that specific analyte as estimated ("J"). No effect on the non-detect data.

   B. If the acceptance criteria for each unlabeled analyte and/or for each labeled analyte is below the range, flag the associated sample positive results as well as non-detects for that specific analyte as estimated ("J").

   C. If the acceptance criteria for each unlabeled analyte and/or for each labeled analyte is excessively below, ≤ 10% of the range, at the minimum, flag the associated sample positive results as well as non-detects for that specific analyte as estimated ("J"). However the validator may use professional judgement to accept or reject positive data and non-detects.

4. If the 25 percent valley for TCDD and TCDF requirement was not met, qualify positive data "J". Do not qualify non-detects. The tetras and pentas (dioxin and furans) are affected. Heptas, Hexas and Octas are not affected.

5. Non compliance of any other criteria specified above, in the method should be evaluated using professional judgement.

6.3 Spot check response factor calculations and ion ratios. Ensure that the correct quantitation ions for the unlabeled CDDs/CDFs and labeled standards were used. In addition, verify the appropriate labeled standard was used for each analyte.

## 7.0 Sample Data

NOTE: Any qualifications such as "J" applied to target compounds should be also applied to their associated total congeners concentration column.

7.1 Were the following MS/DS conditions used?

| | | YES | NO | N/A |
|---|---|---|---|---|
| 7.1.1 | SIM data were acquired for each of the ions listed in Table 8 (see analytical method) including diphenylether interfering ions. | ✓ | | |
| 7.2 | Were the following identification criteria met? | | | |
| 7.2.1 | For the 2.3.7.8 substituted analytes found present and the corresponding labeled compound or internal standard in the sample extract. must show relative retention times at the peak height within the limits given in Table 2. (Method 1613B, Section 16.4) | ✓ | | |
| 7.2.2 | For non-2.3.7.8 substituted compounds (tetra through octa) found present. the retention time must be within the window established by the Window Defining Solution, for the corresponding homologue (Method 1613B. Section 16.4) | ✓ | | |
| 7.2.3 | All specified ions listed in Table 8 for each isomer found present and the associated labeled compounds must be present in the SICP. The two SIM ions for the analyte. the labeled compound, and the internal standard must maximize simultaneously.(± 2 sec.) (Method 1613B. Section 16.1) | ✓ | | |
| 7.2.4 | The integrated ion current for each characteristic ion of the analyte identified as positive, must be at least 2.5 times background noise and must not have saturated the detector. (Method 1613B, Section 16.2) | ✓ | | |
| 7.2.5 | The integrated ion current for the labeled compounds. internal standards. and cleanup standard characteristic ions must be at least 10 times background noise. (Method 1613B. Section 16.2) | ✓ | | |
| 7.2.6 | The relative ion abundance criteria for all CDDs/CDFs found present must be within the limits of Table 9. or ± 10% of the ratio in the midpoint CS3 calibration or calibration verification (VER) whichever is most recent. | | ✓ | |
| 7.2.7 | The relative retention time of the unlabeled 2.3.7.8-substituted PCDD or PCDF must be within the limits given in Table 2 (Method 1613B, Section 16.4). | ✓ | | |
| 7.2.8 | The relative ion abundance criteria for the labeled compounds, cleanup. and internal standard must be met (Table 9 - Method 1613B). | ✓ | | |
| 7.2.9 | The analyte concentration must be within the calibration range. If not. dilution should have been made to bring the concentration within the calibration range. Was this criterion met? | ✓ | | |

NOTE: The analytical method clearly states that samples containing analytes having concentrations higher than 10 times the upper MCLs should be analyzed using a less sensitive. high resolution GC/low resolution MS method.

| | | | | |
|---|---|---|---|---|
| 7.2.10 | The identification of a GC peak as a PCDF can only be made if no signal having a S/N ≥ 2.5 is detected at the same time in the corresponding polychlorinated diphenylether (PCDPE) channel. Was the above condition met? | ✓ | | |

ACTION: 1. If the selected monitoring ions specified in Table 3 were not used for data acquisition, the lab must be contacted by the Project Officer for an explanation. If an incorrect ion was used, reject "R" all the associated data.

YES NO N/A

2. If the retention time of an analyte falls outside the retention time windows established by the associated Window Defining Mixture take the following action:

   A. If the analyte has a corresponding labeled analyte and is within 2 seconds of the labeled analyte, no action taken on positive data or non-detects.

   B. If the analyte has a corresponding labeled analyte and is outside 2 seconds of the labeled analyte, use professional judgement to determine qualifications for positive data or non-detects. At a minimum, "J" or "JN" positive data.

   C. If the analyte does not have a corresponding labeled analyte and is outside 2 seconds of the matching unlabeled analyte from the associated calibration, use professional judgement to determine qualifications for positive data or non-detects. At a minimum, "J" or "JN" positive data.

   D. If analyte meets identification criteria (7.2.2, 7.2.4, 7.2.5, 7.2.7) but does not meet ion abundance ratio criteria (7.2.8) and is not a labeled analog, the sample must be reanalyzed on a confirmation column. If confirmation analysis was not perform, reject "R" the failing analyte.

3. If the criteria listed in section 7.2.4 and 7.2.5 are not met but all other criteria are met, qualify all positive data of the specific analyte with "J".

4. If the analytes reported positive do not meet criteria for section 7.2.6, reject "R" all positive data for these analytes. Change the positive values to EMPC (Estimated Maximum Possible Concentration). Flag "J"

5. If the labeled compounds, internal standards and cleanup standards do not meet ion abundance criteria section 7.2.6, and 7.2.7. (Table 8 - analytical method) but they meet all other criteria, flag all corresponding data with "J".

6. If the lab reported values exceeding the calibration range flag those values with "J".

7. If peak deflections >50% are visible qualify particular compound with "J".

8. If PCDF was detected but an interfering PCDPE was also detected (see Section 7.2.9) and concentration not corrected for the interference, cross out the PCDF data. The reported value of PCDF is changed to EMPC.

9. If the lab did not monitor for PCDPEs, qualify all positive furan data "JN".

7.2.10 Spot check calculations for positive data and verify that the same labeled compounds used to calculate RFs were used to calculate concentration and EMPC. Ensure that the proper CDDs/CDFs and labeled compounds were used.

To recalculate the concentration of individual CDD/CDF analytes in the sample use the following equation:

All Matrices other than water

$$Cn\ (pg/g) = \frac{(A_{n1} + A_{n2}) \times Q_l}{W \times (A_{l1} + A_{l2}) \times RR}$$

Water

$$Cn\ (pg/L) = \frac{(A_{n1} + A_{n2}) \times Q_l}{}$$

YES NO N/A

$V \times (A_{l1} + A_{l2}) \times RR$

Where:

$A_{n1} + A_{n2}$ = integrated areas of the two quantitation ions of analyte of interest. (Target analyte)

$A_{l1} + A_{l2}$ = integrated areas of the two quantitation ions of the appropriate labeled analyte compound.

W = Weight (g) of sample extracted

V = Volume (L) of sample extracted

$Q_l$ = Quantity (pg) of the appropriate labeled compound added to the sample prior to extraction.

RR = Calculated relative response from initial calibration. (see section 5.2.10)

ACTION: If the spot check calculations yielded positive hit concentrations with ≤ 15% Difference from those reported in Form I, correct manually. If the difference between the validator's value and the form I's values are > 15% contact the Project Officer to request from the laboratory for an explanation and a copy of the laboratory's calculations.

7.3 Clean-up procedures

Clean-up may not be necessary for relatively clean samples (drinking waters, ground waters etc). If the matrix required clean-up, the laboratory has 4 different procedures to choose from. Before using any clean-up procedure, the laboratory must demonstrate that the Initial Precision and Recovery requirements of the method can be met using the clean-up procedure.

A labeled clean-up standard $^{37}Cl_4$2,3,7,8-TCDD is added to the sample just before the back extraction with base and acid procedure. This occurs before any recommended clean-up procedures are initiated.

7.3.1 Was the percent recovery of the clean-up standard within the recommended range listed on Table 6 of the Analytical method? ☑ ___ ___

ACTION: If no, and the recovery is less than 25%, qualify all data as estimated "J". If recovery is 0 %, qualify all positive data as estimated "J" and reject "R" all non-detects for that sample.

7.3.2 Check the chromatograms that clean-up procedure was needed for each sample. Were any clean-up procedures needed for either water or soil samples? ___ ☑ ___

ACTION: If yes, check extraction log to verify which clean-up procedures if any were performed. The laboratory is not limited to only one procedure.

1. If no clean-up was performed and the chromatograms indicated that some should have been performed. Use professional judgement to assess the effect on the interference on the validity of the data. Document lack of required clean-up for complex samples in Data Assessment.

2. If one type of clean-up was performed, but the chromatograms indicate that additional clean-up should have been utilized. Use professional judgement to assess the effect on the interference on the validity of the data. Document lack of additional clean-up for complex samples in Data Assessment.

7.3.3 If clean-up procedures were used, did the Laboratory perform clean-up procedures on the

| | YES | NO | N/A |
|---|---|---|---|
| Initial Precision and Recovery samples as required by the method? | [ ] | | ✓ |

ACTION: If no. Use professional judgement to assess the effect of the interference on the validity of the data. Document lack of IPR documentation for clean-up procedures in Data Assessment.

8.0 Estimated Detection Limits (EDL) *If required for the project*

| | YES | NO | N/A |
|---|---|---|---|
| 8.1 Was an EDL calculated for each 2,3,7,8-substituted analyte that was not identified regardless of whether other non-2,3,7,8 substituted analytes were present? | ✓ | | |

ACTION: 1. If EDL or EMPC of an analyte which was not reported as a positive hit is missing, correct manually or contact the Project Officer to request from the laboratory corrections.

8.2 Use the equation below to check EDL calculations:

ALL MATRICES OTHER THAN WATER

$$EDL\ (pg/g) = \frac{2.5 \times Qis \times (Hx^1 + Hx^2) \times D}{W \times (His^1 + His^2) \times RR}$$

WATER

$$EDL\ (pg/L) = \frac{2.5 \times Qis \times (Hx^1 + Hx^2) \times D}{V \times (His^1 + His^2) \times RR}$$

Where:

$Hx^1$ and $Hx^2$ = peak heights of the noise for both quantitation ions of the 2,3,7,8-substituted isomer of interest.

$His^1$ and $His^2$ = peak heights of both the quantitation ions of the appropriate internal standards.

D = dilution factor

Qis, RR, W and V are previously defined.

NOTE: The validator should check the EDL data to verify that peak heights and not areas were used for this calculation. If the area algorithm was used, the validator should contact the Project Officer to request recalculations from the laboratory.

ACTION: If the spot check calculations yielded EDLs or EMPCs with ≤ 15% Difference from those reported in Form I, correct manually. If the difference between the validator's value and the Form I's values are > 15% contact the Project Officer to request from the laboratory for an explanation and a copy of the laboratory's calculations.

