Weston Solutions, Inc.
Suite 201
1090 King Georges Post Road
Edison, New Jersey 08837-3703
732-585-4400 • Fax: 732-225-7037
www.westonsolutions.com

The Trusted Integrator for Sustainable Solutions

REMOVAL SUPPORT TEAM 3
EPA CONTRACT EP-S2-14-01

June 5, 2017

Mr. Cris D'Onofrio, On-Scene Coordinator
U.S. Environmental Protection Agency
Response & Prevention Branch
2890 Woodbridge Avenue
Edison, NJ 08837

EPA CONTRACT No.: EP-S2-14-01
TDD No.: TO-0007-0018
DOCUMENT CONTROL No.: RST3-03-D-0138
SUBJECT: FINAL EMERGENCY REMOVAL ACTION REPORT, REVISION 3 GREENLEAFE DRIVE MERCURY RESPONSE SITE, LYSANDER, ONONDAGA COUNTY, NEW YORK

Dear Mr. D'Onofrio,

Enclosed please find the Final Emergency Removal Action Report, Revision 3 which summarizes the activities conducted at the Greenleafe Drive Mercury Response Site located in Lysander, Onondaga County, New York on April 9, 2016 through May 22, 2016. The comments made by EPA to the final Revision 2 version (DCN: RST3-03-F-0135) of this report have been incorporated.

If you have any questions or comments, please contact me at (908) 565-2987

Sincerely,

WESTON SOLUTIONS, INC.

Michael Beuthe
RST 3 Site Project Manager

Enclosure
cc: TDD File: TO-0007-0018

FINAL EMERGENCY REMOVAL ACTION REPORT, REVISION 3

GREENLEAFE DRIVE MERCURY RESPONSE SITE
GREENLEAFE DRIVE, LYSANDER,
ONONDAGA COUNTY, NEW YORK

DC No: RST3-03-D-0138
TDD No: TO-0007-0018
EPA CONTRACT No: EP-S2-14-01

Prepared for:

U.S. Environmental Protection Agency
Region II – Removal Action Branch
2890 Woodbridge Avenue
Edison, New Jersey 08837

Prepared by:

Removal Support Team 3
Weston Solutions, Inc.
East Division
Edison, New Jersey 08837

June 2017

TABLE OF CONTENTS

1.0 INTRODUCTION 1

1.1 Site Location and Background 1

2.0 SCOPE OF WORK 3

2.1 Pre-Mobilization Activities 4

2.2 Key On-Site Personnel 4

2.3 Indoor Air Monitoring and Sampling 5

2.3.1 Indoor Air Monitoring 5

2.3.2 ERT Clearance Sampling and Results 5

2.4 Remediation, Restoration, and Waste Disposal 5

2.4.1 Property-Specific Remediation and Restoration 6

2.4.2 Documentation of Items for Disposal 7

2.4.3 Soil Removal and Restoration 7

2.4.4 Waste Disposal 8

2.5 Post-Excavation Soil Screening and Sampling 8

LIST OF ATTACHMENTS

Attachment A:	Figure 1A: Site Location Map Figure 1B: Area of Concern Map Figure 2A: Post-Excavation Soil Sample Locations and Excavated Areas-Property 1 Figure 2B: Post-Excavation Soil Sample Locations and Excavated Areas-Property 2
Attachment B:	Table 1: Post-Excavation Soil Sample Collection and Validated Analytical Results Summary Table Table 2: Waste Transportation and Disposal Summary Table
Attachment C:	EPA Action Memorandum
Attachment D:	Photographic Documentation of Site Activities

LIST OF APPENDICES (On Disk)

Appendix A:	Site-Specific Health and Safety Plan
Appendix B:	Site-Specific UFP Quality Assurance Project Plan
Appendix C:	Chain of Custody Records
Appendix D:	Validated Analytical Data Package: ERT Clearance Air Samples
Appendix E:	Validated Analytical Data Package: Post-Excavation Soil Samples
Appendix F:	Waste Disposal Manifests
Appendix G:	Lumex Screening Results Summary Table
Appendix H:	Chemical-Specific Health Consultation for Joint EPA/ATSDR National Mercury Cleanup Policy Workbook
Appendix I:	Draft National Mercury Response Guidebook

1.0 - INTRODUCTION

This Emergency Removal Action Report describes the actions taken during the Emergency Response and Removal Action conducted from April 9, 2016 through May 22, 2016 by the U.S. Environmental Protection Agency (EPA) Region II Response & Prevention Branch with the support of Weston Solutions, Inc., Removal Support Team 3 (RST 3) to clean-up mercury contamination in residential homes resulting from spill of elemental mercury which was stored in a glass jar in one of the affected residences at the Greenleafe Drive Mercury Response Site (the Site). This report also summarizes the activities undertaken to implement the Emergency Removal Action, which includes indoor air monitoring, screening and remediation of personal belongings, soil screening, post-excavation soil sampling, restoration of properties, documentation of items for disposal, and the disposal of contaminated soil, debris, and personal items.

1.1 – Site Location and Background

The Site consists of four properties located on Greenleafe Drive in Lysander, Onondaga County, New York. For privacy reasons and reporting purposes, the four properties are identified in this report as Property 1 through Property 4. Refer to Figure 1A: Site Location Map and Figure 1B: Area of Concern Map.

- **Property 1:** This property is located on the west side of Greenleafe Drive and it was originally contaminated when three children, including one 12 year-old resident, and one 8 year-old and one 13 year-old from the neighborhood, played with mercury in the driveway and garage. The mercury was unknowingly tracked inside the home, reportedly by the first responders during the initial attempt to recover the mercury, and later likely by the family through their daily activities while occupying the home.
- **Property 2:** This property was the source of the mercury and is located on the east side of Greenleafe Drive and approximately three residential properties to the north of Property 1. The mercury was reportedly stored in the garage where the 8-year-old resident discovered it on a shelf and carried it to the driveway and front yard where he and a second non-resident 13 year-old child played with it. Visible puddles and beads of mercury were originally reported to be present in the driveway and along the front sidewalk by the New York State Department of Environmental Conservation (NYSDEC) responder and the NYSDEC contractor, NRC Environmental Services, Inc. (NRC).
- **Property 3:** This property is located on the east side of Greenleafe Drive and two properties to the north of Property 2. It became contaminated when a 13 year-old resident tracked the mercury into the home after playing with it at Properties 1 and 2. Mercury contamination was discovered inside the garage at the stairs leading into the house, in the kitchen, on the stairs leading to the second floor, and in the second floor bedrooms. The resident and other children involved reportedly did not play with mercury at this property.
- **Property 4:** This property was not affected by the mercury release and was used for establishing background mercury vapor levels in indoor air.

On April 5, 2016, an 8 year-old boy residing at Property 2 obtained a jar of liquid mercury that was being stored in his mother's garage. According to the boy's mother, the mercury belonged to his grandfather who was a chemist. At approximately 7:00 pm the 8 year-old boy and another 13 year-old boy brought the jar of mercury to Property 1 to show to a 12 year-old boy residing at that property. Without the knowledge of their parents, the three boys began to play with the mercury in the garage, throwing it at each other and releasing the mercury onto the floor and walls. The boys contaminated the garage, driveway, and their shoes and clothing. Once aware of the situation, the residing parents of Property 1 began to collect the mercury beads from the garage and driveway with eye droppers. The 8 and 13 year-old boys left Property 1 and returned to their homes, Properties 2 and 3, respectively, between 0700 - 0730 hours. Upon returning to their respective residences, the boys tracked the mercury into their homes through their contaminated shoes and clothing.

The resident parents of Property 1 removed their son's clothing and shoes and had him take a shower. According to these parents, they researched the effects of mercury and then contacted the Poison Control Center (PCC) between 0900 – 0930 hours. They were instructed by the PCC to call 911, NYSDEC, and the Center for Disease Control (CDC). Within approximately 15 minutes, the City of Phoenix police department, fire department, and ambulance services arrived on-scene. Using a broom, the fire department reportedly swept visible mercury beads and collected them in a plastic bag. Efforts to sweep mercury from the garage and driveway allegedly caused some of it to scatter into the driveway and surrounding mulch area. Thereafter, when the first responders thought the recovery was as complete as feasible, the property owners were instructed to go back into their home for the night.

On April 6, 2016, after observing that small mercury beads were still present throughout the garage floor, the residents at Property 1 contacted the NYSDEC Region 7 Office, as well as the Onondaga Department of Health (DOH). The NYSDEC and their remediation contractor, NRC, responded immediately. NRC advised the family to evacuate the home, placed a tarp over the driveway, and conducted indoor air monitoring for mercury vapor using a Jerome Mercury Vapor Analyzer (MVA). The mercury vapor readings inside the house ranged from 0.1 to 0.6 milligrams per cubic meter (mg/m^3) and were highest in the son's bedroom and the lower first floor portion of the home.

On April 7, 2016, the NYSDEC and NRC returned to Property 1 and continued remediating the affected areas and items within the property, including inside of the home, garage, driveway, and personal items. Remediation activities involved utilizing a mercury vacuum to capture mercury beads at the affected areas within the property and continuous ventilation of all living spaces within the home. A Jerome MVA was utilized throughout the remediation process to monitor the indoor air for mercury vapor. When the Jerome MVA no longer detected mercury vapor inside the home, the residents were informed by NYSDEC to return to their home and instructed to keep the windows open in order to facilitate circulation of fresh air within the home. The family moved back into their home with the exception of their 2 year-old daughter who was allowed back in after NRC completed additional testing of the home later that day. Concurrently, NRC initiated cleanups at Property 2 and Property 3 where the boys had tracked the mercury onto the properties and into their homes. At Property 2, the origin of the mercury release, NRC attempted remediation of the driveway and part of the lawn which was covered with snow. The resident did not evacuate her home and allegedly denied NYSDEC and their contractor access to the interior of the home.

At Property 3, the shoes and clothing worn by the resident boy when he played and tracked the mercury home was placed in a plastic bag, sealed, and handed to NYSDEC personnel. The NYSDEC used a Jerome MVA to conduct air monitoring for mercury vapor in the home, driveway and garage, and determined that a cleanup was not required since mercury vapor was not detected by the Jerome MVA. The residents were not required to evacuate their home.

On April 8, 2016, NYSDEC contacted the EPA and requested air monitoring support with more sensitive monitoring equipment. At approximately 1850 hours RST 3 was activated by EPA Regional Emergency Operations Center (REOC) to provide emergency response assistance to EPA at the scene of the mercury spill. On April 9, 2016, RST 3 mobilized two Core Response Team (CRT) members to the scene of the incident, primarily to conduct mercury vapor monitoring for the duration of emergency response, and subsequently, during removal action activities.

On April 20, 2016, when it became evident that cross-contamination of mercury within Property 1 had been more extensive than originally believed, the NYSDEC formally requested EPA's assistance to conduct a Removal Action under CERCLA. Upon receiving verbal authorization of funding on April 21, 2016, EPA assumed responsibility as the lead agency to conduct the Removal Action. On April 22, 2016, EPA received a written confirmation of verbal authorization for an Emergency Removal Action at the Site and EPA's Emergency and Rapid Response Services (ERRS) contractor Environmental Restoration, LLC (ER) arrived on-site and assumed remediation responsibilities as the lead agency. On May 9, 2016, EPA received a second written confirmation of verbal authorization for an increase in funding for an Emergency Removal Action under CERCLA. Refer to Attachment C: EPA Action Memorandum.

2.0 – SCOPE OF WORK

During the Emergency Response, RST 3 was tasked by EPA to conduct indoor air monitoring for mercury vapor with Lumex RA-915^{+} MVA (Lumex), serial numbers (Nos.) 1281, 1210, and 0914 and document the Lumex readings in a site-specific database. The purpose of the indoor air monitoring was to determine if mercury vapor concentrations inside the homes on Properties 1 and 2 were below the EPA site-specific re-occupancy Action Level of 1 microgram per cubic meter ($\mu g/m^3$) following NYSDEC and NRC remediation efforts. RST 3 was also tasked with photographic documentation of on-site operations and activities and notations in a Site log book.

As part of Removal Action activities, RST 3 was tasked by EPA to continue indoor air monitoring and documentation of site activities, including utilizing the Lumex to screen personal belongings for mercury vapor and documenting the readings to facilitate sorting of salvageable items for remediation and/or disposal, and utilizing the Lumex to perform field screening of soil for mercury vapor and post-excavation soil sampling.

In order to accomplish this scope of work, the EPA On-Scene Coordinator (OSC) utilized the guidance stipulated in the *Chemical-Specific Health Consultation for Joint EPA/ASTDR National Mercury Cleanup Policy Workgroup Action Levels for Elemental Mercury Spills* to establish a re-occupancy action level of 1 $\mu g/m^3$, a Reference Concentration (RfC) of 0.3 $\mu g/m^3$, and a disposal action level of 6 micrograms per kilogram ($\mu g/kg$). Since all Lumex screening readings were recorded in nanograms per cubic meter (ng/m^3) the RfC and the disposal action level are also reported in ng/m^3 throughout the remainder of this report.

Refer to Attachment D: Photographic Documentation of Site Activities, Appendix A: Site-Specific Health and Safety Plan, Appendix G: Lumex Screening Results Summary Table, Appendix H: *Chemical-Specific Health Consultation for Joint EPA/ATSDR National Mercury Cleanup Policy Workbook*, and Appendix I: *Draft National Mercury Response Guidebook.*

2.1 – Pre-Mobilization Activities

Prior to mobilizing to the Site, a Site-Specific Health and Safety Plan (HASP) as well as a Site-Specific Uniform Federal Policy (UFP) Quality Assurance Project Plan (QAPP) were prepared by RST 3 and approved by the EPA OSC. The HASP outlined the safety procedures for all of the activities that could be performed on-site by RST 3 personnel. The QAPP provided guidelines for field sampling techniques and procedures. RST 3 mobilized to the site on April 9, 2016.

Refer to Appendix A: Site-Specific Health and Safety Plan and Appendix B: Site-Specific UFP Quality Assurance Project Plan.

2.2 – Key On-Site Personnel

Name	Representing	Duties On-Site
Cris D'Onofrio	EPA, Region II	On-Scene Coordinator
Dwayne Harrington	EPA, Region II	On-Scene Coordinator
Stephanie Fitzgerald	NYSDEC	Spill Engineer
Michael Beuthe	RST 3	Site Project Manager, Site Health & Safety, Site QA/QC, Lumex Screening and Documentation
Michael Mannino	RST 3	Lumex Screening and Documentation
Michael Garibaldi	RST 3	Lumex Screening and Documentation
Kathryn Donohue	RST 3	Sample Collection, Sample Management, Lumex Screening and Documentation
Patrick Ahern	RST 3	Lumex Screening and Documentation
Kyle Schweitzer	Weston Solutions	Lumex Screening and Documentation
Matthew Kaplan	Weston Solutions	Lumex Screening and Documentation
Tamara Mitchell	Weston Solutions	Lumex Screening and Documentation
Eric Hascall	Weston Solutions	Lumex Screening and Documentation
Dennis Wilson	Environmental Restoration (ER)	Response Manager
David Jordan	ER	Equipment Operator
Michael Mallard	ER	Equipment Operator
Alex Collins	ER	Environmental Technician
Tom Covert	ER	Environmental Technician
Seaver Dunn	ER	Environmental Technician
Joseph Feneck	ER	Environmental Technician
Babila Fonkem	ER	Environmental Technician
Michael Sanderson	ER	Environmental Technician
Carlos Soriano	ER	Environmental Technician
Marshall Vestal	ER	Environmental Technician

2.3 – Indoor Air Monitoring and Sampling

2.3.1 – Indoor Monitoring

Throughout the Emergency Response and the Removal Action, RST 3 conducted indoor air monitoring for mercury vapor with a Lumex in order to evaluate the progress of the remediation activities being conducted by ERRS and NRC, identify potential mercury source areas within the impacted homes, and to determine when mercury vapor concentrations throughout the homes reached the re-occupancy action level of 1,000 ng/m^3. On April 9, 2016, RST 3 conducted indoor air monitoring at an unaffected property (Property 4) in order to establish background levels of mercury vapor in indoor air. Indoor air monitoring was conducted at Property 1, Property 2, and Property 3, before, during, and after remediation activities in order to track the progress of remediation efforts. Lumex readings were collected in multiple locations in each room of each home in order to accurately document air monitoring and screening results. All air monitoring readings were recorded in a site-specific database.

Refer to Attachment D: Photographic Documentation of Site Activities and Appendix G: Lumex Screening Results Summary Table.

2.3.2 – ERT Clearance Sampling and Results

Clearance sampling was conducted after several rounds of remediation and iterative screening with the Lumex. Once all mercury sources were identified and remediated to the greatest extent possible, each of the homes were subjected to heating and ventilating cycles to reduce mercury levels as much as feasible prior to collecting clearance air samples. On May 5, 2016, The EPA Environmental Response Team (ERT) and their contractor, Scientific, Engineering, Response & Analytical Services (SERAS), mobilized to the Site to collect clearance air samples from Property 1, Property 2, and Property 3. Prior to sampling, the homes were heated to approximately 90 °F using propane powered heaters. Anasorb 300 (SKC 226-17-1A) sorbent tubes were utilized as sampling media over an 8-hour period to collect indoor and ambient air samples at each property. Samples were delivered to the ERT/SERAS Laboratory for elemental mercury analysis.

Analytical results indicated the following ranges of mercury concentrations in the indoor air at each property as follows:

- Property 1: 0.124 – 0.144 micrograms per cubic meter (µg/m^3) (124 – 144 ng/m^3)
- Property 2: 0.0769 – 0.0798 µg /m^3 (76.9 - 79.8 ng/m^3)
- Property 3: 0.131 – 0.180 µg /m^3 (131 – 180 ng/m^3)

Based on the validated analytical results, mercury levels for indoor air were below the re-occupancy action level of 1,000 ng/m^3 in all samples collected.

Refer to Attachment D: Photographic Documentation of Site Activities and Appendix D: Validated Analytical Data Package: ERT Clearance Air Samples.

2.4 –Remediation, Restoration, and Disposal

Remediation activities conducted by ERRS during the removal action included heating the inside of homes using propane heaters, ventilating homes using flex duct, removal of porous materials, removal, remediation and/or disposal of impacted personal items, and contaminated soil removal.