9.0 Estimated Maximum Possible Concentration (EMPC) *If required for the project*

| | YES | NO | N/A |
|---|---|---|---|
| 9.1 Was an EMPC calculated for 2,3,7,8-substituted analytes that had S/N ratio for the quantitation and confirmation ions greater than 2.5, but did not meet all the identification criteria? | [ ] | | |

9.2 Use the equation below to check EMPC calculations:

YES NO N/A

All Matrices other than water

$$\text{EMPC (pg/g)} = \frac{(A_{n1} + A_{n2}) \times Q_I \times D}{W \times (A_{I1} + A_{I2}) \times RR}$$

Water:

$$\text{EMPC (pg/L)} = \frac{(A_{n1} + A_{n2}) \times Q_I \times D}{V \times (A_{I1} + A_{I2}) \times RR}$$

Action: 1. If EDL or EMPC of an analyte which was not reported as a positive hit is missing, correct manually or contact the Project Officer to request from the laboratory corrections.

2. If the spot check calculations yielded EDLs or EMPCs with ≤ 15% Difference from those reported in Form I, correct manually. If the difference between the validator's value and the Form I's values are > 15% contact the Project Officer to request from the laboratory for an explanation and a copy of the laboratory's calculations.

3. If EDLs or EMPCs for the most toxic analytes (TEF ≥ 0.05) are above reporting limits, contact the project office to recommend sample reanalysis.

## 10.0 Method Blanks

10.1 Has a method blank per matrix been extracted and analyzed with each batch of 20 samples? [✓] ___ ___

10.2 If samples of some matrix were analyzed in different events (i.e. different shifts or days) has one blank for each matrix been extracted and analyzed for each event? [✓] ___ ___

10.3 Acceptable method blanks must not contain any signal of 2,3,7,8-TCDD, or 2,3,7,8-TCDF, equivalent to a minimum levels listed in Table 2 or above one third the regulatory compliance level.. Was this criteria met? (Method 1613B, Section 9.5.2) [✓] ___ ___

10.4 For other 2,3,7,8- substituted CDD/CDF isomers of each homologue, the allowable concentration in the method blank is less than minimum level listed in Table 2 (< 5 ng/Kg for soils and 50 pg/L for waters). Was this criteria met? [✓] ___ ___

ACTION: 1. If the proper number of method blanks were not analyzed, document in Data Assessment. If the validator feels that the validity of the data is seriously compromised and validation of data without the method blanks would be flawed then notify the Project Officer. If decision is made to proceed with the validation process, consider the following actions: no action taken on non-detected analytes. If an analyte has a reported concentration that is > 5 times the EDL, qualify "J" and all concentrations ≤ 5 times the EDL are qualified "R" due to possibility of contamination.

2. If the method blank is contaminated with 2,3,7,8-TCDD, 2,3,7,8-TCDF, 1,2,3,7,8-PeCDD, 1,2,3,7,8-PeCDF or 2,3,4,7,8-PeCDF at a concentration higher than the minimum levels in Table 2, reject all contaminant compound positive data for the associated samples "R" and notify the Project Officer to initiate reanalysis.

3. A. If the method blank is contaminated with any of the analytes mentioned in Action # 2 at a concentration of less than the minimum levels in Table 2 specified in the method or of any other 2,3,7,8-substituted analytes at any concentration and the concentration in the sample is less than five times the concentration in the blank, transfer the sample results to the EMPC/EDL column and cross-out the value in

YES NO N/A

the concentration column in order to present the data as a non-detect.

B. If the concentration in the sample is higher than five times the contamination concentration in the blank, no action is needed.

11.0 Labeled Compouud Recoveries

11.1 Were the samples spiked with all the labeled compounds as specified in the method? [✓] ___ ___

11.2 Have labeled compounds' recoveries been within the required limits? [✓] ___ ___

11.3 If not, were samples reanalyzed? [ ] ___ ✓

ACTION: 1. If the labeled compound recovery was below 25 percent, reject "R" all associated non-detect data (EMPC/EDL) and flag with "J" the positive data for the associated compound.

2. If the labeled compound recovery is above the upper limit (150 percent) flag associated positive data with "J". No effect on non-detects.

3. If the labeled compound recovery is less than 10%, qualify positive hits and non-detects associated with the failed labeled compound "R" (Reject). When highly toxic analytes (TEF$\geq$ 0.05) are affected, notify Project Officer to initiate reanalysis.

Recalculate the percent recovery for each labeled standard in the sample extract, $Rec_l$, using the formula:

$$\% Rec_l = \frac{(A_{l1} + A_{l2}) \times Q_{is} \times 100}{(A_{is1} + A_{is2}) \times RF \times Q_l}$$

$A_{l1} + A_{l2}$ = integrated areas of the two quantitation ions of the appropriate labeled compound.

$A_{is1} + A_{is2}$= integrated areas of the two quantitation ions of the appropriate internal standard.

$Q_l$ = quantity of the appropriate labeled compound

$Q_{is}$ = quantity of the appropriate internal standard injected

RF was defined, previously.

12.0 Internal Standard Area Response

There is no method criterion for the Internal Standard area response. However, because it is very critical in determining instrument sensitivity, the Internal Standard area response should be checked for every sample. The two standards $^{13}C_{12}$1,2,3,4-TCDD and $^{13}C_{12}$1,2,3,7,8,9-HxCDD are referred to as Internal Standards in this method. In other Dioxin methods, the two standards are called Recovery Standards.

12.1 Are the internal standard areas for every sample and blank within the upper and lower limits of each associated initial calibration CS3?

Area upper limit= +100% of internal standard area.
Area lower limit= -50% of internal standard area. [✓] ___ ___

12.2 Is the retention time of each internal standard within 15 seconds of the associated initial calibration CS3 standard? [✓] ___ ___

YES NO N/A

ACTION: 1. If the internal standard area is outside the upper or lower limits, flag all related positive and non-detect data (EMPC/EDL) with "J" regardless whether the lab's labeled compound recoveries met specifications or not.

2. If extremely low area counts (<25%) are reported, flag all associated non-detect data as unusable "R" and the positive data "J".

3. If the retention time of the internal standards differs by more than 15 seconds from the initial calibration CS3, use professional judgement to determine the effect on the results. A time shift of more than 15 seconds may cause certain analytes to elute outside the retention time window established by the GC window defining/column performance check solution. A constant shift could be also the result of a leak.

NOTE: Action 1 and 2 are recommendations only since this criterion is not a method requirement. These guidelines are based on other methods, previously validated data packages and Region II recommendations. If method blanks have low area responses as well as the samples, the validator should seriously consider qualifying the data for this criterion. Action 3 is a method requirement.

## 13.0 Second Column Confirmation

13.1 Any sample in which 2,3,7,8-TCDF is identified on a DB-5 column, must have a confirmation analysis (Method 1613B, section 16.5). Was a second column confirmation performed? [ ] ✓ ___

13.2 Was the sample extract reanalyzed on a 30 m DB-225, fused silica capillary column, for 2,3,7,8-TCDF using the GC/MS conditions given in Section 10.1.1 of the analytical method? [ ] ___ ✓

NOTE: The concentration of 2,3,7,8-TCDF obtained from the primary column (DB-5) should only be used for qualification, due to better QC data associated with the primary column. Also note that the confirmation and quantitation of 2,3,7,8-TCDF may be accomplished on a SP-2330 GC column.

ACTION: If confirmation is missing, use professional judgement, or contact the Project Officer for assistance.

13.3 Did the second column meet the calibration and linearity specification in Sections 5.0 and 6.0 above? [ ] ___ ✓

ACTION: If no, refer to section 5.0 and 6.0 for appropriate action.

13.4 Was the % D of the quantitation results of the two columns less than 50? [ ] ___ ✓

ACTION: Note in data assessment the differences, use professional judgement to decide which column data to report for TCDF. No other action is needed since this is not a method requirement but a technical recommendation.

## 14.0 Sample Reanalysis

14.1 The Project Officer will evaluate the need for reanalyzing the samples with qualified data based on site-specific Data Quality Objectives.

14.2 Due to a variety of situations (see below) that may occur during sample analysis, the laboratory is required to reanalyze or re-extract and reanalyze certain samples. If a reanalysis was required but was not performed, contact the Project Officer to initiate reanalysis. List in data assessment all re-extractions and reanalyses

YES NO N/A

and identify the CDD/CDF sample data summaries which must be used by the data user (when more than one analysis is submitted for a sample).

Lab must re-extract and/or re-analyzed samples when the following criteria are not met:

1. Contaminated method blank at concentrations above the minimum levels (Table 2)

2. Labeled compound recoveries outside acceptable ranges listed on Table 6 of Analytical method.

3. Exceedance of calibration range by an analyte (dilution or re-extract using a smaller aliquot).

4. Recovery of labeled compounds outside acceptable limits listed on Table 6 of the Analytical method in a diluted sample (re-extracted using a smaller aliquot).

ACTION: For criteria 1, 2, or 3, notify the Project Officer to discuss possible re-analysis of sample by the laboratory.

For criteria 4, If the calibration was verified and the re-extracted sample still does not meet labeled recovery requirements, then the method does not apply to the sample. The results are not reportable for regulatory purposes (Method 1613B, section 18.4.4). Notify the Project Officer of problem to initiate re-analysis of sample using a different method. Document in Data Assessment.

## 15.0 Precision and Recovery (PAR)

The laboratory is required to show initial demonstration of capability, to evaluate and document data quality. Laboratory performance is compared to established performance criteria to determine if results of analyses meet the performance characteristics of the method.

The laboratory must perform and submit data to establish the ability to generate acceptable precision and accuracy.

15.1 Did the laboratory analyzed an Initial Precision and Recovery (IPR) standard as outlined in section 9.2 required by the analytical method? [✓] ___ ___

ACTION: If no, contact the Project Officer to request resubmittals from the laboratory.

If data is not available, discuss with the Project Officer the feasibility of continuing with validation. If a decision is made to proceed with validation, use professional judgement. All data at a minimum should be qualified as estimated "J". Technically according to the method, data and system performance is unacceptable for all compounds. Analyses should not have continued as per the method. Document under contract non-compliance in Data Assessment.

15.2 Did the IPR standard deviation (s) and average concentration (x) passed criteria as outlined in Table 6 of the method? [ ] ___ [✓]

ACTION: If no, refer to action from section 15.1.

The laboratory must analyzed an Ongoing Precision and Recovery standard (OPR) periodically, at the beginning of 12 hour shift after the analysis of the CS3 calibration verification (VER), and before the analysis of any sample in each set .

15.3 Was the ~~Ongoing~~ BCS ~~Precision and Recovery (OPR)~~ standard analyzed at the required frequency? [✓] ___ ___

15.4 Did the ~~OPR~~ BCS standard passed the concentration criteria limits in ~~Table 6 of the method~~ QAPP? [✓] ___ ___

YES NO N/A

ACTION: If no, refer to action from section 15.1. All samples that do not have a passing OPR standard are potentially affected for that analyte.

**The following sections may be incorporated in the validation process on a case by case basis depending upon the requirements of the Project Plan. Sometimes a laboratory will provide data for some of the following sections on a routine basis. If not a requirement of the Project Plan, then professional judgement is needed to qualify data based on additional information.**

16.0 Isomer Specificity and Toxicity Equivalency Factor (TEF)

NOTE: The TEF value concentrations can be found in the DFLM01.1 Statement of Work for Dioxin Analysis Form I PCDD-2.

When calculating the 2,3,7,8-TCDD Toxicity Equivalency of a sample only those 2,3,7,8 substituted isomers that were positively identified in the sample must be included in the calculations. The sum of the TEF adjusted concentration is used to determine when a second column confirmation is required to achieve analyte specificity.

16.1 Did the lab include EMPC or EDL values in the toxicity equivalency calculations? [✓] ___ ___

16.2 Were all samples, whose toxicity equivalency exceeded the required values were reanalyzed on a confirmation column to establish analyte specificity? [ ] ✓ ___

ACTION: 1. If yes, the toxicity equivalency calculations were not calculated properly, notify the Project Officer to arrange for laboratory resubmittals.

2. If the toxicity equivalency exceeded the required limits (0.7 µg/Kg for soil/ sediment, 7 ng/L for aqueous and 7 µg/Kg for chemical waste samples), and the lab failed to reanalyze the samples on a specific secondary column, notify Project Officer. Reanalysis may be initiated.

NOTE: Any qualifications such as "J" applied to target compounds should be also applied to their associated total congeners concentration.

17.0 Rinsate Blank *(Region 2 QA guidelines recommend rinse blanks for all projects)*

17.1 One rinsate blank should be collected for each batch of 20 soil samples or one per day whichever is more frequent. Were rinsate blanks collected at the above frequency? [✓] ___ ___

17.2 Do any rinsate blanks show the presence of 2,3,7,8-TCDD, 2,3,7,8-TCDF, and 1,2,3,7,8-PeCDD at amounts > .5 µg/L or any other analyte at levels > 1 µg/L? [ ] ✓ ___

ACTION: If any rinsate blank was found to be contaminated with any of the CDDs/CDFs notify the Project Officer to discuss what proper action must be taken.

If any qualification is needed due to rinsate blank contamination, follow the guidelines outlined under Method Blanks, section 10, Actions 2 and 3.

18.0 Field Blanks

18.1 The field blanks are PEM samples (blind blanks) supplied to Laboratory at the frequency of one field blank per 20 samples or one per samples collected over a period of one week, which ever comes first. A typical "field blank" will consist of uncontaminated soil. The field blanks are used to monitor possible cross contamination of samples in the field and in the laboratory.

Were the following conditions met?

YES NO N/A

18.2 Acceptable field blanks must not contain any signal of 2,3,7,8-TCDD, 2,3,7,8-TCDF, 1,2,3,7,8-PeCDD and 1,2,3,7,8-PeCDF equivalent to a concentration of > 20 ng/Kg. [ ] ___ ✓

18.3 For other 2,3,7,8 substituted CDD/CDF analytes of each homologue the allowable concentration in the field blank is less than the upper MCLs listed in the method. [ ] ___ ✓

ACTION: When the field blank is found to be contaminated with target compounds, apply the same action as described for the Method Blank, section 10, Actions 2 and 3.

NOTE: Ask Project Officer to verify that the PEM blank (field blank) did not contain any CDD/CDF analytes and ask their assistance in the evaluation of the PEM field blank.

## 19.0 PEM Interference Fortified Blanks

NOTE: This type of blank may not be available at this time. In many cases, laboratories will substitute matrix spike/matrix spike duplicate (MS/MSD). If a PEM Interference Fortified blank(s) were not analyzed but MS/MSD data were submitted, skip this section and go onto to section 21.

19.1 One known blank usually an interference fortified soil/sediment sample is supplied to the Laboratory. The frequency of this QC sample is one per group of 20 environmental samples or one per samples collected over one week period, whichever occurs first. The sample is spiked by the laboratory with the appropriate volume of the matrix spiking solution and then extracted and analyzed with other samples.

19.2 Was a fortified PEM blank analyzed at the frequency described above? [ ] ✓ ___

19.3 Was the percent recovery of 2,3,7,8-TCDD and other 2,3,7,8-substituted compounds within the 50 to 150 percent control limits? [ ] ___ ✓

ACTION: 1. If the recovery of a 2,3,7,8-substituted analytes falls outside the 50-150 percent control limit, flag all positive and non-detect data of the same and related analytes in the same homolog series with "J". However, if the recovery is below 20%, qualify all associated non-detects "R" and positive hits as "J". Notify the Project Officer. Reanalysis may be initiated.

2. If no fortified PEM blank was analyzed, use professional judgement to assess data validity.

## 20.0 Matrix Spike (MS) Field Sample

Note: Matrix spike is not required by this method although Labs may routinely perform this analysis as part of internal QA/QC and submit this data as part of the package. Verify requirements with Project Officer.

20.1 Was a matrix spike analyzed at the frequency of one per SDG samples per matrix? [ ] ✓ ___

20.2 Was the percent recovery of 2,3,7,8-TCDD and other 2,3,7,8-substituted CDDs/CDFs within 60 to 140 percent? [ ] ___ ✓

ACTION: If problems such as interferences are observed, use professional judgement to assess the quality of the data. The 60-140% limits of the matrix spike data may be used to flag data of the spiked sample only. The matrix spike data of the PE blank sample are more important and must be used primarily in data validation.

20.3 Was a matrix spike duplicate analyzed as per section 11.1 and 11.2? [ ] ___ ✓

YES NO N/A

ACTION: No action required. A matrix spike duplicate is not required. Use professional judgement if there is a large difference in concentrations reported between MS and MSD. Qualifications if any. can only be performed on the sample that was used for this criteria.

21.0 Environmental Duplicate Samples *(recommended in Region 2 for all Projects)*

NOTE: Do not confuse an environmental duplicate with a matrix spike duplicate. An environmental duplicate is a sample that has been divided into 2 parts (extracted and analyzed as two different samples) or as 2 separate samples from the same location sent by the sampling crew. This sample is not spike with any additional compounds other than those compounds required by the method for analysis of all routine samples.

21.1 For every batch of 20 samples or samples collected over a period of one week, whichever is less, there must be a sample designated as duplicate. Were duplicate samples collected at the above frequency? [✓] ___ ___

21.2 Did results of the duplicate samples agree within 25% relative difference for 2,3,7,8-substituted analytes and 50% for the rest of the analytes? 20% RPD [✓] ___ ___

ACTION: The duplicate results can be used in conjunction of other QC data. Use professional judgement.

22.0 REFERENCES

The following references are cited in Method 1613. They are important references for technical information and are submitted here as part of this method's documentation.

1. "Analytical Procedures and Quality Assurance Plan for the Determination of PCDD/PCDF in Fish", USEPA Environmental Research Laboratory, 6201 Congdon Boulevard, Duluth, NH 55804, April 1988.

2. Barnes, Donald G., Kutz, Frederick W., and Bottimore, David P., "Update of Toxicity Equivalency Factors (TEFs) for Estimating Risks Associated with Exposure to Mixtures of Chlorinated Dibenzo-p-dioxins and dibenzofurans (CDDs/CDFs)", Risk Assessment Forum, USEPA, Washington, DC 20460, February 1989.

3. Lamparski, L.L., and Nestrick, T.J., "Determination of Tetra-, Hexa-, Hepta-, and Octachlorodibenzo-p-dioxin Isomers in Particulate Samples at Parts per Trillion Levels", Analytical Chemistry, 52: 2045-2054, 1980.

4. "Measurment of 2,3,7,8-Tetrachlorinated Dibenzo-p-dioxin (TCDD) and 2,3,7,8-Tetrachlorinated Dibenzofurans (TCDF) in Pulp, Sludges, Process Samples and Waste-waters from Pulp and Paper Mills", Wright State University, Dayton, OH 45435, June 1988.

5. Method 1613-Revision B- Tetra through Octa- chlorinated Dioxins and Furans by Isotope Dilution HRGC/HRMS, USEPA, Washington, DC, 20460, October 1994

6. "Method 613--2,3,7,8-tetrachlorodibenzo-p-dioxin", 40 CFR 136 (49 FR 43234), October 26, 1984, Section 4.1.

7. "NCASI Procedures for the Preparation and Isomer Specific Analysis of Pulp and Paper Industry Samples for 2,3,7,8 TCDD and 2,3,7,8 TCDF", National Council of the Paper Industry for Air and Stream Improvement, 260 Madison Avenue, New York, NY 10016. Technical Bulletin No.551, Pre-release Copy, July 1988.

8. Provost, L.P., and Elder, R.S., "Interpretation of Percent Recovery Data", American Laboratory, 15: 56-83, 1983

# Pesticides

**LABORATORY DATA CONSULTANTS, INC.**
7750 El Camino Real, Suite 2L Carlsbad, CA 92009 Phone: 760/634-0437 Fax: 760/634-0439

Windward Environmental, LLC
200 West Mercer Street, Suite 401
Seattle, WA 98119
ATTN: Ms. Jennifer Parker

October 6, 2011

SUBJECT: Lower Passaic River Restoration Project, Data Validation

Dear Ms. Parker,

Enclosed are the final validation reports for the fractions listed below. This SDG was received on September 12, 2011. Attachment 1 is a summary of the samples that were reviewed for each analysis.

**LDC Project # 26203:**

| SDG # | Fraction |
|---|---|
| B1A8699 | Chlorinated Pesticides |

The data validation was performed under EPA Level IV guidelines. The analyses were validated using the following documents, as applicable to each method:

- Final Surface Sediment Chemical Analyses and Benthic Invertebrate Toxicity and Bioaccumulation Testing Quality Assurance Project Plan (QAPP) for the Lower Passaic River Restoration Project, October 2009
- Caged Bivalve Study Addendum, March 2011

Please feel free to contact us if you have any questions.

Sincerely,

Stella Cuenco

Stella S. Cuenco
Data Validation Operations Manager/Senior Chemist

V:\LOGIN\Windward\Passaic\26203COV2.wpd

DL/CD 1555 Pages

Attachment 1

EDD

# LDC #26203 (Windward Environmental, LLC - Seattle WA / Lower Passaic River Restoration Project)

PO# 2011-0012

| LDC | SDG# | DATE REC'D | (3) DATE DUE | Pest. (1699M) | | PCB Cong (1668B) | | Dioxin (1613B) | | Butyltin (Krone) | | Metals (6010B) | | Metals (6020) | | Se (7742) | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Matrix: | Water/Tissue | | | W | T | W | T | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S |
| A | K1106643 | 09/12/11 | 10/03/11 | - | - | - | - | - | - | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | | | | | | | | | | | | | | | | | | |
| B | A3380 | 09/12/11 | 10/03/11 | - | - | 1 | 0 | 1 | 0 | - | - | - | - | - | - | - | - | | | | | | | | | | | | | | | | | | |
| C | B1A8699 | 09/12/11 | 10/03/11 | 1 | 10 | - | - | - | - | - | - | - | - | - | - | - | - | | | | | | | | | | | | | | | | | | |
| Total | A/SC | | | 1 | 10 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 17 |

For Internal Use Only: Shaded cells indicate Level IV validation (all other cells are Level III validation). These sample counts do not include MS/MSD

26203ST.wpd

# Laboratory Data Consultants, Inc.
# Data Validation Report

| | |
|---|---|
| **Project/Site Name:** | Lower Passaic River Restoration Project |
| **Collection Date:** | March 8 through July 18, 2011 |
| **LDC Report Date:** | October 6, 2011 |
| **Matrix:** | Tissue/Water |
| **Parameters:** | Chlorinated Pesticides |
| **Validation Level:** | EPA Level IV |
| **Laboratory:** | Maxxam Analytics, Inc. |
| **Sample Delivery Group (SDG):** | B1A8699 |

**Sample Identification**

LPR6-ECST-Comp01
LPRBG-ECST-Comp01
LPR6-ECST-Comp02
LPR7-ECST-Comp03
LPR7-ECST-Comp04
LPR8-ECST-Comp05
LPR1-GDST-Comp01
LPRBG-GDST-Comp01
LPR2-GDST-Comp02
LPR3-GDST-Comp03
LPR-071811-RB
LPR6-ECST-Comp02DUP

## Introduction

This data review covers 11 tissue samples and one water sample listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 1699 modified for Chlorinated Pesticides.