RST 3 supported ERRS during remediation activities by conducting indoor air monitoring and screening personal items and soil with the Lumex. Decisions regarding the disposal of personal belongings were determined by the EPA OSC and EPA toxicologist. Generally, personal belongings indicating mercury vapor concentrations below the RfC of 300 ng/m^3 were considered salvageable, and personal belongings with mercury vapor concentrations exceeding the RfC were disposed. Some items, such as mattresses, were disposed of based on a combination of factors including the potential for contamination, the end use and associated potential for exposure to the residents, the difficulty in obtaining accurate Lumex screening readings and/or the level of effort required to remediate due to size, shape and material of construction.

Refer to Attachment D: Photographic Documentation of Site Activities

2.4.1 – Property-Specific Remediation and Restoration

Remediation and restoration during the Emergency Removal Action depended on the nature of the affected personal items and the extent of contamination at the impacted areas of each home. The following is a summary of the activities performed at each property:

Property 1: Large personal items including furniture and mattresses were wrapped in plastic and removed from every room in the home. Small personal items were placed into plastic bags which were sealed with duct tape. Personal items were then transported to a tent in the backyard until it could be screened with a Lumex. Each large personal item and each bag of smaller personal items were assigned a unique number and then heated to at least 90 °F prior to performing headspace screening (screening inside the plastic sheeting wrap) with a Lumex. Based on the Lumex readings, personal items were transported to a second tent and were sorted into four groups: less than 50 ng/m^3, 50-300 ng/m^3, 300-6,000 ng/m^3, and greater than 6,000 ng/m^3. Items placed in the less than 50 ng/m^3 group were considered to be near background levels, and were considered clean. Items in the 50-300 ng/m^3 group were still considered clean, but it was at the discretion of the EPA OSC and if items required further remediation. Items in the 300-6,000 ng/m^3 group were remediated to decrease mercury contamination. Items greater than 6,000 ng/m^3 were disposed of since they exceeded the disposal action level and EPA experience indicates that such items cannot be cost effectively remediated.

The HVAC system inside the home was shut off and windows were opened to vent mercury vapors. Initially, mercury vacuums were used to remove mercury beads from the hardwood floors and carpeting throughout the home. However, once the true level of contamination within the carpeting was understood, all of the carpeting was removed from the entire home (with the exception of the play room in the basement) based on the fact that mercury beads cannot be effectively removed from carpeting. Once the bulk of the mercury was removed, all surfaces were wiped down with sulfur containing mercury wipes as required to remove residual mercury. The home was subjected to several cycles of venting and heating with propane heaters to a temperature of at least 90 °F in order to drive off residual mercury from all surfaces and to help identify hot spots. Mercury wipes were used to address any hot spots found during the heating and ventilation cycles. Sealants were used as necessary to seal floor surfaces that contained trace levels of residual mercury that could not be cost effectively remediated further. The application of sealants ensured that air concentrations within the home would be maintained as low as feasible until passive remediation would allow the home to return to background levels.

The garage was the most highly impacted area of the home, and it was the source of the highest mercury vapor readings for indoor air. A mercury vacuum was used on the floor multiple times and the garage was subjected to several rounds of heating and ventilating until vapor levels stabilized at the lowest concentration achievable. Since mercury beads were trapped in cracks in the concrete, a sealant was applied to the floor to trap residual mercury that could not be further remediated in a cost effective manner. Contaminated sheet rock panels were removed and replaced and the garage floor was painted after the sealant was applied.

Since mercury had penetrated into cracks and crevices in the driveway and at the joint between the driveway and garage concrete floor, the driveway was excavated and removed with a mini excavator and later repaved. The soil next to the driveway was removed and replaced with clean fill. Contaminated plumbing traps for the sinks and showers were removed and replaced.

During the remediation of this property, the residents were re-located to a hotel for one month, and they re-occupied their home when clearance indoor air samples indicated mercury vapors were below the re-occupancy level of 1,000 ng/m^3.

Property 2: The container of mercury that was the source of this spill event originated from this property. EPA was granted access to the home to conduct cleanup activities approximately two weeks after initiating the removal action. Since the home was occupied by the residents during that time, there was a concern that mercury beads were scattered throughout the flooring and that the potential for cross contamination was high. However, upon investigation, it was determined that the high integrity of the wood flooring (tight joints and the good condition of the finish coat), had prevented deep contamination of the flooring. Based on a comprehensive mercury screening of the home interior, it was decided that much of the furniture and personal items in the home would not require removal. RST 3 screened bags of personal items, as well as pieces of furniture with a Lumex. Contaminated carpeting was removed from the entire second floor of the home, as well as the office on the first floor. A mercury vacuum was used to remove mercury contamination from the hardwood floors on the first floor and mercury wipes were used to clean potentially contaminated surfaces. Contaminated clothing, shoes and other personal items were removed from the home and remediated in heated tents as feasible and returned to the homeowner. Items that could not be remediated were disposed and replaced, including a contaminated couch and mattresses. The home interior was subjected to several cycles of heating, ventilating and screening with the Lumex to determine the effectiveness of remediation actions.

Based on indoor air readings, it was determined that remediation was not required in the basement except for the staircase where carpet was removed. Elemental mercury was also found in the garage, in the soil next to the driveway, and on the outside walkway leading to the front door. A mercury vacuum was used on the garage floor and a sealant was applied to trap any residual mercury beads that could not be effectively removed by vacuum. The contaminated front walkway was removed along with contaminated soil found next to the driveway and walkway. Excavated soils were replaced with clean fill and walkway pavers were replaced.

The residents were temporarily relocated to a hotel for two weeks during the remediation and were allowed to re-occupy their home when results from the indoor air clearance samples indicated mercury vapors were below the re-occupancy action level of 1,000 ng/m^3.

Property 3: This property was the least impacted of the three homes. Mercury was tracked into the home by the son of the property owners through his shoes and clothes. A mercury vacuum was used to remove mercury from the hardwood floors in the kitchen, the first floor hallway, and to try to remediate the carpeting on the second floor of the home. Carpeting was eventually removed from the entire second floor of the home, as well as in the living room after vacuuming produced unsuccessful results. The home was heated and vented several times to remove any residual mercury vapors from contaminated surfaces and the indoor air. Large pieces of furniture, such as beds, dressers, and sofas were retained in the home. Some personal items, including articles of clothing which indicated high mercury vapor readings were disposed. Mercury contamination found in the clothes washer and dryer could not be cost effectively remediated. These items were therefore removed from the home and replaced.

During the remediation, the residents were relocated to a hotel. The family was allowed to re-occupy their home when indoor air clearance samples indicated mercury vapor was below the re-occupancy action level of 1,000 ng/$m^{3.}$

Refer to Attachment D: Photographic Documentation of Site Activities and Appendix G: Lumex Screening Results Summary Table.

2.4.2 – Documentation of Items for Disposal

RST 3 documented items for disposal in a site-specific database and through photographic documentation. Items were separated into two categories: above the RfC of 300 ng/m^3 and below the RfC of 300 ng/m^3. All personal belongings, including bags, pieces of furniture, or other large items removed from inside the homes were spread out on plastic sheeting, segregated, assigned an identifying number and photo-documented. At the EPA OSC's request, only items that exceeded the RfC of 300 ng/m^3 were individually photo-documented, as these items were to be appraised for potential compensation to the homeowners.

Refer to Attachment D: Photographic Documentation of Site Activities and Appendix G: Lumex Screening Results Summary Table.

2.4.3 – Soil Removal and Restoration

Soils suspected of mercury contamination were screened using a Lumex. Modified plastic bins (bins with a hole drilled in them to provide a sampling port) were placed upside down in a grid pattern in areas of suspected soil contamination. The bins were allowed to heat in the sun to increase the potential of trapping mercury vapors in the headspace, and the headspace was screened using the Lumex. Soils exhibiting elevated mercury readings were excavated (after any visible mercury beads were collected) and removed from Property 1 and Property 2. Contaminated soil was consolidated into plastic bags and disposed of in a roll-off container which was transported to an off-site disposal facility. At Property 1, soil was removed in the garden bed area next to the driveway and basketball hoop, as well as directly in front of the gate entrance to the back yard. At Property 2, soil was removed from areas adjacent the driveway near the fence entrance to the backyard, as well as areas surrounding the front walkway. In addition, soil present underneath the paver walkway was removed following removal of the pavers. RST 3 used a Lumex to screen soil for mercury before, during, and after soil removal in order to track the progress of the remediation effort.

Refer to Attachment A, Figure 2A: Post-Excavation Soil Sample Locations and Excavated Areas-Property 1 and Figure 2B: Post-Excavation Soil Sample Locations and Excavated Areas-Property 2, and Attachment D: Photographic Documentation of Site Activities.

2.4.4 – Waste Disposal

Soils, asphalt and household debris were sampled and tested for disposal characteristics to determine their status as a Resource Conservation and Recovery Act (RCRA) hazardous waste. A total of 22.33 tons of asphalt debris was transported off site for disposal as a non-RCRA regulated material to the Seneca Meadows Inc. landfill in Waterloo, New York.

A total of 7.53 tons of contaminated soil was transported off site for disposal as a non-RCRA regulated material to the Seneca Meadows Inc. landfill in Waterloo, New York.

A total of 19.15 tons of household debris were transported as a non-RCRA regulated material, for off-site disposal to the Seneca Meadows Inc. landfill in Waterloo, New York.

A total of 7 pounds of metallic mercury mixed with debris was transported off site for reclamation as a RCRA regulated hazardous waste, to the AERC COM, Inc., facility located in Allentown, Pennsylvania.

Refer to Attachment B, Table 2: Waste Transportation and Disposal Summary Table and Appendix F: Waste Disposal Manifests.

2.5 – Post Excavation Soil Screening and Sampling

A total of six post excavation soil screening locations were selected by the EPA OSC at Property 1 and Property 2, respectively. On May 20 and 22, 2016, RST 3 collected five-point composite soil samples at each location and placed them in re-sealable plastic bags. Each bagged soil sample was heated to approximately 90°F and then screened for mercury vapor with a Lumex. Based on the Lumex screening results, 6 post excavation soil samples, including one field duplicate and one matrix spike/matrix spike duplicate (MS/MSD) were collected from two sample locations at Property 1 and three sample locations at Property 2. The soil samples were collected using dedicated disposable plastic scoops. Fresh nitrile gloves were donned between sample locations and the soil samples were homogenized prior to being placed into laboratory glassware. All the soil samples were stored on ice after collection. On May 22, 2016, RST 3 hand-delivered all six post-excavation soil samples to the EPA Division of Environmental Sciences and Assessment (DESA) laboratory under chain of custody (COC) record number: 2-052216-173612-0001 for mercury analysis.

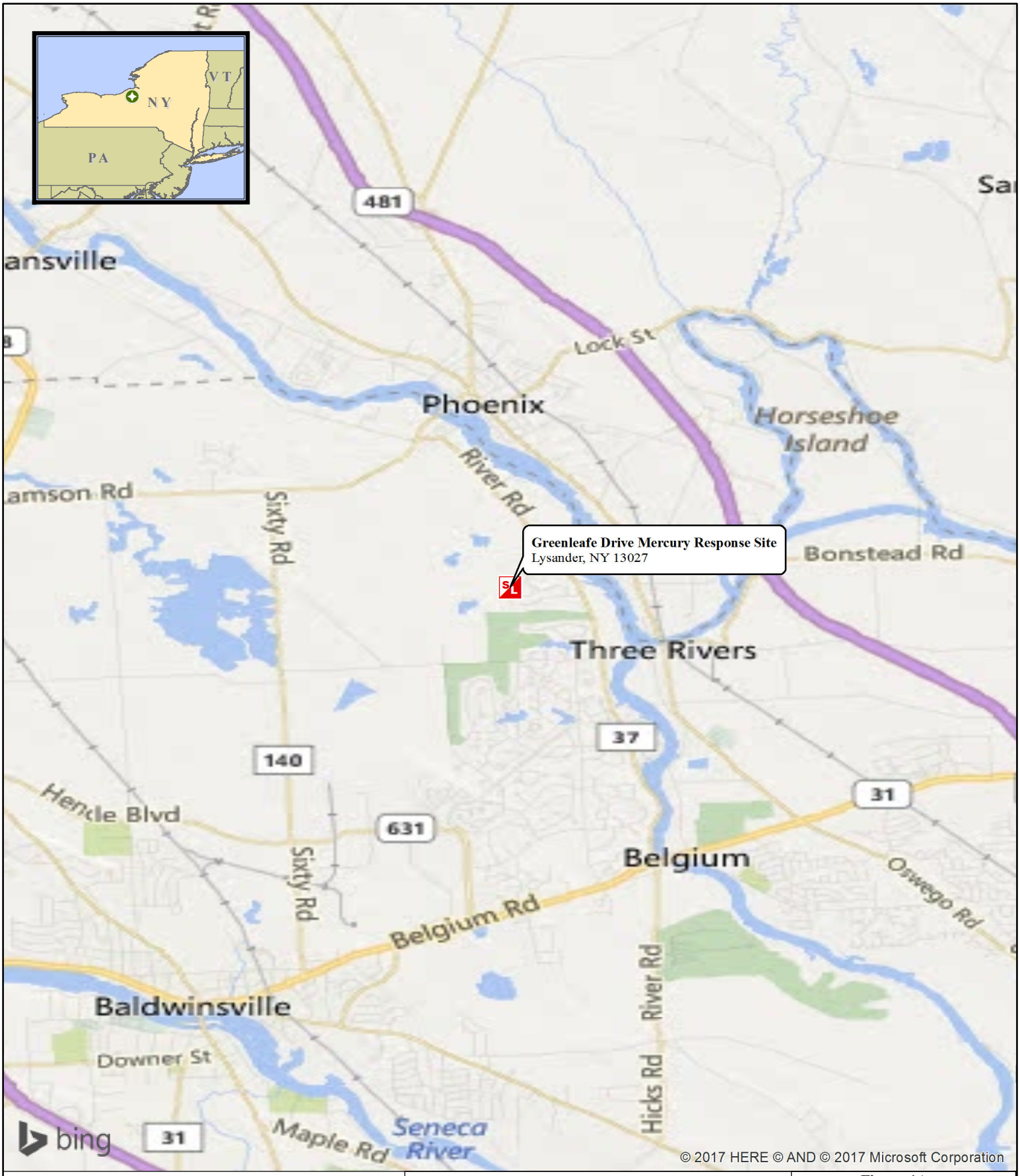
Refer to Attachment D: Photographic Documentation of Site Activities and Appendix C: Chain of Custody Record.

All post excavation soil samples were compared against the EPA Removal Management Level (RML) of 11 milligrams per kilogram (mg/kg) for mercury in residential soil. Mercury concentrations in all soil samples collected ranged from non-detect to 0.087 mg/kg. Based upon the validated soil analytical results, mercury was not detected above the EPA RML in any of the post-excavation soil samples.

Refer to Attachment A, Figure 2A: Post-Excavation Soil Sample Locations and Excavated Areas-Property 1 and Figure 2B: Post-Excavation Soil Sample Locations and Excavated Areas-Property 2, Attachment B, Table 1: Post Excavation Soil Sample Collection and Validated Analytical Results Summary Table, Appendix C: Chain of Custody Record, and Appendix E: Validated Analytical Data Package: Post-Excavation Soil Samples.

ATTACHMENT A

Figure 1A: Site Location Map
Figure 1B: Area of Concern Map
Figure 2A: Post-Excavation Soil Sample Locations and Excavated Areas- Property 1
Figure 2B: Post-Excavation Soil Sample Locations and Excavated Areas- Property 2



Legend

Site Location

N

0 0.35 0.7 1.4 2.1 2.8 Miles

Weston Solutions, Inc.
Federal East Division

In Association With
Scientific and Environmental Associates, Inc.,
Environmental Compliance Consultants, Inc.,
Avatar Environmental, LLC, On-Site Environmental,
Inc.and Sovereign Consulting, Inc

Figure 1A:
Site Location Map

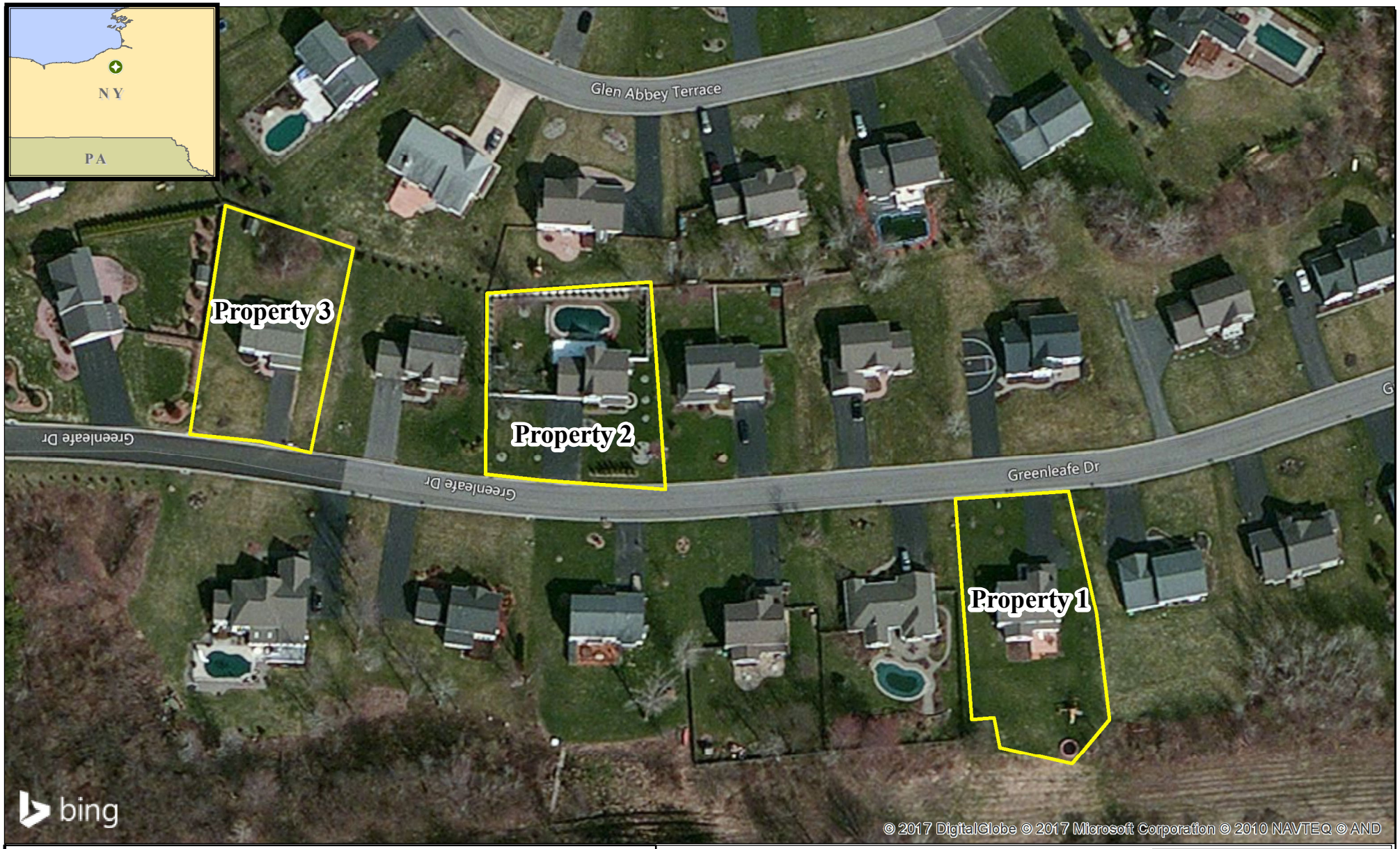
Greenleafe Drive Mercury Response Site
Lysander, New York

U.S. ENVIRONMENTAL PROTECTION AGENCY
REMOVAL SUPPORT TEAM 3
CONTRACT # EP-S2-14-01

DATE MODIFIED: 5/12/2017

GIS ANALYST:	T. Benton
EPA OSC:	C. D'Onofrio
RST SPM:	M. Beuthe
FILENAME:	160518_SITELOCATIONMAP.MXD

\\FSED2DATA1\GISDATA\RST_3\00070018\MXD\160518_SITELOCATIONMAP.MXD



Legend

Property Boundary

N

140 70 0 140 Feet

Weston Solutions, Inc.

In Association With
Avatar Environmental, LLC.,
H & S Environmental, Inc. and
Scientific and Environmental Associates, Inc.

Figure 1B: Area of Concern Map

Greenleafe Drive Mercury Response Site
Lysander, New York

U.S. ENVIRONMENTAL PROTECTION AGENCY
REMOVAL SUPPORT TEAM 2
CONTRACT # EP-W-06-072

GIS ANALYST:	M. BEUTHE
EPA OSC:	C. D'ONOFRIO
RST SPM:	M. BEUTHE
FILENAME:	00070018

DATE MODIFIED: 04/07/2008

Legend

- Soil Sample Locations
- Excavation Area
- Composite Sample Quadrants

Notes:

- Soil samples were collected from each sample location as a five point composite sample.
- All soil samples were collected from 0-2 inches below ground surface.

N

Weston Solutions, Inc.

In Association With
Avatar Environmental, LLC.,
H & S Environmental, Inc. and
Scientific and Environmental Associates, Inc.

Figure 2A: Post-Excavation Soil Sample Locations and Excavation Area - Property 1

Greenleafe Drive Mercury Response Site
Lysander, New York

U.S. ENVIRONMENTAL PROTECTION AGENCY
REMOVAL SUPPORT TEAM 2
CONTRACT # EP-W-06-072

GIS ANALYST:	M. BEUTHE
EPA OSC:	C. D'ONOFRIO
RST SPM:	M. BEUTHE
FILENAME:	00070018

DATE MODIFIED: 04/07/2008

Legend

- Composite Soil Sample Locations
- Excavation Area
- Composite Sample Quadrants
- Discrete Soil Sample Locations

Notes:

- All soil samples were collected from 0-2 inches below ground surface.

N

Weston Solutions, Inc.

In Association With
Avatar Environmental, LLC.,
H & S Environmental, Inc. and
Scientific and Environmental Associates, Inc.

Figure 2B: Post-Excavation Soil Sample Locations and Excavation Area - Property 2

Greenleafe Drive Mercury Response Site
Lysander, New York

U.S. ENVIRONMENTAL PROTECTION AGENCY
REMOVAL SUPPORT TEAM 2
CONTRACT # EP-W-06-072

GIS ANALYST:	M. BEUTHE
EPA OSC:	C. D'ONOFRIO
RST SPM:	M. BEUTHE
FILENAME:	00070018

DATE MODIFIED: 04/07/2008

ATTACHMENT B

Table 1: Post-Excavation Soil Sample Collection and Validated Analytical Results Summary Table
Table 2: Waste Transportation and Disposal Summary Table

Table 1: Post-Excavation Soil Sample Collection and Validated Analytical Results Summary Table
Greenleafe Drive Mercury Response Site
Lysander, Onondaga County, New York

RST 3 Sample No.	[1]EPA RML for Residential Soil (THQ=1.0)	P001-SS005-160520-01	P001-SS005-160520-02	P001-SS006-160520-01	P002-SS001-160520-01	P002-SS002-160521-01	P002-SS003-160522-01
Sample Date		5/20/2016	5/20/2016	5/20/2016	5/20/2016	5/21/2016	5/22/2016
Sample Time		15:50	15:50	15:53	14:00	15:55	10:25
Sample Location		P001-SS005	P001-SS005	P001-SS006	P002-SS001	P002-SS002	P002-SS003
Sample Depth (in)		0-2	0-2	0-2	0-2	0-2	0-2
Sample Matrix		Soil	Soil	Soil	Soil	Soil	Soil
Collection Method		Composite	Composite	Composite	Composite	Composite	Composite
Sample Type		FS/MS/MSD	FD	FS	FS	FS	FS
Mercury	**11**	0.064	0.056	0.059	0.074	0.087	ND

Notes:
RST 3 - Removal Support Team 3
EPA - Enviornmental Protection Agency
No. - Number
FS - Field Sample
FD - Field Duplicate
MS/MSD - Matrix Spike/Matrix Spike Duplicate
in - inches
ND - Not detected
All soil data reported in milligrams per kilogram (mg/kg).
[1]EPA Removal Management Levels (RMLs) for Residential Soil for 10^{-4} Risk Level for Carcinogens or a Hazard Quotient (HQ) of 1 for Non-Carcinogens, May 2016.

Table 2: Waste Transportation and Disposal Summary Table
Greenleafe Drive Mercury Response Site
Lysander, Onondaga County, New York

Non DOT, Non RCRA Regulated Material (Asphalt Debris)				
Date	**Transporter**	**Landfill**	**Manifest #**	**Weight (tons)**
5/18/16	Ricelli Trucking, Inc.	Senneca Meadows	1	12.7
5/18/16	Ricelli Trucking, Inc.	Senneca Meadows	2	9.63
			Total	**22.33**

Non DOT, Non RCRA Regulated Material (Contaminated Soil)				
5/25/16	Ricelli Trucking, Inc.	Sennaca Meadows	1	5.93
5/26/16	Ricelli Trucking, Inc.	Sennaca Meadows	2	1.6
			Total	**7.53**

Non DOT, Non RCRA Regulated Material (Household Debris)				
Date	**Transporter**	**Landfill**	**Manifest #**	**Weight (tons)**
5/18/16	Ricelli Trucking, Inc.	Sennaca Meadows	1	2.56
5/19/16	Ricelli Trucking, Inc.	Sennaca Meadows	2	3.19
5/25/16	Ricelli Trucking, Inc.	Sennaca Meadows	3	0.76
5/27/16	Ricelli Trucking, Inc.	Sennaca Meadows	4	3.7
			Total	**4.46**

Hazardous Waste Solid/Liquid (Mercury)				
Date	**Transporter**	**Waste Facility**	**Manifest #**	**Weight (Pounds)**
5/26/16	AERC.Com.Inc.	Allentown, PA	010911372JJK	5
8/29/16	AERC.Com.Inc.	Allentown, PA	010911407JJK	2
			Total	**7**

ATTACHMNT C

EPA Action Memorandum

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION II
2890 WOODBRIDGE AVENUE
EDISON, NJ 08837

DATE: April 22, 2016

SUBJECT: Confirmation of Verbal Authorization for an Emergency Removal Action at the Greenleafe Drive Mercury Response, Phoenix, Onondaga County, New York

FROM: Cris D'Onofrio, On-Scene Coordinator
Response and Prevention Branch

TO: John Prince, Acting Director
Emergency and Remedial Response Division

THRU: Eric Mosher, Chief
Response and Prevention Branch

SITE ID: A26P

The purpose of this memorandum is to confirm the Acting Division Director's April 21, 2016, verbal authorization of a $250,000 total project ceiling, of which $140,000 is for mitigation contracting. The verbal authorization was required for an emergency Comprehensive Environmental Response Compensation and Liability Act (CERCLA) response action at the Greenleafe Drive Mercury Response Site (Site). The Site consists of three homes which are located on Greenleafe Drive in the Township of Lysander, Onondaga County and the Town of Phoenix, Oswego County, New York.

This is the first action taken at this Site. The emergency action is necessary in order to eliminate the contamination of mercury at three residential properties that were contaminated by children playing with a vial of mercury on April 5, 2016. Two of the homes were contaminated by direct spillage as a result of the children playing with mercury; one of the homes was contaminated via tracking when the contaminated child returned home.

Immediately upon receiving notification of the spill, the New York State Department of Environmental Conservation (NYSDEC) responded to the spill on April 6, 2016. Visible mercury contamination was observed at two of the homes. Ambient air concentrations of mercury inside one of the homes exceeded the 1 ug/m^3 action level and was observed as high as 60 ug/m^3. Ambient air concentrations inside a second home were below the NYSDEC monitoring detection limit of 3 ug/m^3. NYSDEC was denied access to a third home from where the mercury originated and was not able to conduct air monitoring in that home.

NYSDEC immediately began to mitigate the spill through implementation of a variety of actions including vacuum recovery of free mercury and ventilation of the homes. Upon notification of the incident, EPA contacted the NYSDEC responder who requested air monitoring assistance with more sensitive air monitoring equipment. EPA responded on April 9, 2016, to provide air monitoring, assessment and technical support to the NYSDEC.

Visible mercury is currently present in the garage and driveway of the two homes where the children were playing. Air monitoring with the Lumex Mercury Vapor Analyzer (MVA) indicated ambient air readings in all three homes above the 1 ug/m3 clearance value ranging from approximately 1.5 ug/m3 to 3.0 ug/m3. Although readings are above the clearance value, the New York State Department of Health determined that mandatory relocation of residents was not warranted as long as cleanup could reduce ambient air levels within a reasonable timeframe; so residents have been voluntarily occupying their homes with ventilation during the cleanup.

MVA monitoring has since identified that metallic mercury exists in several areas of two of the homes including carpets, sink and tub drains, washing machines, bedding and clothes. On April 20, 2016, it was determined that contamination of clothing and bedding was extensive enough at one home that temporary relocation of the occupants is required to protect the family's health and to conduct an effective cleanup of mercury. Based on these findings, the NYSDEC formally requested EPA assistance to conduct a removal action under CERCLA. Since receiving the verbal authorization of funding on April 21, 2016, EPA has effected the temporary relocation of the occupants in the most impacted home. EPA is in the process of transitioning with NYSDEC as the lead agency for the response.

Conditions at the Site meet the criteria for a removal action under CERCLA as documented in Section 300.415(b)(2) of the National Contingency Plan.

Should you have any questions or require additional information regarding this Site, please feel free to contact me at (908) 420-4475.

cc: J. Rotola, ERRD-RAB
E. Mosher, ERRD-RPB
J. Daloia, ERRD-RPB
D. Kodama, ERRD-RPB

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION II
2890 WOODBRIDGE AVENUE
EDISON, NJ 08837

DATE: May 9, 2016

SUBJECT: Confirmation of 2nd Verbal Authorization for an Emergency Removal Action at the Greenleafe Drive Mercury Response, Phoenix, Onondaga County, New York

FROM: Cris D'Onofrio, On-Scene Coordinator
Response and Prevention Branch

TO: Walter Mugdan, Director
Emergency and Remedial Response Division

THRU: Eric Mosher, Chief
Response and Prevention Branch

SITE ID: A26P

The purpose of this memorandum is to confirm the Division Director's May 9, 2016, verbal authorization of a $320,000 total project ceiling, of which $200,000 is for mitigation contracting. This is the second verbal authorization for this action; the first verbal authorization was granted on April 21, 2016 by the Acting Division Director in the amount of $250,000; this verbal authorization increases the total project ceiling to $570,000. The verbal authorization is required to continue an emergency Comprehensive Environmental Response Compensation and Liability Act (CERCLA) response action at the Greenleafe Drive Mercury Response Site (Site). The Site consists of three homes which are located on Greenleafe Drive in the Township of Lysander, the Town of Phoenix, Onondaga County, New York.

The current verbal authorization is necessary to continue the action currently being undertaken to eliminate the contamination of mercury at three residential properties that were contaminated by children playing with a vial of mercury on April 5, 2016. Two of the homes were contaminated by direct spillage as a result of the children playing with mercury; one of the homes was contaminated via tracking when the contaminated child returned home.

Immediately upon receiving notification of the spill, the New York State Department of Environmental Conservation (NYSDEC) responded to the spill on April 6, 2016. Visible mercury contamination was observed at two of the homes. Ambient air concentrations of mercury inside one of the homes exceeded the 1 ug/m^3 action level and was observed as high as 60 ug/m^3. Ambient air concentrations inside a second home were below the

NYSDEC monitoring detection limit of 3 ug/m^3. NYSDEC was denied access to a third home from where the mercury originated and was not able to conduct air monitoring in that home.

NYSDEC immediately began to mitigate the spill through implementation of a variety of actions including vacuum recovery of free mercury and ventilation of the homes. Upon notification of the incident, EPA contacted the NYSDEC responder who requested air monitoring assistance with more sensitive air monitoring equipment. EPA responded on April 9, 2016, to provide air monitoring, assessment and technical support to the NYSDEC.

On April 20, 2016, it was determined that contamination of clothing and bedding was extensive enough at one home that temporary relocation of the occupants was required to protect the family's health and to conduct an effective cleanup of mercury. Based on these findings, the NYSDEC formally requested EPA assistance to conduct a removal action under CERCLA on April 20, 2016.

Since receiving the first verbal authorization of funding on April 21, 2016, EPA has effected the temporary relocation of the occupants of the three impacted homes. All personal belongings and porous furniture in one of the homes have been removed and are still being screened and remediated or disposed of as required. Two of the impacted homes have been successfully remediated on the interior, however; one family remains in temporary relocation status until the living space can be restored to a functional condition. The third home is currently being remediated; the residents at that location also remain in relocation status.

Conditions at the Site meet the criteria for a removal action under CERCLA as documented in Section 300.415(b)(2) of the National Contingency Plan.

Should you have any questions or require additional information regarding this Site, please feel free to contact me at (908) 420-4475.

cc: J. Rotola, ERRD-RAB
E. Mosher, ERRD-RPB
J. Daloia, ERRD-RPB
D. Kodama, ERRD-RPB

ATTACHMNT D

Photographic Documentation of Site Activities

Photographic Documentation of Site Activities
Greenleafe Drive Mercury Response Site
April 9, 2016 through May 22, 2016

Address	Photo Date	Photo Time	Description	Photograph
Property 1	4/25/2016	14:24	Obvious mercury beads in the soil near the basketball hoop.	
Property 1	4/25/2016	14:24	Mercury beads in the driveway and soil near the basketball hoop.	

Photographic Documentation of Site Activities
Greenleafe Drive Mercury Response Site
April 9, 2016 through May 22, 2016

Address	Photo Date	Photo Time	Description	Photograph
Property 1	4/25/2016	16:47	The storage tent in the backyard. Items were wrapped in poly bags pending screening for mercury vapor with a Lumex 915^{+} (Lumex) mercury vapor analyzer (MVA).	
Property 3	4/26/2016	14:45	Weston Solutions Inc., Removal Support Team 3 (RST 3) member screening the bedroom of the 13 year-old boy with a Lumex.	

Photographic Documentation of Site Activities
Greenleafe Drive Mercury Response Site
April 9, 2016 through May 22, 2016

Address	Photo Date	Photo Time	Description	Photograph
Property 3	4/26/2016	14:45	The carpet in the 13 year-old boy's bedroom where elevated mercury readings were detected.	
Property 3	4/26/2016	14:45	The stairwell and carpeting where elevated mercury readings were detected.	

Photographic Documentation of Site Activities
Greenleafe Drive Mercury Response Site
April 9, 2016 through May 22, 2016

Address	Photo Date	Photo Time	Description	Photograph
Property 3	4/26/2016	14:46	The living room and kitchen where mercury beads were found in the carpet.	
Property 3	4/26/2016	14:47	RST 3 team member and U.S. Environmental Protection Agency's (EPA) Emergency and Rapid Response Services (ERRS) contractor's Response Manager (RM) searching for mercury beads on the carpet, with a flash light, in the bedroom of the 13 year-old boy.	

Photographic Documentation of Site Activities
Greenleafe Drive Mercury Response Site
April 9, 2016 through May 22, 2016

Address	Photo Date	Photo Time	Description	Photograph
Property 1	5/2/2016	14:28	The property showing pin flag placement designating mercury vapor hotspot areas.	
Property 1	5/2/2016	14:28	The area where a plumbing line was excavated to remove and replace drain traps contaminated with metallic mercury.	

Photographic Documentation of Site Activities
Greenleafe Drive Mercury Response Site
April 9, 2016 through May 22, 2016

Address	Photo Date	Photo Time	Description	Photograph
Property 1	5/2/2016	14:28	The driveway after being excavated. Plastic bins were used for screening outdoor surfaces using headspace readings with a Lumex.	
Property 1	5/2/2016	14:29	ERRS contractor personnel applying sealant to walls in order to reduce ambient mercury vapors in the garage.	

Photographic Documentation of Site Activities
Greenleafe Drive Mercury Response Site
April 9, 2016 through May 22, 2016

Address	Photo Date	Photo Time	Description	Photograph
Property 1	5/2/2016	14:29	Plastic sheeting was placed over the soil excavation in the mulch area next to the basketball hoop to prevent exposure to residents and prevent contaminant migration.	
Property 1	5/2/2016	14:29	The storage tent where RST 3 performed screenings of personal belongings with the Lumex. A propane heater was used to heat up the bagged items prior to screening.	