This review follows the Final Surface Sediment Chemical Analyses and Benthic Invertebrate Toxicity and Bioaccumulation Testing Quality Assurance Project Plan (QAPP) for the Lower Passaic River Restoration Project, (October 8, 2009), and the Caged Bivalve Study Addendum (March 2, 2011).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

NJ Presumptive evidence of presence of the compound at an estimated quantity.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

## I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

## II. HRGC/HRMS Instrument Performance Check

Instrument performance was checked at 12 hour intervals. All ion abundance requirements were met.

The PFK exact mass of 280.9824 was verified and the mass resolution was adequately checked.

Retention time windows were established for all homologues.

The static resolving power was at least 8,000.

## III. Initial Calibration

A five point initial calibration was performed as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 35.0% for all compounds.

The ion abundance ratios were within validation criteria with the following exceptions:

| Date | Compound | Ion Abundance Ratio (Limits) | Associated Samples |
|---|---|---|---|
| 9/7/11 (CS2 Std) | Dieldrin<br>4,4'-DDT | 2.04 (1.26-1.88)<br>1.07 (1.26-1.90) | All samples in SDG B1A8699 |
| 9/7/11 (CS5 Std) | $^{13}$C-trans-Nonachlor | 2.25 (1.30-1.96) | All samples in SDG B1A8699 |

This QC exceedance was judged to have no impact on the data quality, therefore no data were qualified based on the ion abundance ratio.

The minimum S/N ratio was greater than or equal to 10 for each unlabeled compound and labeled compound.

## IV. Continuing Calibration

Continuing calibration was performed at required frequencies.

The percent differences (%D) of calibration factors in continuing standard mixtures were within the 50.0% QC limits.

The percent difference (%D) of the second source calibration standard were less than or equal to 50.0% for all compounds.

The individual 4,4'-DDT and Endrin breakdowns (%BD) were less than or equal to 20.0%.

The ion abundance ratios were within validation criteria.

The minimum S/N ratio was greater than or equal to 10 for each unlabeled compound and labeled compound.

## V. Blanks

Method blanks were reviewed for each matrix as applicable. No chlorinated pesticide contaminants were found in the method blanks with the following exceptions:

| Method Blank ID | Extraction Date | Compound | Concentration | Associated Samples |
|---|---|---|---|---|
| 2604778MB | 8/24/11 | Hexachlorobenzene<br>Methoxychlor<br>delta-BHC | 0.0184 ng/g<br>0.064 ng/g<br>0.088 ng/g | All tissue samples in SDG B1A8699 |
| 2604776MB | 7/25/11 | Hexachlorobenzene<br>Methoxychlor | 0.119 ng/L<br>0.139 ng/L | All water samples in SDG B1A8699 |

Sample concentrations were compared to concentrations detected in the method blanks. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated method blanks with the following exceptions:

| Sample | Compound | Reported Concentration | Modified Final Concentration |
|---|---|---|---|
| LPRBG-ECST-Comp01 | Hexachlorobenzene | 0.0418 ng/g | 0.0418U ng/g |
| LPR6-ECST-Comp02 | delta-BHC | 0.21 ng/g | 0.21U ng/g |
| LPR1-GDST-Comp01 | Hexachlorobenzene<br>delta-BHC | 0.0323 ng/g<br>0.42 ng/g | 0.0323U ng/g<br>0.42U ng/g |
| LPRBG-GDST-Comp01 | Hexachlorobenzene | 0.0136 ng/g | 0.0136U ng/g |
| LPR2-GDST-Comp02 | Hexachlorobenzene | 0.0192 ng/g | 0.0192U ng/g |
| LPR3-GDST-Comp03 | Hexachlorobenzene | 0.0199 ng/g | 0.0199U ng/g |
| LPR6-ECST-Comp02DUP | delta-BHC | 0.18 ng/g | 0.18U ng/g |
| LPR-071811-RB | Hexachlorobenzene | 0.0941 ng/L | 0.0941U ng/L |

Sample LPR-071811-RB was identified as a rinsate blank. No chlorinated pesticide contaminants were found in this blank with the following exceptions:

| Rinsate Blank ID | Sampling Date | Compound | Concentration | Associated Samples |
|---|---|---|---|---|
| LPR-071811-RB | 7/18/11 | Hexachlorobenzene | 0.0941 ng/L | All tissue samples in SDG B1A8699 |

Sample concentrations were compared to concentrations detected in the field blanks. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated field blanks.

## VI. Matrix Spike/Matrix Spike Duplicates

Matrix spike and matrix spike duplicate analyses were not required in the QAPP, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Results were within QC limits.

## VII. Laboratory Control Samples (LCS) and Standard Reference Material (SRM) Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits with the following exceptions:

| LCS ID (Associated Samples) | Compound | LCS %R (Limits) | LCSD %R (Limits) | RPD (Limits) | Flag | A or P |
|---|---|---|---|---|---|---|
| 2604776LCS/D (All water samples in SDG B1A8699) | Hexachlorobenzene<br>p,p-DDT<br>beta-BHC<br>alpha-Chlordane | -<br>-<br>-<br>- | -<br>-<br>-<br>- | 34.7 (≤25)<br>31.6 (≤25)<br>39.6 (≤25)<br>35.2 (≤25) | J (all detects)<br>UJ (all non-detects) | P |

Percent recoveries (%R) of the standard reference material were within QC limits with the following exceptions:

| SRM ID | Compound | %R (Limits) | Associated Samples | Flag | A or P |
|---|---|---|---|---|---|
| 2604778SRM | o,p-DDT<br>p,p-DDT<br>Heptachlor<br>Oxychlordane<br>o,p-DDE | 0 (50-200)<br>0 (50-200)<br>13 (50-200)<br>23 (50-200)<br>0 (50-200) | All tissue samples in SDG B1A8699 | J (all detects)<br>UJ (all non-detects) | A |

## VIII. Regional Quality Assurance and Quality Control

Not applicable.

## IX. Internal Standards

All internal standard recoveries were within QC limits.

## X. Target Compound Identification

All target compound identifications were within validation criteria.

## XI. Compound Quantitation and Reported RLs

All compound quantitation and RLs were within validation criteria.

## XII. System Performance

The system performance was acceptable.

## XIII. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

## XIV. Field Duplicates

No field duplicates were identified in this SDG.

## Lower Passaic River Restoration Project
## Chlorinated Pesticides - Data Qualification Summary - SDG B1A8699

| SDG | Sample | Compound | Flag | A or P | Reason |
|---|---|---|---|---|---|
| B1A8699 | LPR-071811-RB | Hexachlorobenzene<br>p,p-DDT<br>beta-BHC<br>alpha-Chlordane | J (all detects)<br>UJ (all non-detects) | P | Laboratory control samples (RPD) |
| B1A8699 | LPR6-ECST-Comp01<br>LPRBG-ECST-Comp01<br>LPR6-ECST-Comp02<br>LPR7-ECST-Comp03<br>LPR7-ECST-Comp04<br>LPR8-ECST-Comp05<br>LPR1-GDST-Comp01<br>LPRBG-GDST-Comp01<br>LPR2-GDST-Comp02<br>LPR3-GDST-Comp03<br>LPR6-ECST-Comp02DUP | o,p-DDT<br>p,p-DDT<br>Heptachlor<br>Oxychlordane<br>o,p-DDE | J (all detects)<br>UJ (all non-detects) | A | Standard reference material (%R) |

## Lower Passaic River Restoration Project
## Chlorinated Pesticides - Laboratory Blank Data Qualification Summary - SDG B1A8699

| SDG | Sample | Compound | Modified Final Concentration | A or P |
|---|---|---|---|---|
| B1A8699 | LPRBG-ECST-Comp01 | Hexachlorobenzene | 0.0418U ng/g | A |
| B1A8699 | LPR6-ECST-Comp02 | delta-BHC | 0.21U ng/g | A |
| B1A8699 | LPR1-GDST-Comp01 | Hexachlorobenzene<br>delta-BHC | 0.0323U ng/g<br>0.42U ng/g | A |
| B1A8699 | LPRBG-GDST-Comp01 | Hexachlorobenzene | 0.0136U ng/g | A |
| B1A8699 | LPR2-GDST-Comp02 | Hexachlorobenzene | 0.0192U ng/g | A |
| B1A8699 | LPR3-GDST-Comp03 | Hexachlorobenzene | 0.0199U ng/g | A |
| B1A8699 | LPR6-ECST-Comp02DUP | delta-BHC | 0.18U ng/g | A |
| B1A8699 | LPR-071811-RB | Hexachlorobenzene | 0.0941U ng/L | A |

## Lower Passaic River Restoration Project
## Chlorinated Pesticides - Field Blank Data Qualification Summary - SDG B1A8699

No Sample Data Qualified in this SDG

LDC #: 26203C3a

SDG #: B1A8699

Laboratory: Maxxam Analytics, Inc.

# VALIDATION COMPLETENESS WORKSHEET

Level IV

Date: 9/19/11

Page: 1 of 1

Reviewer:

2nd Reviewer:

**METHOD:** HRGC/HRMS Chlorinated Pesticides (EPA Method 1699 Modified)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

| | Validation Area | | Comments |
|---|---|---|---|
| I. | Technical holding times | A | Sampling dates: 3/8 – 7/18/11 |
| II. | GC/MS Instrument performance check | A | |
| III. | Initial calibration | SW | 35% |
| IV. | Routine calibration/ICV | A | 10/CCV ≤ 50% |
| V. | Blanks | SW | |
| VI. | Matrix spike/Matrix spike duplicates /DUP | N/A | |
| VII. | Laboratory control samples /SRM | SW | LCS/D. |
| VIII. | Regional quality assurance and quality control | N | |
| IX. | Internal standards | A | |
| X. | Target compound identifications | A | |
| XI. | Compound quantitation and CRQLs | A | |
| XII. | System performance | A | |
| XIII. | Overall assessment of data | A | |
| XIV. | Field duplicates | N | |
| XV. | Field blanks | SW | RB = 1 |

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: tissue & water

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1 | LPR6-ECST-Comp01 | 11 | LPR-071811-RB W | 21 | 260477GMB | 31 | |
| 2 | LPRBG-ECST-Comp01 | 12 | LPR6-ECST-Comp02DUP | 22 | 260478MB | 32 | |
| 3 | LPR6-ECST-Comp02 | 13 | | 23 | | 33 | |
| 4 | LPR7-ECST-Comp03 | 14 | | 24 | | 34 | |
| 5 | LPR7-ECST-Comp04 | 15 | | 25 | | 35 | |
| 6 | LPR8-ECST-Comp05 | 16 | | 26 | | 36 | |
| 7 | LPR1-GDST-Comp01 | 17 | | 27 | | 37 | |
| 8 | LPRBG-GDST-Comp01 | 18 | | 28 | | 38 | |
| 9 | LPR2-GDST-Comp02 | 19 | | 29 | | 39 | |
| 10 | LPR3-GDST-Comp03 | 20 | | 30 | | 40 | |

LDC #: 26203C3a

# VALIDATION FINDINGS CHECKLIST


Reviewer: [illegible]
2nd Reviewer: [illegible]