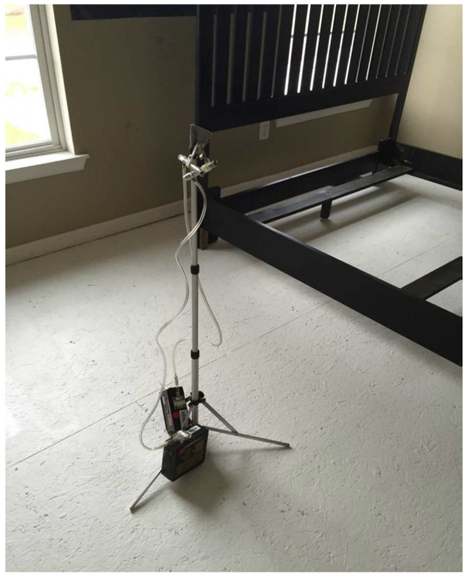
Photographic Documentation of Site Activities
Greenleafe Drive Mercury Response Site
April 9, 2016 through May 22, 2016

Address	Photo Date	Photo Time	Description	Photograph
Property 1	5/2/2016	14:30	A view of the backyard showing tents used to support operations. To the left is the screening tent, in the middle is the staging tent, and to the right is the Remediation tent.	
Property 1	5/3/2016	10:25	Clothes hung in the remediation tent. A propane heater was used to raise the temperature within the tent to drive residual mercury from personal items.	

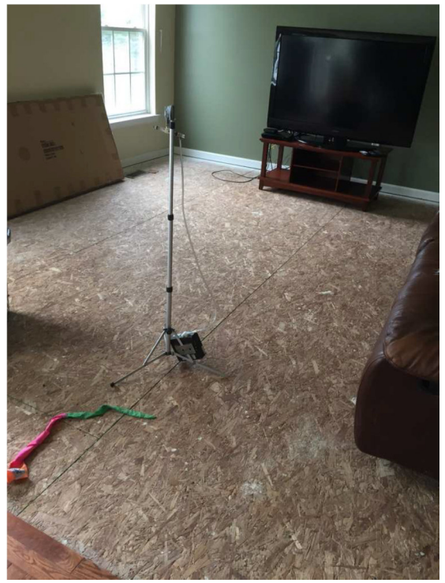
Photographic Documentation of Site Activities
Greenleafe Drive Mercury Response Site
April 9, 2016 through May 22, 2016

Address	Photo Date	Photo Time	Description	Photograph
Property 1	5/3/2016	10:30	A view of the exhaust pipe which was used to ventilate mercury vapor from the first floor.	
Property 1	5/3/2016	14:22	A clothesline set up in the backyard to facilitate venting of handbags.	

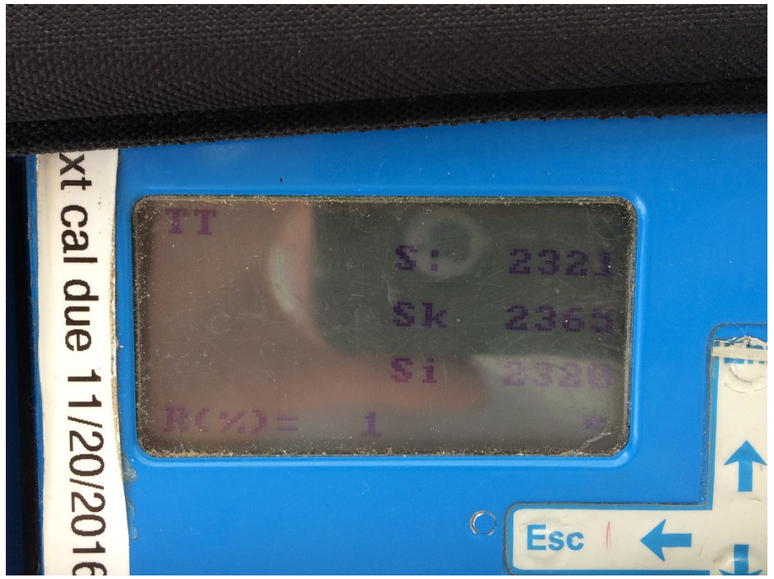
Photographic Documentation of Site Activities
Greenleafe Drive Mercury Response Site
April 9, 2016 through May 22, 2016

Address	Photo Date	Photo Time	Description	Photograph
Property 1	5/5/2016	14:23	A SKC pump setup being used by EPA's Emergency Response Team (ERT) contractor to sample ambient air in the backyard.	
Property 1	5/5/2016	NA	A SKC pump setup being used to sample the 12 year-old boy's bedroom.	

Photographic Documentation of Site Activities
Greenleafe Drive Mercury Response Site
April 9, 2016 through May 22, 2016

Address	Photo Date	Photo Time	Description	Photograph
Property 3	5/5/2016	NA	A SKC pump setup being used to sample the living room.	
Property 2	5/6/2016	12:49	The staging and screening tents set up by ERRS in the backyard.	

Photographic Documentation of Site Activities
Greenleafe Drive Mercury Response Site
April 9, 2016 through May 22, 2016

Address	Photo Date	Photo Time	Description	Photograph
Property 1	5/8/2016	9:20	Lumex readings prior to screening items in the screening tent.	
Property 1	5/8/2016	13:51	Items in the screening tent, including a dryer. Items were bagged or wrapped in poly sheeting to obtain headspace readings in order to determine the level of mercury contamination.	

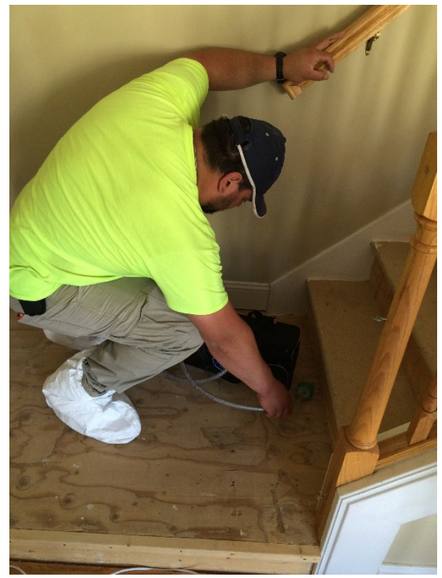
Photographic Documentation of Site Activities
Greenleafe Drive Mercury Response Site
April 9, 2016 through May 22, 2016

Address	Photo Date	Photo Time	Description	Photograph
Property 2	5/8/2016	17:01	Additional items in the staging tent, prior to screening	
Property 1	5/9/2016	10:36	A view of the screening area utilized by RST 3. A propane heater was used to heat bagged items before headspace readings with a Lumex.	

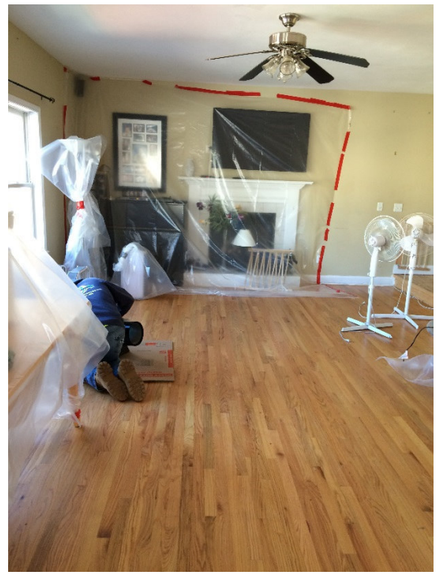
Photographic Documentation of Site Activities
Greenleafe Drive Mercury Response Site
April 9, 2016 through May 22, 2016

Address	Photo Date	Photo Time	Description	Photograph
Property 2	5/9/2016	15:22	RST 3 screening the inside of a washing machine with a Lumex.	
Property 2	5/9/2016	15:26	The kitchen floor where hotspots of mercury vapor were identified.	

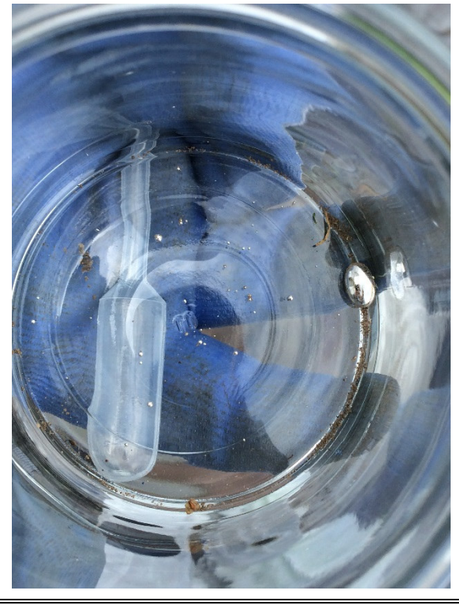
Photographic Documentation of Site Activities
Greenleafe Drive Mercury Response Site
April 9, 2016 through May 22, 2016

Address	Photo Date	Photo Time	Description	Photograph
Property 2	5/9/2016	15:27	Using a Lumex to re-screen the stair landing after remediating a hotspot.	
Property 2	5/9/2016	15:29	A view of the backyard showing personal items being aired out.	

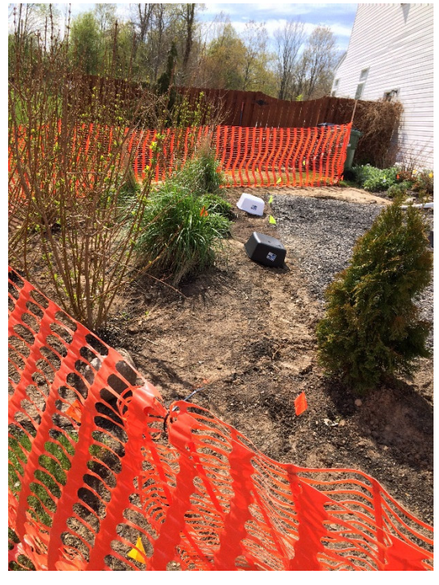
Photographic Documentation of Site Activities
Greenleafe Drive Mercury Response Site
April 9, 2016 through May 22, 2016

Address	Photo Date	Photo Time	Description	Photograph
Property 2	5/9/2016	15:47	A view of the living room while the home was being heated and ventilated. Sensitive personal items were wrapped in poly sheeting to prevent them from entraining mercury vapors during the heat and vent cycles.	
Property 1	5/10/2016	8:57	RST 3 team member using a Lumex to screen soil in the garden area	

Photographic Documentation of Site Activities
Greenleafe Drive Mercury Response Site
April 9, 2016 through May 22, 2016

Address	Photo Date	Photo Time	Description	Photograph
Property 1	5/10/2016	8:57	Bins placed on the property for collection of headspace readings from the soil and driveway areas. Pin flags denote areas that indicated elevated mercury vapor readings.	
Property2	5/10/2016	10:34	Mercury beads collected from the soil by ERRS after the initial contaminated soil was excavated from next to the front walkway.	

Photographic Documentation of Site Activities
Greenleafe Drive Mercury Response Site
April 9, 2016 through May 22, 2016

Address	Photo Date	Photo Time	Description	Photograph
Property 2	5/10/2016	10:35	Removing mercury beads from the soil next to the front walkway.	
Property 1	5/10/2016	15:11	Plastic bins placed over soil and allowed to be heated by sunlight prior to collecting headspace readings with a Lumex.	

Photographic Documentation of Site Activities
Greenleafe Drive Mercury Response Site
April 9, 2016 through May 22, 2016

Address	Photo Date	Photo Time	Description	Photograph
Property 1	5/10/2016	15:11	The mini excavator utilized to remove the contaminated driveway.	
Property 1	5/10/2016	16:55	A contaminated oriental rug removed from the basement. The rug had high sentimental and dollar value. The rug was vacuumed several times with a mercury vacuum, placed outside to air out, and then heated in a tent with propane heater in an attempt to remediate it. Those efforts ultimately failed.	

Photographic Documentation of Site Activities
Greenleafe Drive Mercury Response Site
April 9, 2016 through May 22, 2016

Address	Photo Date	Photo Time	Description	Photograph
Property 1	5/10/2016	16:55	A view of the mercury vacuum used to remove mercury beads from contaminated areas.	
Property 1	5/10/2016	17:01	Using a mercury vacuum to remove mercury beads from the oriental rug removed from the basement.	

Photographic Documentation of Site Activities
Greenleafe Drive Mercury Response Site
April 9, 2016 through May 22, 2016

Address	Photo Date	Photo Time	Description	Photograph
Property 1	5/11/2016	10:48	A view of personal items from the garage which could not be remediated as staged for disposal	
Property 1	5/11/2016	10:48	Additional personal items staged for disposal after screening indicated they could not be remediated to safe levels. s.	

Photographic Documentation of Site Activities
Greenleafe Drive Mercury Response Site
April 9, 2016 through May 22, 2016

Address	Photo Date	Photo Time	Description	Photograph
Property 1	5/11/2016	10:48	Additional personal items designated for disposal.	
Property 1	5/11/2016	15:08	RST 3 team member taking headspace readings to detect ground surface readings after being heated to over 90 degrees Fahrenheit (ºF)	

Photographic Documentation of Site Activities
Greenleafe Drive Mercury Response Site
April 9, 2016 through May 22, 2016

Address	Photo Date	Photo Time	Description	Photograph
Property 2	5/17/2016	15:42	Personal items being stored for disposal in a box truck pending availability of a roll-off container.	
Property 2	5/18/2016	10:22	Removing soil that indicated elevated mercury vapor readings; from the side of the driveway.	

Photographic Documentation of Site Activities
Greenleafe Drive Mercury Response Site
April 9, 2016 through May 22, 2016

Address	Photo Date	Photo Time	Description	Photograph
Property 2	5/20/2016	13:55	The area represented by soil sampling locations P002-SS003, P002-SS004, and P002-SS005; delineated with caution tape and safety cones as remediation is in progress.	
Property 2	5/20/2016	13:55	The area represented by sampling locations P002-SS001 and P002-SS002; delineated with caution tape and safety cones as remediation is in progress.	

Photographic Documentation of Site Activities
Greenleafe Drive Mercury Response Site
April 9, 2016 through May 22, 2016

Address	Photo Date	Photo Time	Description	Photograph
Property 1	5/21/2016	13:27	A view of the property showing the driveway after it had been re-paved.	
Property 1	5/21/2016	14:47	A side view of the property after additional contaminated soil had been removed.	

Photographic Documentation of Site Activities
Greenleafe Drive Mercury Response Site
April 9, 2016 through May 22, 2016

Address	Photo Date	Photo Time	Description	Photograph
Property 1	5/21/2016	14:53	The area represented by discrete soil sample location P001-SS003.	
Property 2	5/22/2016	10:13	The area represented by sampling location P002-SS003 after additional soil was removed due to elevated mercury vapor readings.	

Photographic Documentation of Site Activities
Greenleafe Drive Mercury Response Site
April 9, 2016 through May 22, 2016

Address	Photo Date	Photo Time	Description	Photograph
Property 2	5/22/2016	10:13	Contaminated soil being consolidated in a poly bag for disposal.	

Appendix A

Site-Specific Health and Safety Plan

Weston Solutions, Inc.
Suite 201
1090 King Georges Post Road
Edison, New Jersey 08837-3703
732-585-4400 • Fax: 732-225-7037
www.westonsolutions.com

The Trusted Integrator for Sustainable Solutions

REMOVAL SUPPORT TEAM 3
EPA CONTRACT EP-S2-14-01

April 9, 2016

Mr. Cris D'Onofrio, On-Scene Coordinator
U.S. Environmental Protection Agency, Region II
Response & Prevention Branch
2890 Woodbridge Avenue
Edison, New Jersey 08837

EPA CONTRACT NO: EP-S2-14-01
TDD NO: NOT ASSIGNED
DOCUMENT CONTROL NO: NOTASSIGNED
SUBJECT: SITE-SPECIFIC HEALTH & SAFETY PLAN – BALDWINSVILLE, NY RESIDENTIAL MERCURY RELEASE ER, BALDWINSVILLE, ONONDAGA COUNTY, NEW YORK

Dear Mr. D'Onofrio,

Enclosed please find the Site-Specific Health & Safety Plan (HASP) for the emergency response activities to be conducted at the Baldwinsville, NY Residential Mercury Release ER located in Baldwinsville, Onondaga County, New York beginning on April 9, 2016. If you have any questions or comments, please do not hesitate to contact me at (732) 585-4425.

Sincerely,

Weston Solutions, Inc.

Timothy Benton
RST 3 Operations Lead

Enclosure
cc: TDD File No.: Not Assigned

REGION II RST 3 HEALTH AND SAFETY PLAN
EMERGENCY RESPONSE/REMOVAL ASSESSMENT/REMOVAL ACTION
(Revised 16 March 2011)

TDD No.: Not Assigned

Site Name: Baldwinsville, NY Residential Mercury Release ER

Site Address: Street No.: 3244 Greenleafe Drive
City: Baldwinsville
County/State: Onondaga County/New York

Directions to Site (Color map included on following page):

1090 King Georges Post Rd
Edison, NJ 08837

Get on I-287 N from King Georges Post Rd

1. Head west toward King Georges Post Rd
2. Turn left onto King Georges Post Rd
3. Turn right onto Raritan Center Pkwy
4. Keep right at the fork, follow signs for Middlesex County 514 E/Woodbridge Ave/I-287/NJ-440 and merge onto Woodbridge Ave
5. Use the right lane to take the ramp onto I-287 N

Continue on I-287 N. Take I-78 W, PA-33 N, I-380 N and I-81 N to John Glenn Blvd in Geddes. Take exit 4 from I-690 W

6. Merge onto I-287 N
7. Keep left to stay on I-287 N
8. Use the left 2 lanes to take exit 21B toward I-78 W/Easton Pa
9. Merge onto I-78 W
10. Take exit 71 for PA-33 N toward US-22/Stroudsburg
11. Continue onto PA-33 N
12. Continue onto PA-33 N/US-209 N

13. Keep left to continue on PA-33 N/Hwy 33 N, follow signs for W Interstate 80 W/Bartonsville/Hazelton

14. Use the left lane to merge onto I-80 W toward Hazleton

15. Keep right at the fork to continue on I-380 N, follow signs for Scranton

16. Merge onto I-81 N

17. Keep right at the fork to stay on I-81 N, follow signs for I-88/Syracuse/Albany

18. Take the exit onto I-690 W toward Fairgrounds/Baldwinsville

19. Take exit 4 for John Glenn Blvd

Take River Rd to Greenleafe Dr in Lysander

20. Continue onto John Glenn Blvd

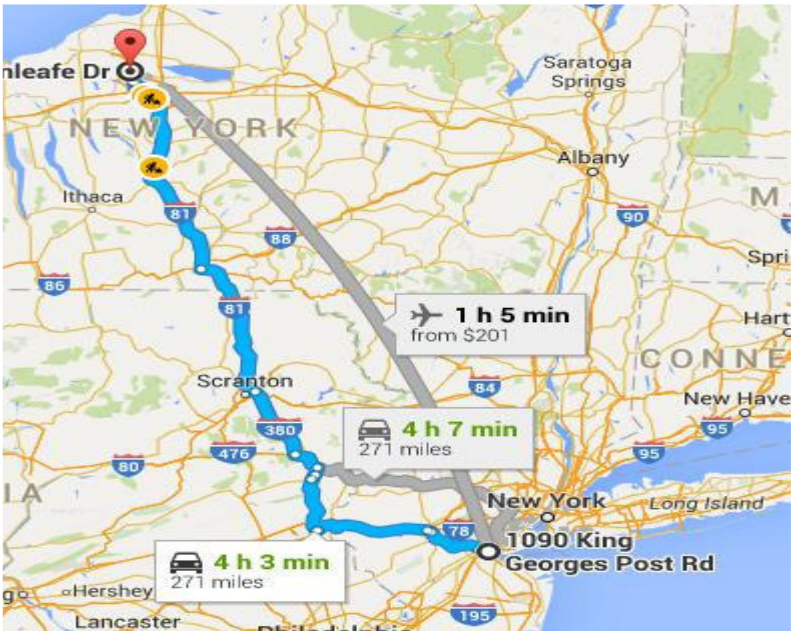
21. Turn left onto NY-370 W

22. Turn right onto River Rd

23. Turn right to stay on River Rd

24. Turn left onto Greenleafe Dr

Destination Time & Distance: 4 hours and 3 min; 271 miles



***This map is subject to Google Map's Terms of Service, and Google Maps is the owner of rights therein.*

Historical/Current Site Information:

At 1850 hours on April 8, 2016, the U.S. Environmental Protection Agency (EPA) activated Weston Solutions, Inc., Removal Support Team 3 (RST 3) to provide emergency response support at a mercury release located in Baldwinsville, New York. RST 3 was tasked with mobilizing two Core Response Team (CRT) members to the scene of the release on April 9, 2016 to conduct mercury vapor monitoring activities.