**Method:** HRGC/GCMS Chlorinated Pesticides (EPA Method 1699M)

| Validation Area | Yes | No | NA | Findings/Comments |
|---|---|---|---|---|
| I. Technical holding times | | | | |
| All technical holding times were met. | ✓ | | | |
| Cooler temperature criteria was met. | ✓ | | | |
| II. GC/MS Instrument performance check | | | | |
| Was PFK exact mass 280.9824 verified? | ✓ | | | |
| Were the retention time windows established for all homologues? | ✓ | | | |
| Is the resolving power at least 8,000 (10% valley definition)? | ✓ | | | |
| Was the mass resolution adequately check with PFK? | ✓ | | | |
| III. Initial calibration | | | | |
| Was the initial calibration performed at 5 concentration levels? | ✓ | | | |
| Were all percent relative standard deviations (%RSD) ≤ 35% for unlabeled standards and labeled standards? | ✓ | | | |
| Did all calibration standards meet the Ion Abundance Ratio criteria? | | ✓ | | |
| Was the signal to noise ratio for each target compound and labeled standard ≥ 10? | ✓ | | | |
| IV. Continuing calibration | | | | |
| Was a routine calibration performed at the beginning and end of each 12 hour period? | ✓ | | | |
| Were endrin and 4,4'-DDT breakdowns ≤ 20% for individual breakdown in the Evaluation mix standards? | ✓ | | | |
| Were all percent differences (%D) ≤ 50% for unlabeled standards and labeled standards? | ✓ | | | |
| Did all routine calibration standards meet the Ion Abundance Ratio criteria? | ✓ | | | |
| V. Blanks | | | | |
| Was a method blank associated with every sample in this SDG? | ✓ | | | |
| Was a method blank performed for each matrix and concentration? | ✓ | | | |
| Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet? | ✓ | | | |
| VI. Matrix spike/Matrix spike duplicates | | | | |
| Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water. | | ✓ | | |
| Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits? | ✓ | | | DUP |
| VII. Laboratory control samples | | | | |
| Was an LCS analyzed for this SDG? | ✓ | | | |
| Was an LCS analyzed per extraction batch? | ✓ | | | |
| Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits? | | ✓ | | |
| VIII. Regional Quality Assurance and Quality Control | | | | |

LDC #: 26203C3a

# VALIDATION FINDINGS CHECKLIST


Reviewer:
2nd Reviewer:

| Validation Area | Yes | No | NA | Findings/Comments |
|---|---|---|---|---|
| Were performance evaluation (PE) samples performed? | | ✓ | | |
| Were the performance evaluation (PE) samples within the acceptance limits? | | | ✓ | |
| IX. Internal standards | | | | |
| Were internal standard recoveries within the QC criteria? | ✓ | | | |
| Was the minimum S/N ratio of all internal standard peaks ≥ 10? | ✓ | | | |
| X. Target compound identification | | | | |
| Were the signals for the two exact m/z's present? | ✓ | | | |
| Was the signal to noise ratio for each target compound and labeled standard ≥ 2.5? | ✓ | | | |
| Was the Ion Abundance Ratio for the two quantitation ions within criteria? | ✓ | | | |
| Were the relative retention time(RRT) within the RRT QC limits? | ✓ | | | |
| Was an acceptable lock mass recorded and monitored? | ✓ | | | |
| XI. Compound quantitation/CRQLs | | | | |
| Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound? | ✓ | | | |
| Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation? | ✓ | | | |
| XII. System performance | | | | |
| System performance was found to be acceptable. | ✓ | | | |
| XIII. Overall assessment of data | | | | |
| Overall assessment of data was found to be acceptable. | ✓ | | | |
| XIV. Field duplicates | | | | |
| Field duplicate pairs were identified in this SDG. | | ✓ | | |
| Target compounds were detected in the field duplicates. | | | ✓ | |
| XV. Field blanks | | | | |
| Field blanks were identified in this SDG. | ✓ | | | |
| Target compounds were detected in the field blanks. | ✓ | | | |

# VALIDATION FINDINGS WORKSHEET

**METHOD:** Pesticides (EPA Method 1699M)

| | | | | |
|---|---|---|---|---|
| A. alpha-BHC | J. 4,4'-DDE | S. alpha-Chlordane | BB. Aroclor-1260 | KK. p,p-DDT |
| B. beta-BHC | K. Endrin | T. gamma-Chlordane | CC. 2,4'-DDD | LL. o,p-DDT |
| C. delta-BHC | L. Endosulfan II | U. Toxaphene | DD. 2,4'-DDE | MM. o,p-DDE |
| D. gamma-BHC | M. 4,4'-DDD | V. Aroclor-1016 | EE. 2,4'-DDT | NN. o,p-DDD |
| E. Heptachlor | N. Endosulfan sulfate | W. Aroclor-1221 | FF. Hexachlorobenzene | OO. Oxychlordane |
| F. Aldrin | O. 4,4'-DDT | X. Aroclor-1232 | GG. Chlordane | PP. cis-Nonachlor |
| G. Heptachlor epoxide | P. Methoxychlor | Y. Aroclor-1242 | HH. Chlordane (Technical) | QQ. trans-Nonachlor |
| H. Endosulfan I | Q. Endrin ketone | Z. Aroclor-1248 | II. p,p-DDE | |
| I. Dieldrin | R. Endrin aldehyde | AA. Aroclor-1254 | JJ. p,p-DDD | |

Notes:_____

LDC #: 26203C39

# VALIDATION FINDINGS WORKSHEET
## Initial Calibration


Reviewer: K
2nd Reviewer: Q

**METHOD:** HRGC/LRMS Chlorinated Pesticides (EPA Method 1699M)
Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was the initial calibration performed at 5 concentration levels?
Y N N/A Were all percent relative standard deviations (%RSD) ≤ 35%?
Y N N/A Did all calibration standards meet the Ion Abundance Ratio criteria?
Y N N/A Was the signal to noise ratio for each target compound and labeled standard ≥ 10?

| # | Date | Standard ID | Compound | Finding %RSD (Limit: ≤35.0%) | Finding Ion Abundace Ratio | Associated Samples | Qualifications |
|---|---|---|---|---|---|---|---|
| | 9/7/11 | 10pt CS2 std | I | | 2.04 (1.26-1.88) | All | text |
| | | ↓ | O | | 1.07 (1.26-1.99) | | ↓ |
| | | 10pt CS5 std | 13C-DD | | 2.25 (1.30-1.96) | | |

LDC #: 26203C3a

# VALIDATION FINDINGS WORKSHEET
## Blanks


Reviewer: A
2nd Reviewer: A

**METHOD:** HRGC/GCMS Chlorinated Pesticides (EPA Method 1699M)
Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were all samples associated with a method blank?
Y N N/A Was a method blank performed for each matrix and whenever a sample extraction was performed?
Y N N/A Was the method blank contaminated?

**Blank extraction date:** 8/24/11 **Blank analysis date:** 9/8/11
**Conc. units:** ng/g Associated Samples: All tissue Qualify U

| Compound | Blank ID | Sample Identification | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| [redacted] | 2604778MB | 5X | 2 | 3 | 7 | 8 | 9 | 10 | 12 | |
| FF | 0.0184 | 0.092 | 0.0418 | | 0.0323 | 0.0136 | 0.0192 | 0.0199 | | |
| P | 0.064 | 0.32 | | | | | | | | |
| C | 0.088 | 0.44 | | 0.21 | 0.42 | | | | 0.18 | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |

**Blank extraction date:** 7/25/11 **Blank analysis date:** 9/7/11 **Associated samples:** All water
**Conc. units:** ng/L

| Compound | Blank ID | Sample Identification | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| [redacted] | 2604776MB | 5X | 11 | | | | | | | |
| FF | 0.119 | 0.595 | 0.0941 | | | | | | | |
| P | 0.138 | 0.69 | | | | | | | | |
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CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
All contaminants within five times the method blank concentration were qualified as not detected, "U".

LDC #: 26203C39

# VALIDATION FINDINGS WORKSHEET
## Field Blanks

Page: 1 of 1
Reviewer: M
2nd Reviewer: [illegible]

**METHOD:** HRGC/GCMS Chlorinated Pesticides (EPA Method 1699M)

Y N N/A Were field blanks identified in this SDG?
**Blank units:** ng/L **Associated sample units:**_____
**Sampling date:** 7/18/11
**Field blank type:** (circle one) Field Blank / Rinsate / Other:_____ Associated Samples: All tissue (>5x)

| Compound | Blank ID | Sample Identification | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 11 | | | | | | | | | |
| FF | 0.0941 | | | | | | | | | |
| ~~E M~~ | ~~0.168~~ | | | | | | | | | |
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**Blank units:**_____ **Associated sample units:**_____
**Sampling date:**_____
**Field blank type:** (circle one) Field Blank / Rinsate / Other:_____ Associated Samples:_____

| Compound | Blank ID | Sample Identification | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
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CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Samples with compound concentrations within five times the associated field blank concentration are listed above, these sample results were qualified as not detected, "U".

LDC #: 26203C3a

# VALIDATION FINDINGS WORKSHEET
## Laboratory Control Samples (LCS)


Reviewer: A
2nd Reviewer: A

**METHOD:** HRGC/GCMS Chlorinated Pesticides (EPA Method 1699M)
Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a LCS required?
Y N N/A Was a LCS analyzed every 20 samples for each matrix or whenever a sample extraction was performed?
Y N N/A Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?

| # | Date | Lab ID/Reference | Compound | LCS %R (Limits) | LCSD %R (Limits) | RPD (Limits) | Associated Samples | Qualifications |
|---|---|---|---|---|---|---|---|---|
| | | 2604776LCS/D | FF | ( ) | ( ) | 34.7 (≤25) | All HDS | J/UJ/P |
| | | | KK | ( ) | ( ) | 31.6 ( ) | | |
| | | | B | ( ) | ( ) | 29.6 ( ) | | |
| | | | S | ( ) | ( ) | 35.2 ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
| | | 2604778SRM | LL | 0 (50-200) | ( ) | ( ) | All tissue | J/UJ/A |
| | | | KK | 0 ( ) | ( ) | ( ) | | |
| | | | E | 13 ( ) | ( ) | ( ) | | |
| | | | OO | 23 ( ) | ( ) | ( ) | | |
| | | | MM | 0 ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
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| | | | | ( ) | ( ) | ( ) | | |

LDC #: 26203C3a

# VALIDATION FINDINGS WORKSHEET
## Initial Calibration Calculation Verification


Reviewer: R
2nd Reviewer: 9

**METHOD:** HRGC/LRMS Chlorinated Pesticides (EPA Method 1699M)

The Relative Response Factor (RRF), average RRF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

$RRF = (A_x)(C_{is})/(A_{is})(C_x)$ — $A_x$ = Area of compound, $A_{is}$ = Area of associated internal standard
average RRF = sum of the RRFs/number of standards — $C_x$ = Concentration of compound, $C_{is}$ = Concentration of internal standard
%RSD = 100 * (S/X) — S = Standard deviation of the RRFs, X = Mean of the RRFs

| # | Standard ID | Calibration Date | Compound (Reference Internal Standard) | Reported Average RRF (initial) | Recalculated Average RRF (initial) | Reported RRF ( 100 std) | Recalculated RRF ( 100 std) | Reported %RSD | Recalculated %RSD |
|---|---|---|---|---|---|---|---|---|---|
| 1 | ICAL | 9/7/11 | A | 1.62 | 1.62 | 1.799 | 1.799 | 9.661 | 9.672 |
| | | | F | 1.06 | 1.06 | 1.140 | 1.140 | 5.783 | 5.785 |
| | | | J | 1.41 | 1.41 | 1.558 | 1.558 | 6.540 | 6.536 |
| | | | K | 1.18 | 1.18 | 1.239 | 1.239 | 4.835 | 4.831 |
| | | | O | 1.25 | 1.25 | 1.228 | 1.228 | 4.067 | 4.063 |
| 2 | | | | | | | | | |
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Comments: Refer to Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 26203C3a