A 7 year-old boy was given a jar of liquid mercury that belonged to his grandfather who was a chemist. On Tuesday, April 5, 2016 at approximately 7:00 pm the 7 year old boy and another 13 year old boy visited a neighbor's 12 year-old son at their residence (3249 Greenleafe Drive, Baldwinsville, New York). Without the knowledge of the parents the three boys played with the mercury, throwing it at each other, contaminating their shoes and clothing while releasing the mercury onto the floor, garage, and nearby walls. The three children then tracked the mercury via their shoes and clothing to their respective homes. The parents started to collect the mercury from the driveway and garage into the jar with eye droppers. The two boys went home between 7:00 pm - 7:30 pm. The three impacted residences are:

- 3244 Greenleafe Drive (where mercury originated)
- 3240 Greenleafe Drive
- 3249 Greenleafe Drive

After researching the properties of mercury, between 9:00 - 9:30 pm on April 5, 2016, the property owner (3249 Greenleafe Drive) contacted the Poison Control Center who instructed the parents to remove the boys' contaminated clothing and to shower, which was already done, and told to call 911, the New York State Department of Environmental Conservation (NYSDEC) and the Center for Disease Control (CDC). The local police department, City of Phoenix, fire department, and ambulances responded within 15 minutes. The fire department tried to sweep the mercury with a broom which further spread the material and the property owners were told to go back into their house. NYSDEC was not notified on Tuesday, April 5, 2016.

On Wednesday, April 6, 2016, the property owner noticed that mercury was present throughout the garage floor and called the authorities for assistance. The Onondaga County Department of Health (DOH) was contacted. The NYSDEC Region 7 Office was also contacted and responded immediately by hiring a remediation contractor, NRC, to respond. The NRC took readings, placed a tarp on the driveway and told everyone to evacuate the house. Readings ranged from 0.1 to 0.6 milligrams per cubic meter (mg/m^3); they were highest in the boy's bedroom and lower downstairs inside the residence.

On Thursday, April 7, 2016, the DOH contractor (NRC) took mercury readings which were zero, and the residences re-entered the house and opened the windows. As a result of the zero mercury readings, the residents were told they can move back into their house with the exception of their 2 year old daughter who should not return until the NRC samples the house again later in the today. The NRC is currently conducting cleanups of the two neighbors' houses where the boys had tracked the mercury on their shoes and clothing into their homes. This includes the driveways, clothing, and other mercury contaminated belongings.

NRC has been conducting cleanups of the mercury, summarized as follows:

- 3244 Greenleafe Drive (where mercury release originated)
  - NRC cleaned the driveway and where mercury was spilled onto the snow. ***Resident would not allow access for NRC to enter the home.***
  - These residents have not evacuated the home.

- 3240 Greenleafe Drive
  - According to NYSDEC, the mercury only entered the house as it was tracked in by the child. The child's clothes were bagged and given to NYSDEC.
  - Readings in the driveway, garage, and interior were non-detect; NYSDEC determined that cleanup was not required. No further action has been taken.
  - These residents have not evacuated the home.

- 3249 Greenleafe Drive
  - NRC has been cleaning up the contaminated driveway, garage, and contaminated personal belongings at the residence. Readings inside the house have been non-detect in all areas following the interior cleanup, which is being done using a mercury vacuum; NRC focused on the interior cleanup first. The interior cleanup has been completed. The mudroom is still blocked off; NYSDEC considers this a barrier to any vapors from the garage and driveway. The cleanup in the garage is now underway. All materials are being separated into those which give readings and those that are non-detect; materials with readings are being bagged for disposal. All materials will be wiped down with a mercury cleaning solution. The planting beds surrounding the driveway have been covered with poly; cleanup of the planting beds and driveway is pending. The driveway might be replaced entirely. These outdoor activities will most likely occur the following week.
  - The residents evacuated the home on Wednesday, April 6, 2016 and returned on Thursday, April 7, 2016. EPA advised that there is no way to determine whether interior mercury detections are below EPA action levels until additional readings have been taken with a Lumex or more sensitive instrument.

RST 3 Scope of Work:

As part of the emergency response, RST 3 has been tasked with providing two CRT members to provide mercury air monitoring and documentation at the scene of the release. Air monitoring will be conducted utilizing a Lumex Mercury Vapor Analyzer (MVA). Sampling activities may be conducted upon request of the EPA On-Scene Coordinator (OSC).

Three (3) S.M.A.R.T. Health and Safety Goals for the Project (Simple, Measurable, Actionable, Reasonable, & Timely):

1. Safely navigate (no accidents) while in vehicle during mobilization to and from the Site.
2. Safe procedures will be used when working in the exclusion zone of the incident.
3. Follow proper Lumex MVA field screening procedures and action levels.

Incident Type:

- [x] Emergency Response: Beginning on April 9, 2016
- [ ] Removal Assessment
- [ ] Removal Action
- [ ] Residential Sampling/Investigation
- [ ] PRP Oversight
- [ ] Other

Location Class:

- [ ] Industrial
- [ ] Commercial
- [x] Urban/Residential
- [x] Rural

U.S. EPA OSC: Cris D'Onofrio
Original HASP: Yes
Lead RST 3: Michael Beuthe

Date of Initial Site Activities: 4/9/2016
Site Health & Safety Coordinator: Michael Beuthe
Site Health & Safety Alternate: Peter Lisichenko

Response Activities/Dates of Response (fill in as applicable)

Emergency Response:

- [x] Perimeter Recon.: Beginning on April 9, 2016
- [x] Site Entry: Beginning on April 9, 2016
- [x] Visual Documentation: Beginning on April 9, 2016
- [ ] Multi-Media Sampling:
- [ ] Decontamination:

Removal Assessment:

- [ ] Perimeter Recon
- [ ] Site Entry
- [ ] Visual Documentation
- [ ] Multi-Media Sampling
- [ ] Decontamination

Removal Action:

- ☐ Perimeter Recon
- ☐ Site Entry
- ☐ Visual Documentation
- ☐ Multi-Media Sampling
- ☐ Decontamination

Physical Safety Hazards to Personnel:

☑ Inclement Weather – Attach FLD02	☐ Heat – Attach FLD05	☑ Cold – Attach FLD06
☐ Confined Space – Attach FLD08	☐ Industrial Trucks – Attach FLD09	☐ Manual Lifting – Attach FLD10
☐ Terrain – Attach FLD11	☐ Structural Integrity – Attach FLD13	☐ Site Security – Attach FLD14
☐ Pressurized Containers, Systems – Attach FLD16	☐ Use of Boats – Attach FLD18	☐ Waterways – Attach FLD19
☐ Explosives – Attach FLD21	☐ Heavy Equipment – Attach FLD22	☐ Aerial Lifts and Manlifts – Attach FLD24
☐ Elevated Surfaces and Fall Protection – Attach FLD25	☐ Ladders – Attach FLD26	☐ Excavations/Trenching – Attach FLD28
☐ Fire Prevention – Attach FLD31	☐ Demolition – Attach FLD33	☐ Underground/Overhead Utilities – Attach FLD34
☐ Hand and Power Tools – Attach FLD38	☑ Illumination – Attach FLD39	☐ Storage Tanks – Attach FLD40
☐ Lead Exposure – Attach FLD46	☐ Sample Storage – Attach FLD49	☐ Cadmium Exposure – Attach FLD50
☐ Asbestos Exposure – Attach FLD52	☐ Hexavalent Chromium Exposure – Attach FLD 53	☐ Benzene Exposure – Attach FLD 54
☐ Drilling Safety – Attach FLD56	☐ Drum Handling – Attach FLD58	☐ Gasoline Contaminant Exposure – Attach FLD61
☐ Noise – Attach CECHSP, Section 7	☑ Walking/Working Surfaces	☐ Oxygen Deficiency
☐ Unknowns in Tanks or Drums	☐ Nonionizing Radiation	☐ Ionizing Radiation

Biological Hazards to Personnel:

☐ Infectious/Medical/Hospital Waste – Attach FLD 44 and 45	☑ Non-domesticated Animals – Attach RST 3 FLD43A
☑ Insects – Attach RST 3 FLD 43B	☑ Poisonous Plants/Vegetation – Attach RST 3 FLD 43D
☐ Molds and Fungi – Attach RST 3 FLD 43C	☐ Blood-borne Pathogens – Attach FLD 44 and FLD 45

Training Requirements:

- ☑ 40-Hour HAZWOPER Training with three days supervised experience
- ☐ 8-Hour Management or Supervisor Training in addition to basic training course
- ☑ 8-Hour Annual Refresher Health and Safety Training
- ☐ Site Specific Health and Safety Training
- ☐ DOT (CMV Training - ERV in Use)
- ☐ Bio-Medical Collection and Response

Medical Surveillance Requirements:

- ☑ Baseline initial physical examination with physician certification
- ☑ Annual medical examination with physician certification
- ☑ Site-specific medical monitoring protocol (Radiation, Heavy Metals)
- ☐ Asbestos worker medical protocol

Vehicle Use Assessment and Selection:

Driving is one of the most hazardous and frequent activities for Weston Employees. As such, Weston Employees are required to adhere to established safe operating practices in order to maintain their eligibility to drive Weston owned, leased, or rented vehicles. Every person riding in a Weston vehicle, including passengers must maintain a commitment for a safe journey. This means being attentive while in the vehicle and helping the driver to notice hazards ahead of and around the vehicle and ensure that their presence does not distract the driver from safely operating the vehicle.

A high percentage of vehicle accidents occur when operating in reverse. Anytime a vehicle is operated in reverse, e.g., backing out of a parking area, if there are passengers, at least one of them are to assist the driver by acting as a guide person during the reverse movement or during other vehicle operation where it would be prudent to have a guide person(s) participate in the vehicle movement. When practical, the preferred parking method would be to back into the parking area.

At a minimum, each Weston Driver must:

- Possess a current, valid drivers' license
- Current Commercial Motor Vehicle (CMV) card when operating the Emergency Response Vehicle
- Obey posted speed limits and traffic laws
- Wear seat belts at all times while the vehicle is in operation
- Conduct a 360 degree inspection around the vehicle before attempting to drive the vehicle
- Report accidents / incidents immediately and complete a Notice of Incident (NOI)
- Keep vehicles on approved roadways (4WD doesn't guarantee mobility on unapproved surfaces)

.

All Region II RST 3 personnel are experienced and qualified to drive RST 3 fleet vehicles (Tahoe, Suburbans, Minivan/Cargo Van, and Emergency Response Vehicle). However, in the event that vehicle rental is required, each person must take the time to familiarize themselves

with that particular vehicle. This familiarization includes adjustment of the dashboard knobs/controls, mirrors, steering wheel, seats, and a 360 degree external inspection of the vehicle.

1. The following vehicles are anticipated to be used on this project:

☐	Car	☐	Pickup Truck
☑	Intermediate/Standard SUV (e.g. Chevy Trailblazer, Chevy Tahoe, Ford Explorer, Ford Escape)	☑	Full Size SUV (e.g. Chevy Suburban, Ford Expedition, GMC Yukon)
☐	Minivan/Cargo Van (e.g. Chevy Uplander, Chevy Express Van)	☐	Box Truck (Size: approx. 12 feet)
☐	Emergency Response Vehicle (ERV)	☐	Other_____

2. Are there any on-site considerations that should be noted:

☑	Working/Driving Surfaces	☐	Debris	☐	Overhead Clearance	☐	Obstructions
☐	Tire Puncture Hazards	☐	Vegetation	☐	Terrain	☐	Parking
☐	Congestion	☐	Site Entry/Exit Hazards	☐	Local Traffic Volume	☐	Security
☐	Heavy Equipment	☑	Time/Length of Work Day			☐	Other:

Do any of the considerations above require further explanation: No

3. Was the WESTON Environmental Risk Management Tool completed in EHS? Yes

   Was an Environmental Compliance Plan required? No

4. Are there any seasonal considerations that should be noted (e.g., Anticipated Snowy Conditions): There is the potential for snowy and/or icy driving conditions while mobilizing to and from the Site. Extra caution should be taken.

5. Is a Traffic Control Plan required? ☑ Yes ☐ No

Physical Parameters	**Chemical Contaminant** **Mercury** **CAS # 7439-97-6**
Exposure Limits / IDLH Level	ppm 0.1 mg/m^3 PEL ppm 0.05 mg/m^3 REL ppm 10 mg/m^3 IDLH
Physical Form (Solid/Liquid/Gas)	Solid X Liquid X Gas
Color	Silver-White, Heavy
Odor	Odorless
Flash Point Flammable Limits	N/A Degrees F N/A % UEL N/A % LEL
Vapor Pressure Vapor Density	0.0012 mm/Hg 7 Air = 1
Specific Gravity	13.6 Water = 1
Solubility	Insoluble
Incompatible Materials	Acetylene, ammonia, chlorine dioxide, azides, calcium (amalgam formation), sodium carbide, lithium, rubidium, copper
Routes of Exposure	X Inh X Abs X Con X Ing
Symptoms of Acute Exposure	Irritation eyes, skin; cough, chest pain, dyspnea (breathing difficulty), bronchitis, pneumonitis; tremor, insomnia, irritability, indecision, headache, lassitude (weakness, exhaustion); stomatitis, salivation; gastrointestinal disturbance, anorexia, weight loss; proteinuria
First Aid Treatment	Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately
Ionization Potential	Unknown eV
Instruments for Detection	PID w/ Probe FID CGI RAD Det Tube Other LUMEX, NIOSH 6009; OSHA ID140

Control Measures

Site Map with Work Zones: Work zones are currently unknown. The appropriate work zones will be determined on-site during Site orientation.

***This map is subject to Google's Terms of Service, and Google is the owner of rights therein.*

Work Zone Definitions:

Exclusion Zone - the area where contamination is either known or expected to occur and the greatest potential for exposure exists. The outer boundary of the Exclusion Zone, called the Hotline, separates the area of contamination from the rest of the Site.

Contamination Reduction Zone (CRZ) - the area in which decontamination procedures take place. The purpose of the CRZ is to reduce the possibility that the Support Zone will become contaminated or affected by the site hazards.

Support Zone - the uncontaminated area where workers are unlikely to be exposed to hazardous substances or dangerous conditions. The Support Zone is the appropriate location for the command post, medical station, equipment and supply center, field laboratory, and any other administrative or support functions that are necessary to keep site operations running efficiently.

Communications:

- ☑ Buddy System
- ☐ Radio
- ☐ Air Horn for Emergencies
- ☑ Hand Signals/Visual Contact

Personnel Decontamination Procedures: None

- ☐ Wet Decontamination (procedures as follows)
- ☑ Dry Decontamination (procedures as follows)

It is anticipated that all emergency response activities will be conducted in Level D personal protective equipment (PPE). However, if Action Levels are exceeded then Level C/B PPE will be utilized. The Action Levels for mercury vapors are as follows:

1.) > 1,000 nanograms per cubic meter (ng/m^3) = Level D PPE
2.) < 1,000 ng/m^3 and > 2,500 ng/m^3 = Level C PPE
3.) > 2,500 ng/m^3 = Level B PPE

Equipment Decontamination Procedures:

- ☐ Wet Decontamination (procedures as follows)
- ☑ Dry Decontamination (procedures as follows)

No equipment decontamination is anticipated for the emergency response support activities.

Adequacy of decontamination determined by: Site Health & Safety Officer

Personal Protective Equipment

TASK TO BE PERFORMED	ANTICIPATED LEVEL OF PROTECTION	TYPE OF CHEMICAL PROTECTIVE COVERALL	INNER GLOVE / OUTER GLOVE / BOOT COVER	PROTECTIVE EYEWEAR	APR CARTRIDGE TYPE or SCBA
Mercury MVA Air monitoring	Level D/C/B	None/Tyvek	Nitrile/Nitrile	Yes	None/Full Face/APR Mercury Filter cartridge (SCOTT 642-HGCL)
Documentation	Level D/C/B	None/Tyvek	Nitrile/Nitrile	Yes	None/Full Face/APR Mercury Filter cartridge (SCOTT 642-HGCL)

Hazard Task Analysis

RISK LEVEL (High, Medium, Low)	TASK/HAZARD	RECOGNITION/ SYMPTOMS	MITIGATION	LEVEL OF PROTECTION
Medium	**Task:** Air monitoring and documentation. **Hazard:** slips, trips, falls and uneven walking surfaces	Snow cover of ground surface. Exterior walking surfaces clear of debris and uneven surfaces that may increase the potential for an incident.	Awareness of surrounding and footing.	Level D/C/B

Frequency and Types of Air Monitoring:

☑ Continuous- _____ ☐ Routine - _____ ☐ Periodic - _____

DIRECT READING INSTRUMENTS	**MultiRAE** CGI / O_2 / H_2S / CL_2 / CO / PID	**Ludlum 19** Micro-R Meter / **Ludlum Model 3** Survey Meter	**AreaRae** CGI / O_2 / H_2S / CL_2 / CO / PID	**Lumex Mercury Vapor Analyzer**
EQUIPMENT ID NUMBER	N/A	N/A	N/A	TBD
CALIBRATION DATE	N/A	N/A	N/A	TBD
RST 3 PERSONNEL	N/A	N/A	N/A	Michael Beuthe Peter Lisichenko
ACTION LEVEL	> 10 - 20% LEL (Confined Space / non-Confined Space) < 19.5%, O_2 Deficient > 23% O_2 – Enriched H_2S – PEL: 20 ppm IDLH: 100 ppm Cl_2 – PEL: 1 ppm IDLH: 10 ppm	<3X Background Exercise Caution; ≥ 1 mR/HR – Exit Area, Establish Perimeter, Contact RST 3 HSO	> 10 - 20% LEL (Confined Space / non-Confined Space) < 19.5%, O_2 Deficient > 23% O_2 – Enriched H_2S – PEL: 20 ppm IDLH: 100 ppm Cl_2 – PEL: 1 ppm IDLH: 10 ppm	Mercury Vapors (Except Organo Alkyls): PEL - 0.1 mg/m3 IDLH – 10 mg/m3 The Action Levels for mercury vapors are as follows: >1,000 nanograms per cubic meter (ng/m^3) = Level D PPE < 1,000 ng/m^3 and > 2,500 ng/m^3 = Level C PPE > 2,500 ng/m^3 = Level B PPE

Emergency Telephone Numbers

Emergency Contact	Location / Address	Telephone Number	Notified
Hospital	St Joseph's Hospital Health Center 301 Prospect Ave Syracuse, NY 13203	911 Non-Emergency: (315) 448-5111	Yes
Ambulance	911	911	No
Police	911	911	No
Fire Department	911	911	No

Chemical Trauma Capability? ☑ Yes ☐ No

If no, closest backup: _____ Phone:

Directions to St Joseph's Hospital Health Center (Color map on following page):

11 min (5.6 mi)

1. Head south on Greenleafe Dr toward Frenchmans Creek Dr

0.6 mi

2. Turn right onto River Rd

2.3 mi

3. Turn left onto NY-31 E

2.4 mi

4. Turn right onto Soule Rd

0.2 mi

5. Turn left to merge onto NY-481 S

0.1 mi

Follow NY-481 S and I-81 S to Websters Landing in Syracuse. Take exit 19 from I-81 S

13 min (14.0 mi)

6. Merge onto NY-481 S/Hwy 481 S

6.5 mi

7. Take exit 9S for Interstate 81 S toward Syracuse

0.3 mi

8. Merge onto I-81 S

7.1 mi

9. Take exit 19 for Clinton St/Salina St

213 ft

10. Keep right at the fork, follow signs for Clinton Street

262 ft

Take Butternut St and N Townsend St to Prospect Ave

4 min (0.7 mi)

11. Turn right onto Websters Landing (signs for Butternut)

486 ft

12. Turn right onto Butternut St

0.4 mi

13. Turn right onto N Townsend St

0.2 mi

14. Turn right onto Union Ave

348 ft

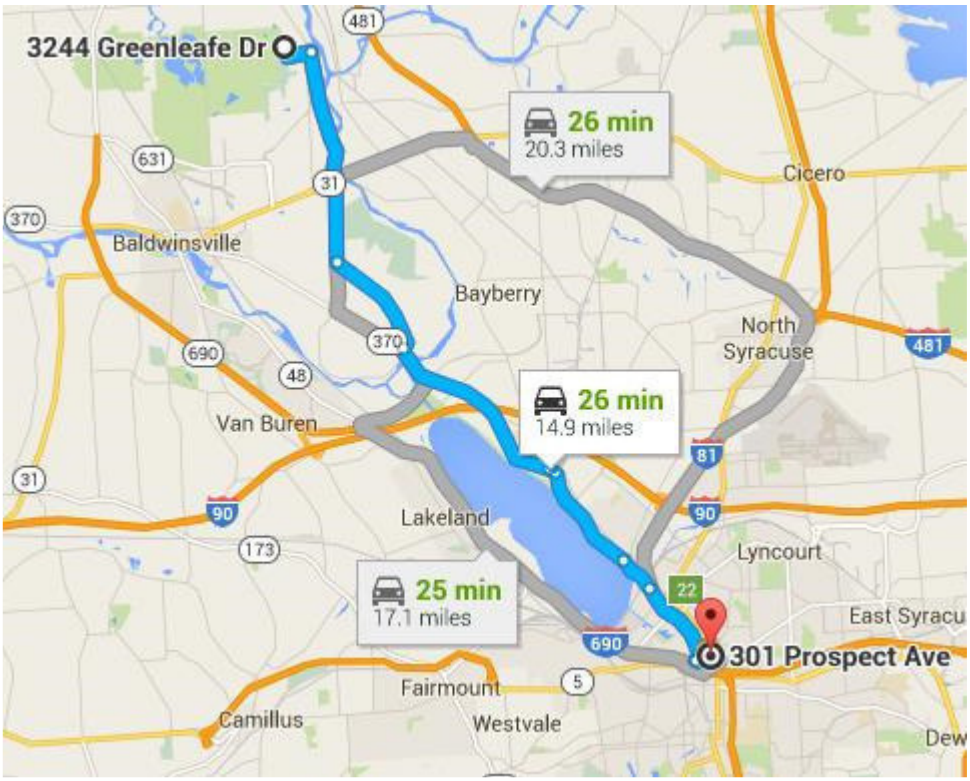
15. Union Ave turns left and becomes Prospect Ave

Destination will be on the right

20 ft

301 Prospect Ave
Syracuse, NY 13203

Destination Time & Distance: 26 minutes, 20.3 miles



***This map is subject to Google Map's Terms of Service, and Google Maps is the owner of rights therein.*

Route verified by:_____ Date:___/___/_____

Additional Emergency Telephone Contacts

WESTON Medical Emergency Service Dr. Peter Greaney, Medical Director WorkCare 300 South Harbor Blvd, Suite 600 Anaheim, California 92805	800-455-6155 Regular Business Hours (9AM to 7:30PM) **Dial 0 or Ext. 175 for Michelle Bui to request the on-call clinician.** 800-455-6155 After Hours (Weekdays 7:31PM to 8:59AM, Weekends, Holidays) **Dial 3 to reach the after-hours answering service. Request that the service connect you with the on-call clinician or the on-call clinician will return your call within 30 minutes.**
Chemtrec	800-424-9300
ATSDR	404-639-0615
ATF (explosives information)	800-424-9555
National Response Center	800-424-8802
National Poison Control Center	800-764-7661
Chemtel	800-255-3924
DOT	800-424-8802
CDC	800-232-0124

Pre-Response Approval

HASP prepared by: Timothy Benton Date: 4/9/2016

Pre-Response/Entry Approval by: _____ Date: 4/9/2016

Tasks Conducted	Level of Protection/Specific PPE Used
Mercury MVA Air monitoring	Level D/C/B
Documentation	Level D/C/B

Hazardous Waste Site and Environmental Sampling Activities

Off Site: ☐ Yes ☑ No

On Site: ☐ Yes ☑ No

Describe types of samples and methods used to obtain samples:

As part of the emergency response, RST 3 has been tasked with providing two CRT members to provide mercury vapor air monitoring and documentation at the scene of the mercury release. Air monitoring will be conducted utilizing a Lumex MVA. The Action Levels for mercury vapors are as follows:

1.) > 1,000 ng/m^3 = Level D PPE
2.) < 1,000 ng/m^3 and > 2,500 ng/m^3 = Level C PPE
3.) > 2,500 ng/m^3 = Level B PPE

No sampling is currently being requested as part of the initial emergency response activities.

Was laboratory notified of potential hazard level of samples? ☑ Yes ☐ No

Disclaimer: This Health and Safety Plan (HASP) was prepared for work to be conducted under the RST 3 Contract EP-S2-14-01. Use of this HASP by WESTON and its subcontractors is intended to fulfill the OSHA requirements found in 29 CFR 1910.120. Items not specifically covered in this HASP are included by reference to 29 CFR 1910 and 1926.

The signatures below indicate that the individuals have read and understood this Health and Safety Plan.

PRINTED NAME	SIGNATURE	AFFILIATION	DATE

Post-Response Approval

Final Submission of HASP by:		Date:
Post Response Approval by:		Date:
RST 3 HSO Review by:		Date:

Air Monitoring Summary Log

Date: ___/___/
Data Collected by:

Station/ Location	**MultiRAE** CGI / O_2 / H_2S / CL_2 / CO / PID	**Ludlum 19** Micro-R Meter **/ Ludlum Model 3** Survey Meter	**AreaRae** CGI / O_2 / H_2S / CL_2 / CO / PID	**Lumex Mercury Vapor Analyzer**	**Particulate Monitors**

ATTACHMENT A

NIOSH Pocket Guides

Centers for Disease Control and Prevention
CDC 24/7: Saving Lives. Protecting People.™

Search the Pocket Guide

SEARCH

Enter search terms separated by spaces.

Mercury compounds [except (organo) alkyls] (as Hg)

Synonyms & Trade Names Mercury metal: Colloidal mercury, Metallic mercury, Quicksilver
Synonyms of "other" Hg compounds vary depending upon the specific compound.

CAS No. 7439-97-6 (metal)	**RTECS No.** OV4550000 (metal) (/niosh-rtecs/OV456D70.html)	**DOT ID & Guide** 2809 172 (http://wwwapps.tc.gc.ca/saf-sec-sur/3/erg-gmu/erg/guidepage.aspx?guide=172) (http://www.cdc.gov/Other/disclaimer.html) (metal)
Formula Hg (metal)	**Conversion**	**IDLH** 10 mg/m³ (as Hg) See: 7439976 (/niosh/idlh/7439976.html)
Exposure Limits **NIOSH REL** : Hg Vapor: TWA 0.05 mg/m³ [skin] Other: C 0.1 mg/m³ [skin] **OSHA PEL** † (nengapdxg.html) : TWA 0.1 mg/m³		**Measurement Methods** **NIOSH** 6009 (/niosh/docs/2003-154/pdfs/6009.pdf) ; **OSHA** ID140 (http://www.osha.gov/dts/sltc/methods/inorganic/id140/id140.html) (http://www.cdc.gov/Other/disclaimer.html) See: NMAM (/niosh/docs/2003-154/) or OSHA Methods (http://www.osha.gov/dts/sltc/methods/index.html) (http://www.cdc.gov/Other/disclaimer.html)

Physical Description Metal: Silver-white, heavy, odorless liquid. [Note: "Other" Hg compounds include all inorganic & aryl Hg compounds except (organo) alkyls.]

MW: 200.6	**BP:** 674° F	**FRZ:** -38°F	**Sol:** Insoluble	**VP:** 0.0012 mmHg	**IP:** ?
Sp.Gr: 13.6 (metal)	**Fl.P:** NA	**UEL:** NA	**LEL:** NA		

Metal: Noncombustible Liquid

Incompatibilities & Reactivities Acetylene, ammonia, chlorine dioxide, azides, calcium (amalgam formation), sodium carbide, lithium, rubidium, copper

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms irritation eyes, skin; cough, chest pain, dyspnea (breathing difficulty), bronchitis, pneumonitis; tremor, insomnia, irritability, indecision, headache, lassitude (weakness, exhaustion); stomatitis, salivation; gastrointestinal disturbance, anorexia, weight loss; proteinuria

Target Organs Eyes, skin, respiratory system, central nervous system, kidneys

Personal Protection/Sanitation (See protection codes (protect.html))	**First Aid** (See procedures (firstaid.html)) **Eye:** Irrigate immediately

Skin: Prevent skin contact **Eyes:** No recommendation **Wash skin:** When contaminated **Remove:** When wet or contaminated **Change:** Daily	**Skin:** Soap wash promptly **Breathing:** Respiratory support **Swallow:** Medical attention immediately

Respirator Recommendations

Mercury vapor:

NIOSH

Up to 0.5 mg/m3:
(APF = 10) Any chemical cartridge respirator with cartridge(s) providing protection against the compound of concern†
(APF = 10) Any supplied-air respirator

Up to 1.25 mg/m3:
(APF = 25) Any supplied-air respirator operated in a continuous-flow mode
(APF = 25) Any powered, air-purifying respirator with cartridge(s) providing protection against the compound of concern†(canister)

Up to 2.5 mg/m3:
(APF = 50) Any chemical cartridge respirator with a full facepiece and cartridge(s) providing protection against the compound of concern†
(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concern†
(APF = 50) Any supplied-air respirator that has a tight-fitting facepiece and is operated in a continuous-flow mode
(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and cartridge(s) providing protection against the compound of concern(canister)
(APF = 50) Any self-contained breathing apparatus with a full facepiece
(APF = 50) Any supplied-air respirator with a full facepiece

Up to 10 mg/m3:
(APF = 1000) Any supplied-air respirator operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions:
(APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode
(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape:
(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concern
Any appropriate escape-type, self-contained breathing apparatus

Other mercury compounds: NIOSH/OSHA

Up to 1 mg/m3:
(APF = 10) Any chemical cartridge respirator with cartridge(s) providing protection against the compound of concern†
(APF = 10) Any supplied-air respirator

Up to 2.5 mg/m3:
(APF = 25) Any supplied-air respirator operated in a continuous-flow mode

(APF = 25) Any powered, air-purifying respirator with cartridge(s) providing protection against the compound of concern†(canister)

Up to 5 mg/m3:
(APF = 50) Any chemical cartridge respirator with a full facepiece and cartridge(s) providing protection against the compound of concern†
(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concern†
(APF = 50) Any supplied-air respirator that has a tight-fitting facepiece and is operated in a continuous-flow mode
(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and cartridge(s) providing protection against the compound of concern(canister)
(APF = 50) Any self-contained breathing apparatus with a full facepiece
(APF = 50) Any supplied-air respirator with a full facepiece

Up to 10 mg/m3:
(APF = 1000) Any supplied-air respirator operated in a pressure-demand or other positive-pressure mode

Emergency or planned entry into unknown concentrations or IDLH conditions:
(APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode
(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape:
(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concern
Any appropriate escape-type, self-contained breathing apparatus

Important additional information about respirator selection (pgintrod.html#mustread)

See also: INTRODUCTION (/niosh/npg/pgintrod.html) See ICSC CARD: 0056 (/niosh/ipcsneng/neng0056.html) See MEDICAL TESTS: 0136 (/niosh/docs/2005-110/nmed0136.html)

Page last reviewed: April 4, 2011
Page last updated: November 18, 2010
Content source: National Institute for Occupational Safety and Health (NIOSH) Education and Information Division

Centers for Disease Control and Prevention 1600 Clifton Road Atlanta, GA 30329-4027, USA
800-CDC-INFO (800-232-4636) TTY: (888) 232-6348 - Contact CDC–INFO

USA.gov Government Made Easy

ATTACHMENT B

WESTON FLDs

FLD 02 INCLEMENT WEATHER

Hot weather (ambient temperatures over 70°F), cold weather (ambient temperatures below 40°F), rain, snow, ice, and lightning are examples of inclement weather that may be hazardous or add risk to work activities. Extremes of heat, cold, and humidity, as well as rain, snow, and ice, can adversely affect monitoring instrument response and reliability, respiratory protection performance, and chemical protective clothing materials.

RELATED FLDs AND OP

FLD 05 – Heat Stress Prevention and Monitoring
FLD 06 – Cold Stress
OP 05-03-008 – Inclement Weather & Business Disruption Policy

PROCEDURE

The potential for exacerbating the impact of physical hazards must be considered for tasks that expose personnel to inclement weather. Risk assessment and hazards analysis should be accomplished during the planning stages of a project for the most likely inclement weather conditions that may be encountered, i.e., rain and lightning in late spring, summer, and early fall, or lightning prone areas; cold, snow, and ice in winter. The Field Safety Officer (FSO) must determine the proper safety procedures and recommend them to the site manager. Each worker must evaluate the risk associated with his/her work and be actively alert to these hazards. Managers and workers must be familiar with the requirements of FLD 05 and FLD 06.

A pre-site activity risk assessment must be completed when inclement weather occurs. Weather conditions that affect instruments and personal protective equipment (PPE) function must be conveyed to site workers who should monitor function and integrity of PPE and be alert to changing weather conditions. A decision must be made on the proper safety procedures to use if work must continue, or to stop work if the risk is too great. The appropriate Safety Professional **must be notified of all instances of the need to stop work for safety reasons, including inclement weather**.

Heat

Hot, dry weather increases risk of soil drying, erosion, and dust dispersion, which may present or increase risk of exposure and environmental impact from toxic hazards. Hot weather will increase pressure on closed containers and the rate of volatilization, thereby potentially increasing the risk of exposure to toxic, flammable, or explosive atmospheres.

Prevention and Protective Measures

Employees must be protected from airborne contaminants using engineering controls such as wetting dry soil to prevent particle dispersion, and providing local ventilation to reduce volatile air contaminants to safe levels, or if engineering controls are infeasible, using prescribed PPE. Wind shifts and velocity should be measured where change may result in dispersion of airborne contaminants into the work area.

Rain, Wet Weather, and High Humidity

Wet conditions resulting from rain and wet weather increase slipping and tripping hazards, braking distances of vehicles, the potential for vehicle skidding, or difficulties in handling powered devices such as augers and drills. Rain fills holes, obscures trip and fall hazards, and increases risk of electrical shock

when working with electrical equipment. Changes in soil conditions caused by rain can impact trenching and excavating activities, creating the potential for quicksand formation, wall collapse, and cave-in. Vehicles become stuck in mud, and tools and personnel can slip on wet surfaces. Rain and wet conditions may decrease visibility (especially for personnel wearing respiratory protection) and limit the effectiveness of certain direct-reading instruments (e.g., photoionization detectors [PIDs]).

Feet that become wet and are allowed to remain wet can lead to serious problems under both heat and cold conditions. Activities that may result in wet feet include extended work in chemical protective clothing and wading in water/liquid during biological assessments. Trench foot, paddy foot, and immersion foot are terms associated with foot ailments resulting from feet being wet for long periods of time. All have similar symptoms and effects. Initial symptoms include edema (swelling), tingling, itching, and severe pain. These may be followed by more severe symptoms including blistering, death of skin tissue, and ulceration. (NOTE: The following Preventive and Protective Measures also apply to Cold, Snow, and Ice.)