# VALIDATION FINDINGS WORKSHEET
## Routine Calibration Results Verification


Reviewer:
2nd Reviewer:

**METHOD:** HRGC/LRMS Chlorinated Pesticides (EPA Method 1699M)

The percent difference (%D) of the initial calibration average Relative Response Factors (RRFs) and the continuing calibration RRFs were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. RRF - RRF)/ave. RRF
RRF = $(A_x)(C_{is})/(A_{is})(C_x)$

Where: ave. RRF = initial calibration average RRF
RRF = continuing calibration RRF
$A_x$ = Area of compound, $A_{is}$ = Area of associated internal standard
$C_x$ = Concentration of compound, $C_{is}$ = Concentration of internal standard

| # | Standard ID | Calibration Date | Compound (Reference Internal Standard) | Average RRF (initial) | Reported RRF (CC) | Recalculated RRF (CC) | Reported %D | Recalculated %D |
|---|---|---|---|---|---|---|---|---|
| 1 | M5110907A016 | | A | 1.62 | 1.788 | 1.788 | 10.58 | 10.58 |
| | | | F | 1.06 | 1.176 | 1.176 | 10.72 | 10.72 |
| | | | J | 1.41 | 1.584 | 1.584 | 12.68 | 12.66 |
| | | | K | 1.18 | 1.283 | 1.283 | 8.50 | 8.54 |
| | | | O | 1.25 | 1.512 | 1.512 | 20.63 | 20.67 |
| 2 | | | | | | | | |
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Comments: Refer to Routine Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 26203C3a

# VALIDATION FINDINGS WORKSHEET
## Laboratory Control Sample Results Verification


Reviewer: [illegible]
2nd Reviewer: [illegible]

**METHOD:** HRGC/LRMS Chlorinated Pesticides (EPA Method 1699M)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the laboratoy control sample and laboratory control sample duplicate (if applicable) were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 * SSC/SA  Where: SSC = Spiked sample concentration
SA = Spike added

RPD = I LCS - LCSD I * 2/(LCS + LCSD)  LCS = Laboraotry control sample percent recovery LCSD = Laboratory control sample duplicate percent recovery

LCS ID: LCS/D 260477L

| Compound | Spike Added ( ~~ng/g~~ L ) | | Spiked Sample Concentration ( ~~ng/g~~ L ) | | LCS Percent Recovery | | LCSD Percent Recovery | | LCS/LCSD RPD | |
|---|---|---|---|---|---|---|---|---|---|---|
| | LCS | LCSD | LCS | LCSD | Reported | Recalc. | Reported | Recalc. | Reported | Recalculated |
| A | 20 | 20 | 28.4 | 27.6 | 142 | 142 | 138 | 138 | 2.9 | 2.9 |
| F | ↓ | ↓ | 17.6 | 22.6 | 88 | 88 | 113 | 113 | 24.9 | 24.9 |
| K | ↓ | ↓ | 24.0 | 24.8 | 120 | 120 | 124 | 124 | 3.3 | 3.3 |
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Comments: Refer to Laboratory Control Sample findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 26203C2a

# VALIDATION FINDINGS WORKSHEET
## Sample Calculation Verification


Reviewer: X
2nd reviewer: q

**METHOD:** HRGC/LRMS Chlorinated Pesticides (EPA Method 1699M)

Y N N/A Were all reported results recalculated and verified for all level IV samples?
Y N N/A Were all recalculated results for detected target compounds agree within 10.0% of the reported results?

Concentration = $\frac{(A_x)(I_s)(DF)}{(A_{is})(RRF)(V_o)(\%S)}$

$A_x$ = Area of the characteristic ion (EICP) for the compound to be measured

$A_{is}$ = Area of the characteristic ion (EICP) for the specific internal standard

$I_s$ = Amount of internal standard added in nanograms (ng)

$V_o$ = Volume or weight of sample extract in milliliters (ml) or grams (g).

RRF = Relative Response Factor (average) from the initial calibration

Df = Dilution Factor.

%S = Percent solids, applicable to soil and solid matrices only.

Example:

Sample I.D. 1, J:

Conc. = $\frac{(1102816)(40)(1)}{(4515250)(1.41)(5.1393)}$

= 4.02 ng/g

| # | Sample ID | Compound | Reported Concentration ( ) | Calculated Concentration ( ) | Qualification |
|---|---|---|---|---|---|
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# Lipids

**LABORATORY DATA CONSULTANTS, INC.**
7750 El Camino Real, Suite 2L Carlsbad, CA 92009 Phone: 760/634-0437 Fax: 760/634-0439

Windward Environmental, LLC
200 West Mercer Street, Suite 401
Seattle, WA 98119
ATTN: Ms. Jennifer Parker

October 6, 2011

SUBJECT: Lower Passaic River Restoration Project, Data Validation

Dear Ms. Parker,

Enclosed are the final validation reports for the fractions listed below. These SDGs were received on September 19, 2011. Attachment 1 is a summary of the samples that were reviewed for each analysis.

**LDC Project # 26278:**

| SDG # | Fraction |
|---|---|
| 1132006 | Mercury & Methyl Mercury |
| K1107026 | Metals, Percent Lipids, Butyltins |

The data validation was performed under EPA Level IV guidelines. The analyses were validated using the following documents, as applicable to each method:

- Final Surface Sediment Chemical Analyses and Benthic Invertebrate Toxicity and Bioaccumulation Testing Quality Assurance Project Plan (QAPP) for the Lower Passaic River Restoration Project, October 2009
- Caged Bivalve Study Addendum, March 2011
- USEPA Region II Validation SOP HW-2, (Revision 13, September 2006) for Metals, modified as necessary to accommodate the QAPP criteria
- USEPA, Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review, June 2008
- USEPA, Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review, January 2010

Please feel free to contact us if you have any questions.

Sincerely,

Stella S. Cuenco
Data Validation Operations Manager/Senior Chemist

L:\Windward\Passaic\26278COV.wpd

Attachment 1

| EDD | LDC #26278 (Windward Environmental, LLC - Seattle WA / Lower Passaic River Restoration Project) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | PO# 2011-0012 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LDC | SDG# | DATE REC'D | (3) DATE DUE | Hg (1631) | | Methyl Hg (1630) | | Metals (SW846) | | Lipids (B&D) | | Butyltin (KRONE) | | | | | | | | | | | | | | | | | | | | | | | |
| Matrix: Water/Tissue | | | | W | T | W | T | W | T | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S |
| A | 1132006 | 09/19/11 | 10/10/11 | 0 | 11 | 0 | 11 | - | - | - | - | - | - | | | | | | | | | | | | | | | | | | | | | | | |
| B | K1107026 | 09/19/11 | 10/10/11 | - | - | - | - | 0 | 10 | 0 | 10 | 0 | 10 | | | | | | | | | | | | | | | | | | | | | | | |
| Total | A/SC | | | 0 | 11 | 0 | 11 | 0 | 10 | 0 | 10 | 0 | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 52 |

Shaded cells indicate Level IV validation (all other cells are Level III validation). These sample counts do not include MS/MSD, and DUPs

# Laboratory Data Consultants, Inc.
# Data Validation Report

| | |
|---|---|
| **Project/Site Name:** | Lower Passaic River Restoration Project |
| **Collection Date:** | March 8 through June 8, 2011 |
| **LDC Report Date:** | October 10, 2011 |
| **Matrix:** | Tissue |
| **Parameters:** | Percent Lipids |
| **Validation Level:** | EPA Level IV |
| **Laboratory:** | Columbia Analytical Services, Inc. |
| **Sample Delivery Group (SDG):** | K1107026 |

**Sample Identification**

LPR6-ECST-Comp01
LPRBG-ECST-Comp01
LPR6-ECST-Comp02
LPR7-ECST-Comp03
LPR7-ECST-Comp04
LPR8-ECST-Comp05
LPR1-GDST-Comp01
LPRBG-GDST-Comp01
LPR2-GDST-Comp02
LPR3-GDST-Comp03
LPR6-ECST-Comp02DUP
LPR6-ECST-Comp02TRP

## Introduction

This data review covers 12 tissue samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per Bligh & Dyer Method for Percent Lipids.

This review follows the Final Surface Sediment Chemical Analyses and Benthic Invertebrate Toxicity and Bioaccumulation Testing Quality Assurance Project Plan (QAPP) for the Lower Passaic River Restoration Project, (October 8, 2009), the Caged Bivalve Study Addendum (March 2, 2011), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review (January 2010).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

NJ Presumptive evidence of presence of the compound at an estimated quantity.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

## I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

## II. Initial Calibration

All criteria for the initial calibration were met.

## III. Calibration Verification

Calibration verification frequency and analysis criteria were met.

## IV. Blanks

Method blanks were reviewed for each matrix as applicable. No percent lipids were found in the initial, continuing and preparation blanks.

No field blanks were identified in this SDG.

## V. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) analyses were not required by the method.

## VI. Duplicates/Triplicates

Duplicate (DUP) and Triplicate (TRP) sample analyses were reviewed for each matrix as applicable. Results were within QC limits.

## VII. Laboratory Control Samples (LCS) and Standard Reference Material (SRM) Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

The percent differences (%D) of the standard reference material (SRM) were within the QC limits.

## VIII. Sample Result Verification

All sample result verifications were acceptable.

## IX. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

## X. Field Duplicates

No field duplicates were identified in this SDG.

**Lower Passaic River Restoration Project**
**Percent Lipids - Data Qualification Summary - SDG K1107026**

No Sample Data Qualified in this SDG

**Lower Passaic River Restoration Project**
**Percent Lipids - Laboratory Blank Data Qualification Summary - SDG K1107026**

No Sample Data Qualified in this SDG

**Lower Passaic River Restoration Project**
**Percent Lipids - Field Blank Data Qualification Summary - SDG K1107026**

No Sample Data Qualified in this SDG

LDC #: 26278B6

SDG #: K1107026

Laboratory: Columbia Analytical Services

# VALIDATION COMPLETENESS WORKSHEET

Level ~~III~~ IV

Date: 9/27/11

Page: 1 of 1

Reviewer: CR

2nd Reviewer: [illegible]

**METHOD:** Percent Lipids (~~Blyth~~ Bligh & Dyer Method)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

| | Validation Area | | Comments |
|---|---|---|---|
| I. | Technical holding times | A | Sampling dates: 3/8-6/8/11 |
| IIa. | Initial calibration | A | |
| IIb. | Calibration verification | A | |
| III. | Blanks | A | |
| IV | Matrix Spike/Matrix Spike Duplicates | N | Not required |
| V | Duplicates | A | Dup, TrP |
| VI. | Laboratory control samples | A | LCS-SRM |
| VII. | Sample result verification | A ~~N~~ | |
| VIII. | Overall assessment of data | A | |
| IX. | Field duplicates | N | |
| X | Field blanks | N | |

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: Tissue

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1 | LPR6-ECST-Comp01 | 11 | LPR6-ECST-Comp02DUP | 21 | | 31 | |
| 2 | LPRBG-ECST-Comp01 | 12 | LPR6-ECST-Comp02TRP | 22 | | 32 | |
| 3 | LPR6-ECST-Comp02 | 13 | | 23 | | 33 | |
| 4 | LPR7-ECST-Comp03 | 14 | | 24 | | 34 | |
| 5 | LPR7-ECST-Comp04 | 15 | | 25 | | 35 | |
| 6 | LPR8-ECST-Comp05 | 16 | | 26 | | 36 | |
| 7 | LPR1-GDST-Comp01 | 17 | | 27 | | 37 | |
| 8 | LPRBG-GDST-Comp01 | 18 | | 28 | | 38 | |
| 9 | LPR2-GDST-Comp02 | 19 | | 29 | | 39 | |
| 10 | LPR3-GDST-Comp03 | 20 | | 30 | | 40 | |

Notes:

DC #: 60C18036

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
Reviewer: CR
2nd Reviewer: [illegible]

Method: Inorganics (EPA Method See cover)

| Validation Area | Yes | No | NA | Findings/Comments |
|---|---|---|---|---|
| *I. Technical holding times* | | | | |
| All technical holding times were met. | ✓ | | | |
| Cooler temperature criteria was met. | ✓ | | | |
| *II. Calibration* | | | | |
| Were all instruments calibrated daily, each set-up time? | ✓ | | | |
| Were the proper number of standards used? | ✓ | | | |
| Were all initial calibration correlation coefficients > 0.995? | | | ✓ | |
| Were all initial and continuing calibration verification %Rs within the 90-110% QC limits? | | | ✓ | |
| Were titrant checks performed as required? (Level IV only) | | | ✓ | |
| Were balance checks performed as required? (Level IV only) | ✓ | | | |
| *III. Blanks* | | | | |
| Was a method blank associated with every sample in this SDG? | ✓ | | | |
| Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet. | | ✓ | | |
| *IV. Matrix spike/Matrix spike duplicates and Duplicates* | | | | |
| Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water. | ✓ | | | |
| Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken. | | | ✓ | |
| Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of ≤ CRDL(≤ 2X CRDL for soil) was used for samples that were ≤ 5X the CRDL, including when only one of the duplicate sample values were ≤ 5X the CRDL. | ✓ | | | |
| *V. Laboratory control samples* | | | | |
| Was an LCS anaylzed for this SDG? | ✓ | | | |
| Was an LCS analyzed per extraction batch? | ✓ | | | |
| Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% (85-115% for Method 300.0) QC limits? | ✓ | | | |
| *VI. Regional Quality Assurance and Quality Control* | | | | |
| Were performance evaluation (PE) samples performed? | | ✓ | | |
| Were the performance evaluation (PE) samples within the acceptance limits? | | | ✓ | |

LDC #: 26278B6

VALIDATION FINDINGS CHECKLIST


Reviewer: CP
2nd Reviewer: V

| Validation Area | Yes | No | NA | Findings/Comments |
|---|---|---|---|---|
| *VII. Sample Result Verification* | | | | |
| Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation? | ✓ | | | |
| Were detection limits < RL? | ✓ | | | |
| *VIII. Overall assessment of data* | | | | |
| Overall assessment of data was found to be acceptable. | ✓ | | | |
| *IX. Field duplicates* | | | | |
| Field duplicate pairs were identified in this SDG. | | ✓ | | |
| Target analytes were detected in the field duplicates. | | | ✓ | |
| *X. Field blanks* | | | | |
| Field blanks were identified in this SDG. | | ✓ | | |
| Target analytes were detected in the field blanks. | | | ✓ | |

LDC #: LCC1048

# VALIDATION FINDINGS WORKSHEET
## Level IV Recalculation Worksheet

Page: 1 of 1
Reviewer: QR
2nd Reviewer: [illegible]

METHOD: Inorganics, Method See cover

Percent recoveries (%R) for a laboratory control sample and a matrix spike sample were recalculated using the following formula:

$$\%R = \frac{Found}{True} \times 100$$

Where, Found = concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result).
True = concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

$$RPD = \frac{|S-D|}{(S+D)/2} \times 100$$

Where, S = Original sample concentration
D = Duplicate sample concentration

| Sample ID | Type of Analysis | Element | Found / S (units) | True / D (units) | Recalculated %R / ~~RPD~~ RSD | Reported %R / ~~RPD~~ RSD | Acceptable (Y/N) |
|---|---|---|---|---|---|---|---|
| LCS | Laboratory control sample | Fat | 7.5 | 10.17 | 74 | — | Y |
| — | Matrix spike sample | | (SSR-SR) | | | | |
| 11/12 | ~~Duplicate~~ sample Triplicate | % Lipids | 0.5 | 0.5<br>0.4 | 15 | 15 | Y |

Comments: Refer to appropriate worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

TOTCLC.6

LDC #: 26278B6

# VALIDATION FINDINGS WORKSHEET
## Sample Calculation Verification

Page: 1 of 1
Reviewer: CR
2nd reviewer: [illegible]

METHOD: Inorganics, Method See cover

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Have results been reported and calculated correctly?
Y N N/A Are results within the calibrated range of the instruments?
Y N N/A Are all detection limits below the CRQL?

Compound (analyte) results for %Lipids reported with a positive detect were recalculated and verified using the following equation:

Concentration =

$$\frac{\text{Dish/Lipids} - \text{Dish}}{\text{Wet wt.}} \times 100$$

Recalculation:

$$\frac{1.343g - 1.331g}{2.26g} \times 100 = 0.53\%$$

| # | Sample ID | Analyte | Reported Concentration ( % ) | Calculated Concentration ( % ) | Acceptable (Y/N) |
|---|---|---|---|---|---|
| | 3 | %Lipids | 0.53 | 0.53 | Y |
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Note:

RECALC.6

# Percent Moisture

**Laboratory Data Consultants, Inc.**

**7750 El Camino Real, Ste. 2L Carlsbad, CA 92009**

**Phone** 760.634.0437 **Web** www.lab-data.com **Fax** 760.634.0439

Windward Environmental, LLC
200 West Mercer Street, Suite 401
Seattle, WA 98119
ATTN: Ms. Jennifer Parker

October 13, 2011

SUBJECT: Lower Passaic River Restoration Project, Data Validation

Dear Ms. Parker,

Enclosed are the final validation reports for the fractions listed below. This SDG was received on September 28, 2011. Attachment 1 is a summary of the samples that were reviewed for each analysis.

**LDC Project # 26311:**

| SDG # | Fraction |
|---|---|
| L1110328 | Semivolatiles, Polynuclear Aromatic Hydrocarbons, Polychlorinated Biphenyls, Percent Moisture |

The data validation was performed under EPA Level IV guidelines. The analyses were validated using the following documents, as applicable to each method:

- Final Surface Sediment Chemical Analyses and Benthic Invertebrate Toxicity and Bioaccumulation Testing Quality Assurance Project Plan (QAPP) for the Lower Passaic River Restoration Project, October 2009
- Caged Bivalve Study Addendum, March 2011
- USEPA Region II Validation SOP HW-22, (Revision 2, June 2001) for Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry SW-846 method 8270C, modified as necessary to accommodate the QAPP criteria
- USEPA Region II Validation SOP HW-45, (Revision 1, October 2006) for Polychlorinated Biphenyls by Gas Chromatography SW-846 method 8082, modified as necessary to accommodate the QAPP criteria
- USEPA, Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review, June 2008
- USEPA, Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review, January 2010

Please feel free to contact us if you have any questions.

Sincerely,

Stella Cuenco

Stella S. Cuenco
Data Validation Operations Manager/Senior Chemist

V:\LOGIN\Windward\Passaic\26311COV.wpd

Attachment 1

| EDD | LDC #26311 (Windward Environmental, LLC - Seattle WA / Lower Passaic River Restoration Project) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | PO# 2011-0012 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LDC | SDG# | DATE REC'D | (3) DATE DUE | SVOA (8270C | | PAHs (8270C -SIM) | | PCBs (8082) | | % Moist. (2540G) | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Matrix: Water/Tissue | | | | W | T | W | T | W | T | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S |
| A | L1110328 | 09/28/11 | 10/19/11 | 1 | 10 | 1 | 10 | 1 | 10 | 0 | 10 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total | T/SC | | | 1 | 10 | 1 | 10 | 1 | 10 | 0 | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 43 |

For Internal Use Only: Shaded cells indicate Level IV validation (all other cells are Level III validation). These sample counts do not include MS/MSD, and DUPs

26311ST.wpd

# Laboratory Data Consultants, Inc.
# Data Validation Report

| | |
|---|---|
| **Project/Site Name:** | Lower Passaic River Restoration Project |
| **Collection Date:** | March 8 through June 8, 2011 |
| **LDC Report Date:** | October 11, 2011 |
| **Matrix:** | Tissue |
| **Parameters:** | Percent Moisture |
| **Validation Level:** | EPA Level IV |
| **Laboratory:** | Alpha Analytical, Inc. |
| **Sample Delivery Group (SDG):** | L1110328 |

**Sample Identification**

LPR6-ECST-Comp01
LPRBG-ECST-Comp01
LPR6-ECST-Comp02
LPR7-ECST-Comp03
LPR7-ECST-Comp04
LPR8-ECST-Comp05
LPR1-GDST-Comp01
LPRBG-GDST-Comp01
LPR2-GDST-Comp02
LPR3-GDST-Comp03
LPR6-ECST-Comp01DUP

## Introduction

This data review covers 11 tissue samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per Standard Method 2540G for Percent Moisture.

This review follows the Final Surface Sediment Chemical Analyses and Benthic Invertebrate Toxicity and Bioaccumulation Testing Quality Assurance Project Plan (QAPP) for the Lower Passaic River Restoration Project, (October 8, 2009), the Caged Bivalve Study Addendum (March 2, 2011), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review (January 2010).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

NJ Presumptive evidence of presence of the compound at an estimated quantity.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

## I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

## II. Initial Calibration

All criteria for the initial calibration were met.

## III. Calibration Verification

Calibration verification frequency and analysis criteria were met.

## IV. Blanks

Method blank sample analyses were not required by the method.

No field blanks were identified in this SDG.

## V. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) analyses were not required by the method.

## VI. Duplicates

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Results were within QC limits.

## VII. Laboratory Control Samples (LCS)

Laboratory control samples are not required by the method.

## VIII. Sample Result Verification

All sample result verifications were acceptable.

## IX. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

## X. Field Duplicates

No field duplicates were identified in this SDG.