Preventive and Protective Measures

Walkways, stairs, ladders, elevated workplaces, and scaffold platforms must be kept free of mud, ice, and snow. Employees shall be prohibited from working on scaffolds covered with snow, ice, or other slippery material except as necessary for removal of such materials.

Vehicles used in rain or cold weather must have working windshield wipers and defrosters, and windows must be kept clear of obstruction.

Drivers must observe traffic laws, including maintaining speed within limits safe for weather conditions, and wearing seat belts at all times. Note that this may mean operating below the posted speed limit.

When walking, workers should use a walking stick or probe to test footing ahead where there is standing water, snow, or ice to protect the walker against stepping into potholes or onto puncture hazards, buried containers, or other potential structurally unsound surfaces.

Prior to using vehicles or equipment in off-road work, workers should walk the work area or intended travelway when puddles or snow may obscure potholes, puncture hazards, or buried containers, or other potential structurally unsound surfaces.

Project managers should arrange to have winches, come-alongs, or other mechanical assistance available when vehicles are used in areas where there is increased risk of getting stuck. Cable or rope and mechanical equipment used for pulling stuck vehicles must be designed for the purpose, of sufficient capacity for the load, and be inspected regularly and before use to ensure safety. **Manually pushing stuck vehicles is to be avoided**.

Prevention methods are required when work is performed in wet conditions or when conditions result in sweating, causing the feet to become and remain wet. Proper hygiene is critical. Workers must dry their feet and change socks regularly to avoid conditions associated with wet feet. Use of foot talc or powder can additionally assist in prevention of this type of condition.

Cold, Snow, and Ice

Cold weather affects vehicle operation by increasing difficulty in starting and braking. Ice, frost, and snow can accumulate on windows and reduce vision. Cold, wet weather can cause icing of roadways,

driveways, parking areas, general work places, ladders, stairs, and platforms. Ice is not always as obvious to see as snow or rain, and requires special attention, especially when driving or walking.

Snow and ice increase the risk of accidents such as slipping when walking, climbing steps and ladders, or working at elevation, and the risk of accidents when driving vehicles or operating heavy equipment. Heavy snow and ice storms may cause electric lines to sag or break, and the use of electrical equipment in snow increases the risk of electric shock. Snow can hide potholes and mud, which can result in vehicles getting stuck or persons falling when stepping into hidden holes. Snow also may cover water, drums or other containers, sharp metal objects, debris, or other objects that can cause falls or punctures.

Preventive and Protective Measures

WESTON personnel are cautioned against operating motor vehicles such as cars or trucks on ice under any circumstances. If traveling in icy conditions, WESTON personnel should follow all public service advisories that curtail driving activities.

Personnel performing activities that require working over ice should be aware of minimal ice thickness safety guidelines as follows:

- 4-inch minimum: activities such as walking or skating.
- 6-inch minimum: activities such as snowmobiling or the use of equipment with the same weight and cross-sectional area as a snowmobile.

Personnel should always be aware that these measurement guidelines are under ideal conditions and that snow cover, conditions on rivers, ponds, or lakes with active currents, and other environmental factors impact the safety of working on ice. Clear ice typically is the strongest, while ice that appears cloudy or honeycombed (contains entrained air) is not as structurally strong. Measurements made by drilling or cutting through the ice should be made every few feet to verify safe conditions. Provisions for rescue (e.g., ladders or long poles and effective communications) must be available at the work site.

Lightning

Lightning represents a hazard of electrical shock that is increased when working in flat open spaces, elevated work places, or near tall structures or equipment such as stacks, radio towers, and drill rigs. Lightning has caused chemical storage tank fires and grass or forest fires. Static charges associated with nearby electrical storms can increase risk of fire or explosion when working around flammable materials, and can adversely affect monitoring instruments.

Lightning is the most dangerous and frequently encountered weather hazard people experience each year. Lightning affects all regions. **Florida, Michigan, Pennsylvania, North Carolina, New York, Ohio, Texas, Tennessee, Georgia, and Colorado** have the most lightning deaths and injuries.

Preventive and Protective Measures

Prior to working in areas or beginning projects when or where there is an increased potential for lightning striking personnel, steps must be taken to predict the occurrence of lightning strikes. Recommendations include:

- Check with client management to determine if there are any patterns or noted conditions that can help predict lightning or if there are structures that are prone to lightning strikes. Arrange for

client notification when there is increased potential for lightning activities. Ensure that clients include WESTON workers in lightning contingency plans.

- Monitor weather reports.
- Note weather changes and conditions that produce lightning.
- Stop work in open areas, around drill rigs or other structures that may attract lightning, on or in water and in elevated work places when lightning strikes are sighted or thunder is heard near a work site.
- Ensure all personnel are provided with safe areas of refuge. Prevent personnel from standing in open areas, under lone trees, or under drill rigs.
- Observe the "30-30" Rule. If you see lightning and thunder is heard within 30 seconds (approximately 6 miles), seek shelter. If you hear thunder, but did not see the lightning, you can assume that lightning is within 6 miles and you should seek shelter. Remain in the sheltered location for 30 minutes following the last lightning strike.
- Use a hand held static potential meter (lightning detection device) to monitor the potential difference between a cloud and the ground. When the measured potential is greater than 2 kV/m, there is a potential for a lightning strike – seek shelter.

High Wind and Tornado Safety

High Winds

Many construction workers have died due to wind-related accidents and injuries. A ladder that seems secure under normal circumstances can become unstable during windy conditions and cause you to fall. Scaffolding that is improperly secured can rip free during strong winds and kill bystanders. The risk of injury for construction workers increases during strong winds. Keep in mind that changing weather conditions can affect your daily work tasks, and make sure you have a game plan to prevent proper damage and personal injury.

Stay Informed: With today's modern technology available at the touch of a button, you should keep up to date with the latest local weather reports. Visit weatherbug.com or weather.gov to stay informed in case of wind warnings, watches, and advisories. Larger projects may have their own weather station on site to provide instant weather data. Use daily hazard assessments to determine if working conditions have changed or will change throughout the day.

Be Prepared: When you know the weather will be windy, secure loose building materials, scaffolding and fencing that could be picked up or torn loose by strong winds and thrown onto surrounding streets, structures, vehicles, or bystanders.

Know the Limits of Your Equipment: When operating any equipment, take time to read the operator's manual and become familiar with the wind specifications. Many crane manufacturers have high-wind guidelines to prevent you from operating a crane in unsafe weather. You should also check safety equipment such as fall protection to determine if it is adequate for windy conditions.

Know the Terminology

Severe Thunderstorm Watch

A Severe Thunderstorm Watch means that strong thunderstorms capable of producing winds of 58 mph or higher and/or hail 3/4 inches in diameter or larger are possible. If you are in the area of a Severe Thunderstorm Watch, you should be prepared to take shelter from thunderstorms. Severe Thunderstorm Watches are generally issued for 6-hour periods.

Severe Thunderstorm Warning

A Severe Thunderstorm Warning means that thunderstorms capable of strong winds and/or large hail are occurring or could form at any time. If you are in the area of a severe thunderstorm, you should take shelter indoors immediately, avoid windows, and be prepared for high winds and hail. Severe Thunderstorm Warnings are generally in effect for an hour or less.

High Wind Watch

A High Wind Watch is issued when sustained winds exceeding 40 mph and/or frequent gusts over 60 mph are likely to develop in the next 24 to 48 hours. For summit areas, high wind watches are issued when sustained winds are expected to exceed 45 mph and/or frequently gust over 60 mph. If you are in an area for which a High Wind Watch has been issued you should secure loose objects outdoors that may blow about and avoid outdoor activity that exposes you to high winds.

High Wind Warning

A High Wind Warning is issued when sustained winds exceeding 40 mph and/or frequent gusts over 60 mph are occurring or imminent. For summit areas, warnings are issued for winds exceeding 45 mph and/or frequently gusting over 60 mph. Wind warnings may issued up to 24 hours ahead of the onset of high winds and remain in effect for 6 to 12 hours. If you are in an area where a high wind warning is in effect you should avoid activities that expose you to high winds. Loose objects may be blown around. Tree limbs may break and fall. Power lines may be blown down.

Wind Advisory

A Wind Advisory is issued when sustained winds of 30 to 39 mph and/or frequent gusts to 50 mph or greater are occurring or imminent. Wind advisories may be in effect for 6 to 12 hours. If you are in an area where a wind advisory is in effect you should secure loose objects that may be blown about outdoors and limit activity that may expose you to high winds.

Work Safely: If you will be working on a windy day, you should be alert and protected. Wear eye protection to prevent dust and other particles from entering or striking your eyes. Keep your hard hat on at all times to prevent injuries from falling or flying objects. The likelihood of falls from heights is greatly increased by strong winds. Wear the necessary PPE to ensure your safety.

To avoid flying debris and to minimize damage during high winds:

- Shut down outdoor activities involving work at elevation on ladders, scaffolding, aerial lifts, etc.; handling large tarps and plastic sheeting when wind speeds exceed 25 mph; including work with radioactive materials and highly toxic materials that could be dispersed by the winds.
- At 13 - 18 mph wind will raise dust. Follow the dust action level.

- Move mobile items stored outside to indoor storage.
- Secure any items that cannot be moved inside.
- Be careful opening exterior doors.
- Be cautious about downed power lines, tree limbs, and debris on roads.
- Be alert for animals who have escaped from farms and zoos.

Stay Away from Power Lines: High winds can cause tree limbs to fall on power lines resulting in electrocution hazards or loss of power. Your best bet is to keep your distance.

Tornados

What is a TORNADO?

A tornado is a violent windstorm characterized by a twisting, funnel-shaped cloud. It is spawned by a thunderstorm or as a result of severe weather associated with hurricanes. A funnel cloud is formed as cool air overrides a layer of warm air, forcing the warm air to rise rapidly. The damage from a tornado results from high wind velocity and wind blown debris.

Tornado Safety

When a tornado approaches, you have only a brief amount of time to make life-or-death decisions. Advance planning and quick response are the keys to surviving a tornado.

Purchase a NOAA Weather Alert radio with an alert feature. When tuned to the proper frequency, these weather radios remain silent until a weather emergency occurs. Once they pick up the alarm tone, they will begin broadcasting emergency weather information so that citizens can protect themselves and their property. Some models of the NOAA weather radio incorporate the Specific Area Message Encoder technology, allowing users to target only those warnings that affect their immediate geographic area.

Conduct tornado drills. Designate an area to serve as your safe area, and practice having team members assemble there in response to a mock tornado warning.

Emergency Communications Plan. Develop an emergency communications plan in case team members are separated from one another when a tornado warning goes into effect. Designate an emergency coordinator. Instruct everyone to contact this coordinator in a weather emergency for instructions on what to do during the storm and where to reassemble after the emergency has passed. Design contingency plans to be consistent with client contingency plans. When possible use client warning and alerting systems and confirm that team members have access to shelters and know how to get to them.

Know the Difference between a Tornado Watch and a Tornado Warning

Tornado Watch: Issued by the National Weather Service when tornadoes are possible in your area. You should remain alert for approaching storms. Remind family members of where the safe areas are within your home, and carefully monitor radio or television reports for further developments.

Tornado Warning: Indicates that a tornado has been sighted in your area, or is indicated on weather radar. You should proceed to safe shelter immediately.

When A Tornado Warning Goes In Effect, Put Your Safety Plans In Action.

In Your Automobile: Motor vehicles are easily overturned by tornado winds. Leave your vehicle and seek shelter in a sturdy building. As a last resort, seek shelter in a ditch or culvert. Do not try to outrun or outmaneuver a tornado! Use the time to seek appropriate shelter outside your vehicle.

Office Buildings, Hotels, and Shopping Centers: Take shelter in an interior hallway on a lower floor. A closet, bathroom or other small room with short, stout walls will give some protection from collapse and flying debris. Otherwise, get under heavy furniture and stay away from windows. Many tornado deaths have occurred in large buildings due to the collapse of a roof or wide span wall. A corner area, away from a window, is safer than the middle of a wide span wall.

Out In Open Country: When severe weather approaches, seek inside shelter immediately. The chances of encountering falling trees, downed power lines and lightning are far greater than encountering a tornado itself. If a tornado approaches, lie flat in the nearest depression, such as a culvert or ditch, and cover your head with your arms.

BE ALERT TO CHANGING WEATHER CONDITIONS

HAVE AN EMERGENCY WEATHER PLAN IN PLACE

REHEARSE YOUR CONTINGENCY PLANS PERIODICALLY

KNOW WHERE TO GO WHEN A TORNADO THREATENS.

FLD 06 COLD STRESS

Three major factors that contribute to cold stress are cold temperatures, dampness, and wind velocity. Persons working outdoors in low temperatures, especially in wet or windy conditions, are subject to cold stress. Exposure to extreme cold for even a short time can cause severe injury to the surface of the body, or result in cooling of the body core temperature which, if unchecked, can be fatal. Site workers must learn to recognize and treat the various forms of cold stress.

RELATED FLDs

FLD 02 – Inclement Weather
FLD 17 – Diving
FLD 19 – Working Over or Near Water
FLD 25 – Working at Elevation/Fall Protection

GENERAL INFORMATION

Body heat is conserved through the constriction of surface blood vessels. This constriction reduces circulation at the skin layers and keeps blood nearer the body core. Loss of body heat can occur through:

1. Respiration – The process of breathing; inhaling and exhaling air. Heat is lost when breathing cold air into the lungs.
2. Evaporation – Heat loss from the body by vaporization of water from the skin surface.
3. Conduction – Direct transfer of body heat by contact with a cooler object. Conduction may occur when sitting on snow, touching cold equipment, and working in the rain. Body heat is lost rapidly when a person becomes wet. Most clothing loses approximately 90 percent of its insulating properties when wet. Additionally, water conducts heat 240 times faster than air; thus, the body cools suddenly when the layer of clothing that contacts the skin becomes wet.
4. Radiation – Heat radiated outward from the body to a cooler environment. The greatest amount of body heat is lost from uncovered surfaces of the body, especially the head, neck, and hands.
5. Convection – Heat transferred to cool air moving across the surface of the body. The body continually heats a thin layer of air next to the skin. Clothing retains this warm surface layer of air. If this warm air is removed by air currents (wind), the body will be cooled while attempting to rewarm the surface air. Wind chill is the chilling effect of moving air in combination with low temperature.

Other factors may contribute to cold stress, such as:

1. Medications, including antidepressants, sedatives, tranquilizers and some heart medications may affect the body's ability to thermo-regulate.
2. Dehydration, or the loss of body fluids, occurs in a cold environment and may increase the susceptibility of workers to cold injury due to a significant change in blood flow to the extremities.
3. Heavy work typically causes sweating that will result in wet clothing.

4. A worker's predisposing health condition such as cardiovascular disease, diabetes, and hypertension.
5. Older people are not able to generate heat as quickly, thus may be at more risk than younger adults.

When the body is unable to warm itself, serious cold-related illness and injuries may occur, including permanent tissue damage and possible death.

RECOGNITION AND RISK ASSESSMENT

In the planning stages of a project, the potential for cold-related hazards must be considered in the site-specific Health and Safety Plan (HASP) and during risk assessment. The Field Safety Officer (FSO) must make decisions on the proper safety procedures and recommend them to the site manager. Each worker must evaluate the risk associated with his or her work and be actively alert to these hazards. Any site worker may stop work if safety procedures are not followed or the risk is too great.

Low Temperature + Wind Speed + Wetness = Injuries and Illness

The Cold Stress Equation (OSHA Card-3156) is a quick-reference tool provided on the Weston Portal.

Frostbite

Frostbite is the freezing of tissue and most commonly affects the toes, ears, fingers, and face. Frostbite occurs when an extremity loses heat faster than it can be replaced by the circulating blood. Frostbite may result from direct exposure to extreme cold or cool, high wind. Damp socks and shoes may contribute to frostbite of the toes.

Signs and symptoms of frostbite include:

- Cold, tingling, aching, or stinging feeling followed by numbness
- Skin color is red, purple, white, or very pale and is cold to the touch
- Blisters may be present (in severe cases)

Treatment for frostbite:

- Call for emergency medical assistance.
- Move the victim indoors and/or away from additional exposure to cold, wet, and wind.
- Wrap the affected area in a soft, clean cloth (sterile, if available).
- Give a warm drink (water or juices, not coffee, tea or alcohol). Do not allow the victim to smoke.
- Do not rub the frostbitten part (this may cause gangrene).
- Do not use ice, snow, gasoline or anything cold on the frostbitten area.
- Do not use heat lamps or hot water bottles to rewarm the frostbitten area.
- Do not place the frostbitten area near a hot stove.
- Do not break blisters.
- After rewarming, elevate the area and protect it from further injury.

Hypothermia

Hypothermia means "low heat" and is a potentially serious condition. Systemic hypothermia occurs when body heat loss exceeds body heat gain and the body core temperature falls below the normal 98.6°F. While some hypothermia cases are caused by extremely cold temperatures, most cases develop in air

temperatures between 30° and 50°F, especially when compounded with water immersion and/or windy conditions.

The victim of hypothermia may not know, or refuse to admit, that he or she is experiencing hypothermia. All personnel must be observant for these signs for themselves and for other team members. Hypothermia can include one or more of the following symptoms.

- Cool bluish skin
- Uncontrollable shivering
- Vague, slow, slurred speech
- Irritable, irrational, or confused behavior
- Memory lapses
- Clumsy movements, fumbling hands
- Fatigue or drowsiness

Below the critical body core temperature of 95°F, the body cannot produce enough heat by itself to recover. At this point, emergency measures must be taken to reverse the drop in core temperature. The victim may slip into unconsciousness and can die in less than 2 hours after the first signs of hypothermia are detected. Treatment and medical assistance are critical.

Treatment for hypothermia:

- Call for emergency medical assistance.
- Do not leave the victim alone.
- Prevent further heat loss by moving the person to a warmer location out of the wind, wet, and cold.
- Remove cold, wet clothing and replace with warm dry clothing or wrap the victim in blankets.
- If the victim is conscious, provide warm liquids, candy, or sweetened foods. Carbohydrates are the food most quickly transformed into heat and energy. Do not give the victim alcohol or caffeine.
- Have the person move their arms and legs to create muscle heat. If they are unable to move, place warm bottles or hot packs in the arm pits, groin, neck, and head. Do not rub the arms and legs or place the person in warm water.