**Lower Passaic River Restoration Project**
**Percent Moisture - Data Qualification Summary - SDG L1110328**

No Sample Data Qualified in this SDG

**Lower Passaic River Restoration Project**
**Percent Moisture - Laboratory Blank Data Qualification Summary - SDG L1110328**

No Sample Data Qualified in this SDG

**Lower Passaic River Restoration Project**
**Percent Moisture - Field Blank Data Qualification Summary - SDG L1110328**

No Sample Data Qualified in this SDG

LDC #: 26311A6
SDG #: L1110328
Laboratory: Alpha Analytical

# VALIDATION COMPLETENESS WORKSHEET
Level IV

Date: 6-6-11
Page: 1 of 1
Reviewer:
2nd Reviewer:

**METHOD:** Percent Moisture (SM2540G)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

| | Validation Area | | Comments |
|---|---|---|---|
| I. | Technical holding times | A | Sampling dates: 3/8-6/8/11 |
| IIa. | Initial calibration | A | |
| IIb. | Calibration verification | A | |
| III. | Blanks | N | Not required |
| IV | Matrix Spike/Matrix Spike Duplicates | N | ↓ |
| V | Duplicates | A | Dup |
| VI. | Laboratory control samples | N | Not required |
| VII. | Sample result verification | A | |
| VIII. | Overall assessment of data | A | |
| IX. | Field duplicates | N | |
| X | Field blanks | N | |

Note: A = Acceptable
N = Not provided/applicable
SW = See worksheet
ND = No compounds detected
R = Rinsate
FB = Field blank
D = Duplicate
TB = Trip blank
EB = Equipment blank

Validated Samples: Tissue

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1 | LPR6-ECST-COMP01 | 11 | LPR6-ECST-COMP01DUP | 21 | | 31 | |
| 2 | LPRBG-ECST-COMP01 | 12 | | 22 | | 32 | |
| 3 | LPR6ECST-COMP02 | 13 | | 23 | | 33 | |
| 4 | LPR7-ECST-COMP03 | 14 | | 24 | | 34 | |
| 5 | LPR7-ECST-COMP04 | 15 | | 25 | | 35 | |
| 6 | LPR8-ECST-COMP05 | 16 | | 26 | | 36 | |
| 7 | LPR1-GDST-COMP01 | 17 | | 27 | | 37 | |
| 8 | LPRBG-GDST-COMP01 | 18 | | 28 | | 38 | |
| 9 | LPR2-GDST-COMP02 | 19 | | 29 | | 39 | |
| 10 | LPR3-GDST-COMP03 | 20 | | 30 | | 40 | |

Notes:

.DC #: 26311176

VALIDATION FINDINGS CHECKLIST


Reviewer: CR
2nd Reviewer: [illegible]

Method: Inorganics (EPA Method See cover)

| Validation Area | Yes | No | NA | Findings/Comments |
|---|---|---|---|---|
| *I. Technical holding times* | | | | |
| All technical holding times were met. | ✓ | | | |
| Cooler temperature criteria was met. | ✓ | | | |
| *II. Calibration* | | | | |
| Were all instruments calibrated daily, each set-up time? | ✓ | | | |
| Were the proper number of standards used? | ✓ | | | |
| Were all initial calibration correlation coefficients > 0.995? | | | ✓ | |
| Were all initial and continuing calibration verification %Rs within the 90-110% QC limits? | | | ✓ | |
| Were titrant checks performed as required? (Level IV only) | | | ✓ | |
| Were balance checks performed as required? (Level IV only) | ✓ | | | |
| *III. Blanks* | | | | |
| Was a method blank associated with every sample in this SDG? | | | ✓ | |
| Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet. | | | ✓ | |
| *IV. Matrix spike/Matrix spike duplicates and Duplicates* | | | | |
| Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water. | ✓ | | | |
| Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken. | | | ✓ | |
| Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of ≤ CRDL(≤ 2X CRDL for soil) was used for samples that were ≤ 5X the CRDL, including when only one of the duplicate sample values were < 5X the CRDL. | ✓ | | | |
| *V. Laboratory control samples* | | | | |
| Was an LCS anaylzed for this SDG? | | | ✓ | |
| Was an LCS analyzed per extraction batch? | | | ✓ | |
| Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% (85-115% for Method 300.0) QC limits? | | | ✓ | |
| *VI. Regional Quality Assurance and Quality Control* | | | | |
| Were performance evaluation (PE) samples performed? | | ✓ | | |
| Were the performance evaluation (PE) samples within the acceptance limits? | | | ✓ | |

LDC #: 26311A6

VALIDATION FINDINGS CHECKLIST


Reviewer: CR
2nd Reviewer: ✓

| Validation Area | Yes | No | NA | Findings/Comments |
|---|---|---|---|---|
| *VII. Sample Result Verification* | | | | |
| Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation? | ✓ | | | |
| Were detection limits < RL? | ✓ | | | |
| *VIII. Overall assessment of data* | | | | |
| Overall assessment of data was found to be acceptable. | ✓ | | | |
| *IX. Field duplicates* | | | | |
| Field duplicate pairs were identified in this SDG. | | ✓ | | |
| Target analytes were detected in the field duplicates. | | | ✓ | |
| *X. Field blanks* | | | | |
| Field blanks were identified in this SDG. | | ✓ | | |
| Target analytes were detected in the field blanks. | | | ✓ | |

LDC #: 20311/10

# VALIDATION FINDINGS WORKSHEET
## Level IV Recalculation Worksheet

Page: 1 of 1
Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Inorganics, Method See cover

Percent recoveries (%R) for a laboratory control sample and a matrix spike sample were recalculated using the following formula:

$\%R = \frac{Found}{True} \times 100$ Where, Found = concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result).
True = concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

$RPD = \frac{|S-D|}{(S+D)/2} \times 100$ Where, S = Original sample concentration
D = Duplicate sample concentration

| Sample ID | Type of Analysis | Element | Found / S (units) | True / D (units) | Recalculated %R / RPD | Reported %R / RPD | Acceptable (Y/N) |
|---|---|---|---|---|---|---|---|
| N | Laboratory control sample | | | | | | |
| N | Matrix spike sample | | (SSR-SR) | | | | |
| 11 | Duplicate sample | %Moist | 91.0 | 91.5 | 1 | 1 | Y |

Comments: Refer to appropriate worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

TOTCLC.6

LDC #: 26311A6

# VALIDATION FINDINGS WORKSHEET
## Sample Calculation Verification

Page: 1 of 1
Reviewer: CR
2nd reviewer: V

METHOD: Inorganics, Method See cover

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Have results been reported and calculated correctly?
Y N N/A Are results within the calibrated range of the instruments?
Y N N/A Are all detection limits below the CRQL?

Compound (analyte) results for % Moisture reported with a positive detecl were recalculated and verified using the following equation:

Concentration =

$$100 - \frac{\text{Dry Wt} - \text{Tare}}{\text{Wet Wt} - \text{Tare}} \times 100$$

Recalculation:

$$100 - \frac{1.45g - 1.26g}{3.38g - 1.26g} \times 100 = 91.0\%$$

| # | Sample ID | Analyte | Reported Concentration (%) | Calculated Concentration (%) | Acceptable (Y/N) |
|---|---|---|---|---|---|
| | 1 | % Moisture | 91.0% | 91.0 | Y |
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Note:

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# APPENDIX P. COMPARISON OF LABORATORY REPORTING LIMITS WITH DATA QUALITY LEVELS

# 1 Introduction

Data quality levels (DQLs) for bivalve tissue were provided in the *Lower Passaic River Restoration Project Quality Assurance Project Plan: Surface Sediment Chemical Analysis and Benthic Invertebrate Toxicity and Bioaccumulation Testing* (Windward 2009), hereafter referred to as the Benthic QAPP and the *Lower Passaic River Restoration Project Quality Assurance Project Plan: Caged Bivalve Study Addendum to the Quality Assurance Project Plan: Surface Sediment Chemical Analyses and Benthic Invertebrate Toxicity and Bioaccumulation Testing, Addendum No. 4,* hereafter referred to as the Benthic QAPP Addendum No. 4 (Windward 2011). Bivalve tissue DQLs were based on the lowest available ecological tissue thresholds based on tissue-residue toxicity reference values (TRVs) (if available); TRVs included those derived for the protection of benthos and fish, as well as dietary TRVs for the protection of wildlife receptors. Attachment K of the Benthic QAPP provides the values used to derive DQLs. The DQLs are analytical goals that were provided in the Benthic QAPP and Benthic QAPP Addendum No. 4 solely for the purpose of evaluating laboratory analytical methods and achievable laboratory limits; DQLs are not project-specific screening levels or preliminary remediation goals (PRGs), and are not approved by the US Environmental Protection Agency (USEPA) as the appropriate risk assessment criteria for this project.

Table 1 presents a summary of the chemicals for which benthic tissue laboratory reporting limits (RLs) exceed the DQLs provided in the Benthic QAPP (Windward 2009) and Benthic QAPP Addendum No. 4 (Windward 2011). As noted in Worksheet No. 15 of the Benthic QAPP and Benthic QAPP Addendum No. 4, exceedances of DQLs were expected for a number of chemicals. However, RL exceedances of DQLs were not expected for di-n-butylphthalate (Table 1).

**Table 1. Summary of results for chemicals that have RLs that exceed DQL in bivalve tissue**

| Parameter | N | No. of Detects | Range of Detected Values | No. of Non-Detects | Range of RLs | DQL[a] | No. of RLs > DQL | DQL exceedance expected per QAPP[b]? |
|---|---|---|---|---|---|---|---|---|
| **SVOCs (µg/kg)** | | | | | | | | |
| Bis-(2-ethylhexyl)phthalate | 10 | 1 | 1,600 | 9 | 900 – 950 | 390 | 9 | Yes |
| Di-n-butylphthalate | 10 | 0 | na | 10 | 900 – 950 | 500 | 10 | **No** |

**Bold** indicates cases wherein the laboratory detection limits were not expected to exceed the DQL based on the MDLs and QLs presented in the Benthic QAPP (Windward 2009) and Benthic QAPP Addendum No. 4 (Windward 2011).

[a] Bivalve tissue DQLs presented in the Benthic QAPP (Windward 2009) and Benthic QAPP Addendum No. 4 (Windward 2011) are based on the lowest available ecological tissue thresholds based on tissue residue TRVs (if available); TRVs included those derived for the protection of benthos and fish, as well as dietary TRVs for the protection of wildlife receptors. Attachment K of the Benthic QAPP provides the values used to derive DQLs. The DQLs are analytical goals that were provided in the Benthic QAPP solely for the purpose of evaluating laboratory analytical methods and achievable laboratory limits; DQLs are not project-specific screening levels or PRGs and are not approved by the USEPA as the appropriate risk assessment criteria for this project.

[b] Column indicates whether the laboratory detection limits were expected to exceed the DQL based on the MDLs and QLs presented in the Benthic QAPP (Windward 2009) and Benthic QAPP Addendum No. 4 (Windward 2011).

DQL – data quality level
MDL – method detection limit
N – number of samples
na – not applicable
PRG – preliminary remediation goal
QAPP – quality assurance project plan
QL – quantitation limit
RL – reporting limit
SVOC – semivolatile organic compound
TRV – toxicity reference value
USEPA – US Environmental Protection Agency

# 2 References


Windward. 2009. Lower Passaic River Restoration Project. Lower Passaic River Study Area RI/FS. Quality Assurance Project Plan: Surface sediment chemical analyses and benthic invertebrate toxicity and bioaccumulation testing. Final. Prepared for Cooperating Parties Group, Newark, New Jersey. Windward Environmental LLC, Seattle, WA.

Windward. 2011. Lower Passaic River Restoration Project. Lower Passaic River Study Area RI/FS. Caged bivalve study. Addendum to the Quality Assurance Project Plan: Surface sediment chemical analyses and benthic invertebrate toxicity and bioaccumulation testing. Addendum No. 4. Final. Prepared for Cooperating Parties Group, Newark, NJ. March 2, 2011. Windward Environmental LLC, Seattle, WA.