Prevention and Protection

The following general guidelines are recommended for preventing or minimizing cold stress:

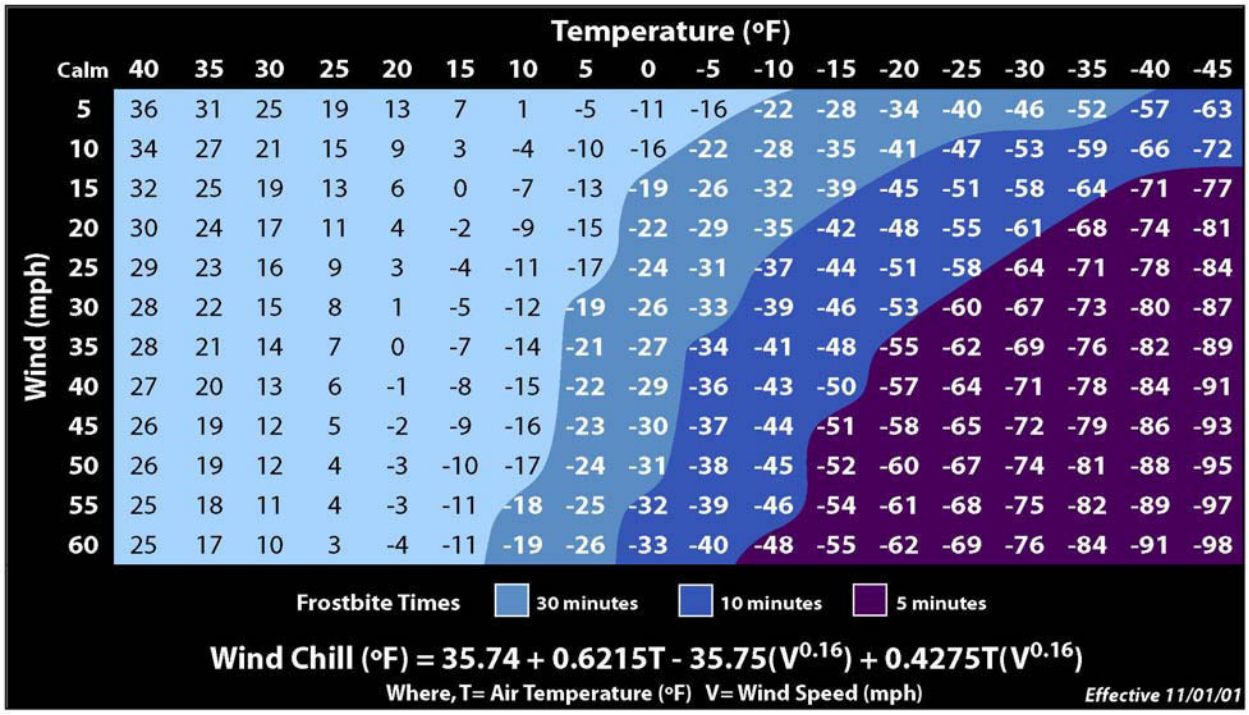
- Wear loose, layered clothing, masks, woolen scarves, and hats. Wear liners under hard hats
- Protect hands with gloves or mittens.
- Never touch cold metal with bare hands.
- Wear waterproof, slip-resistant, insulated boots
- Use chemical foot and hand warmers (commercially available) inside boots and gloves.
- In extreme cold, cover the mouth and nose with wool or fur to “pre-warm” the air you breathe.
- If wearing a face protector, remove it periodically to check for frostbite.

- Ensure that clothing remains secure around the body, especially at the neck and waist.
- If required to wear chemical protective clothing, remember that it generally does not afford protection against cold stress. In many instances, chemical protective clothing increases susceptibility. Dress carefully if both chemical protection and thermal insulation are required.
- Remove outer layers to avoid overheating and soaking clothing with perspiration; replace layers to avoid becoming chilled.
- Keep clothes dry by wearing water-resistant and wind-resistant clothing and outerwear.
- Wear clothing that will "breathe" or allow water vapor to escape.
- Eat well-balanced meals, ensure adequate intake of liquids and avoid alcoholic beverages. Drink warm sweet beverages and soups. Limit the intake of caffeinated drinks due to the diuretic and circulatory effects.
- Utilize available warm shelters and implement work-rest schedules.
- If warm shelters are not available, use cars/vehicles as shelter from the cold. (Ensure that tailpipes are not covered by heavy snowfall).
- Use radiant heaters to provide warmth (if using propane heaters ensure adequate ventilation to avoid carbon monoxide poisoning).
- Monitor yourself and others for changes in physical and mental condition.
- Use the buddy system or supervision to ensure constant protective observation.
- If heavy work must be done, resulting in sweating/wet clothing, take rest periods in heated shelters and change into dry clothing as necessary.
- New employees should not work full-time in the cold during the first days of employment until they become accustomed to the working conditions and the use of required protective clothing.
- Include the weight and bulkiness of clothing in estimating the required work performance and weights to be lifted by the worker.
- Arrange the work in such a way that sitting or standing still for long periods is minimized.
- Perform work protected from drafts to the greatest extent possible. If possible, shield the work area from wind.
- Instruct workers in safety and health procedures. The training program should include, as a minimum, instruction in:
  - Signs and symptoms of frostbite, impending hypothermia, or excessive cooling of the body
  - Proper use of clothing
  - Proper eating and drinking habits
  - Safe work practices
  - Proper rewarming procedures and appropriate first aid treatment
- Tables 1 and 2 should be consulted to adjust working schedules for wind chill conditions based on equivalent chill temperature (ECT). These tables are guidelines only; ambient temperatures and wind conditions should be monitored frequently and work schedules adjusted as required. If workers show signs or symptoms of cold stress, the work schedule must be adjusted, as required.

Work/Warming Regimen

Work should be performed in the warmest part of the day. If work is performed continuously in the cold or winter conditions or where rain or cool winds are expected, provide heated warming shelters, tents, cabins, or break rooms nearby. Encourage workers to use the shelter at regular intervals depending on the severity of the cold exposure. Table 2, Cold Work/Warmup Schedule for 4-Hour Shifts, provides guidance for working in severe cold weather. The onset of heavy shivering, the feeling of excessive fatigue, drowsiness, irritability, or euphoria are indications for immediate return to the shelter. Pain, numbness, or tingling in the extremities are indications for immediate return to the shelter. When entering the heated shelter, the outer layer of clothing should be removed and the remainder of the clothing loosened to permit sweat evaporation, or the worker should change into dry clothing. Never return to work in wet clothing.

Table 1. Wind Chill Chart



NWS/NOAA

Table 2. Cold Work/Warmup Schedule for 4-Hour Shifts

EQUIVALENT CHILL TEMPERATURE	MAXIMUM WORK PERIOD	NO. OF BREAKS
≥-24°F	Normal	1
-25° to –30°F	75 minutes	2
-31° to –35°F	55 minutes	3
-36° to –40°F	40 minutes	4
-41° to –45°F	30 minutes	5
≤-46°F	Stop work	Stop work

FLD 39 ILLUMINATION

RELATED FLDs

FLD 08 – Confined Space Entry Program
FLD 10 – Manual Lifting and Handling of Heavy Objects
FLD 12 – Housekeeping
FLD 13 – Structural Integrity
FLD 18 – Operation and Use of Boats
FLD 22 – Heavy Equipment Operation
FLD 23 – Cranes, Rigging, and Slings
FLD 33 – Demolition
FLD 38 – Hand and Power Hand Tools

PROCEDURE

While work is in progress, offices, facilities, access-ways, working areas, construction roads, etc., will be lighted by at least the minimum light intensities specified in Table 1.

Office lighting will be in accordance with American National Standards Institute (ANSI)/ Illuminating Engineering Society of North America (IESNA) RP-1.

Roadway lighting will be in accordance with ANSI/IESNA RP-8.

Marine lighting will be in accordance with ANSI/IESNA RP-12.

Means of Egress

- Means of egress will be illuminated, with emergency and non-emergency lighting, to provide a minimum of 1 footcandle (fc) (lumens per square foot [lm/ft^2]) (11 lux [lx], measured at the floor. (Reference NFPA 101)
- The illumination will be arranged so that the failure of any single lighting unit, including the burning out of an electric bulb, will not leave any area in total darkness.

Lamps and fixtures will be guarded and secured to preclude injury to personnel. Open fluorescent fixtures will be provided with wire guards, lenses, tube guards and locks, or safety sockets that require force in the horizontal axis to remove the lamp.

Lamps for general illumination shall be protected from accidental contact or breakage. Protection shall be provided by elevation of at least 7 ft (2.1 m) from normal working surface or suitable fixture or lamp holder with a guard.

TABLE 1 - MINIMUM LIGHTING REQUIREMENTS

Facility or Function	Illuminance – lx (lm/ft2)
Accessways	
– general indoor	55 (5)
– general outdoor	33 (3)
– exitways, walkways, ladders, stairs	110 (10)
Administrative areas (offices, drafting/meeting rooms, etc.)	540 (50)
Chemical laboratories	540 (50)
Construction Areas	
– general indoor	55 (5)
– general outdoor	33 (3)
– tunnels and general underground work areas, (minimum 110 lx required at tunnel and shaft heading during drilling, mucking, and scaling)	55 (5)
Conveyor routes	110 (10)
Docks and loading platforms	33 (3)
Elevators (freight and passenger)	215 (20)
First-aid stations and infirmaries	325 (30)
Maintenance/Operating Areas/Shops	
– vehicle maintenance shop	325 (30)
– carpentry shop	110 (10)
– outdoors field maintenance area	55 (5)
– refueling area, outdoors	55 (5)
– shops, fine detail work	540 (50)
– shops, medium detail work	325 (30)
– welding shop	325 (30)
Mechanical/electrical equipment rooms	110 (10)
Parking areas	33 (3)
Toilets, wash, and dressing rooms	110 (10)
Visitor areas	215 (20)
Warehouses and Storage Rooms/Areas	
– indoor stockroom, active/bulk storage	110 (10)
– indoor stockroom, inactive	55 (5)
– indoor rack storage	270 (25)
– outdoor storage	33 (3)
Work areas – general (not listed above)	325 (30)

RST 3 FLD 43A ANIMALS

Animals represent hazards because of their poisons or venoms, size and aggressiveness, diseases transmitted, or the insects they may carry.

Feral Animals

Landfills and abandoned buildings often attract stray or abandoned dogs. These animals often become pack-oriented, very aggressive, and represent serious risk of harm to unprotected workers.

Workers entering abandoned buildings should be alert for such animals and avoid approaching them since this may provoke aggressive behavior. Avoidance and protection protocols include watching for animal dens, using good housekeeping, and using repellents.

Dangerous Wild Animals

Work in remote areas inhabited by wild animals that have been known to cause injury and kill human beings, requires that companies working in these areas carefully plan for wildlife encounters. This FLD outlines actions that, when properly implemented, should provide a high degree of protection for WESTON employees and wildlife.

See Wildlife Hazard Recognition and Protection Procedure (Attached).

Venomous Snakes and Lizards

Venomous Snakes

Venomous snakes are common around the world. The major variables are the likelihood of encounter and the snake that is likely to be encountered. Encounters with snakes may be caused by moving containers, reaching into holes, or just walking through high grass, swampy areas, or rocks. **Do not attempt to catch any snakes.**

Symptom of venomous snake bites:

- Bloody wound discharge, blurred vision, burning, convulsions, diarrhea, dizziness, excessive sweating, fainting, fang marks in the skin, fever, increased thirst, local tissue death, loss of muscle coordination, nausea and vomiting, numbness and tingling, rapid pulse, severe pain, skin discoloration, swelling at the site of the bite, weakness.

Venom from venomous snakes and lizards can be divided into three types of toxins, however, there are some indications that snake venom may have more than one toxin and characteristics may change as a snake ages. The three types of toxins and their effects are:

Hemotoxins destroy blood cells and affect the circulatory system. The site of the bite rapidly becomes swollen, discolored, and painful. This is usually accompanied by swelling, discoloration, and pain progressing toward the heart.

Neurotoxins affect the nervous system and symptoms vary from foggy vision, dizziness, and other comparatively mild symptoms to rigid or flaccid paralysis, shortness of breath, weakness or paralysis of the lower limbs, double vision, inability to speak or swallow, drooping eyelids, and involuntary tremors of the facial muscles. Death can occur in as little as ten minutes, usually due to abrupt cessation of respiration.
Myotoxins destroy cells and cause muscle necrosis.

In the US, with the exception of the coral snakes which tend to have neuron-toxic venom, most venomous snakes have been categorized as having hemotoxic venom (in some areas Mojave rattlesnakes are found to have neuron-toxic venom). There is some indication that some species of rattlesnakes have both hemotoxic and neuron-toxic venom. It is also reported that venom of younger snakes may be more neuron-toxic

There are many are highly venomous snakes worldwide, some are deadly and most can be deadly without proper care.

Geographical Listing of Venomous Snakes

Following is a list of poisonous snakes by geographic area. This list is extensive but may not be all inclusive. In planning for work around the world, also contact local agencies to determine whether there may be additional venomous snakes or lizards.

North America

Copperheads (Broad-banded, Northern, Osage, Southern, Trans-Pecos)
Rattlesnakes Diamondback (eastern and western), Massasauga (eastern and western)
Cottonmouth or water moccasin (Eastern)

Prevention of Bites

Key factors to working safely in areas where snakes or lizards may be encountered include:

- Be alert
- Use care when reaching into or moving containers
- Use sticks or long-handled tools when reaching where you cannot see
- Be familiar with the habits and habitats of snakes in the vicinity of an incident or site
- In areas or activities where encounters with snakes are likely, wear sturdy leather or rubber work boots and snake chaps
- Do not attempt to catch snakes unless required and qualified

A snake bite warrants medical attention after administration of proper first-aid procedures. It is important to contact local medical facilities to determine where anti-venoms are located.

First-Aid

1. Keep the person calm. Restrict movement, and keep the affected area below heart level to reduce the flow of venom.

2. Remove any rings or constricting items because the affected area may swell. Create a loose splint to help restrict movement of the area.

3. If the area of the bite begins to swell and change color, the snake was probably venomous.

4. Monitor the person's vital signs -- temperature, pulse, rate of breathing, and blood pressure if possible. If there are signs of shock (such as paleness), lay the person flat, raise the feet about a foot, and cover the person with a blanket.

5. Get medical help immediately.

6. Try to photograph or identify the snake. Do not waste time hunting for the snake, and do not risk another bite. Be careful of the head of a dead snake. A snake can actually bite for up to an hour after it is dead (from a reflex).

- DO NOT allow the person to become over-exerted. If necessary, carry the person to safety.
- DO NOT apply a tourniquet.
- DO NOT apply cold compresses to a snake bite.
- DO NOT cut into a snake bite with a knife or razor.
- DO NOT try to suction the venom by mouth.
- DO NOT give stimulants or pain medications unless instructed to do so by a doctor.
- DO NOT give the person anything by mouth.
- DO NOT raise the site of the bite above the level of the person's heart
- Transport the victim to medical attention immediately

Animal Borne Diseases

Rabies

Animal borne diseases include rabies (generally found in dogs, skunks, raccoons, bats, and foxes). Rabies varies from area to area as do the animals most likely to be rabid.

Questions and Answers about Rabies

Q. What is Rabies and how is it transmitted?

A. Rabies is a viral infection most often transmitted by bites of animals infected with the virus.

Q. What animals are most likely to be infected?

A. Skunks, raccoons, foxes, and bats are wild animals most frequently found to be infected with rabies; however, any warm blooded animal can be infected. Squirrels, groundhogs, horses, cattle, and rabbits have been tested positive for rabies. Dogs and cats are frequently rabies-infected if not immunized.

Q. How can you tell if an animal is rabies-infected?

A. Rabies infection is not always apparent. Signs to look for in wild animals are over-aggressiveness or passivity. Spotting animals which are normally nocturnal (active at night) during the day and being able to approach them would be an example of unusual behavior. Finding a bat alive and on the ground is abnormal. The best precaution, however, is to observe wild animals from a safe distance, even if they are injured. Avoid dogs and cats that you do not know.

Q. What should you do if bitten by an animal you suspect is infected with rabies?

A. As quickly as possible, wash the bite area with soap and water, then disinfect with 70% alcohol and seek medical attention for follow-up. Try to capture the animal. Avoid being bitten again or contacting the mouth or any saliva of the animal. Keep the animal under surveillance and call the police for assistance to capture it. Have the animal tested.

A dead animal believed to be infected should be preserved and tested for rabies. Health departments are often sources where information can be found regarding testing.

Q. Is there a cure for rabies?

A. Rabies is preventable, even after being bitten, if treatment is begun soon enough. Getting prompt medical attention and confirming the rabies infection of an animal are very important. **Rabies is not curable once symptoms or signs of rabies appear.**

There are vaccines available that should be considered if a work assignment involves trapping animals likely to carry rabies. Medical consultants must be involved in decisions to immunize workers against rabies.

Hantavirus

WESTON employees or contractors/subcontractors conducting field work in areas where there is evidence of a rodent population should be aware of an increased level of concern regarding the transmission of "Hantavirus"-associated diseases. Hantavirus is associated with rodents, especially the deer mouse (*Peromyscus maniculanis*) as a primary reservoir host. Hantavirus has resulted in several deaths in the U.S.

The Hantavirus can be transmitted by infected rodents through their saliva, urine, and feces. Human infection may occur when infected wastes are inhaled as a result of aerosols produced directly from the animals. They also may come from dried materials introduced into broken skin or onto mucous membranes. Infections in humans occur most in adults and are associated with

activities that provide contact with infected rodents in rural/semi-rural areas. Hantavirus begins with one or more flu-like symptoms (i.e., fever, muscle aches, headache, and/or cough) and progresses rapidly to severe lung disease. Early diagnosis and treatment are vital.

Prevention

Personnel involved in work areas where rodents and the presence of the Hantavirus are known or suspected will need to take personal protective measures and to develop an expanded site safety plan.

Field personnel involved in trapping or contacting rodents or their waste products will need to wear respirators with high-efficiency particulate air (HEPA) filters, eye protection, Tyvek coveralls, chemical-resistant gloves, and disposable boot covers. Strict decontamination requirements are needed. Double-bag, label, and specific handling, packaging, shipping, storage, and analytical procedures are required to minimize the risks of exposure from collected mice. More detailed procedures can be obtained from WESTON Corporate Health and Safety.

For employees and facilities in rural/semi-rural areas, the following risk-reduction strategies are appropriate:

- Eliminate rodents and reduce availability of food sources and nesting sites used by rodents.
- Store trash/garbage in rodent-proof metal or thick plastic containers with tight lids.
- Cut all grass/underbrush in proximity to buildings.
- Prevent rodents from entering buildings (e.g., use steel wool, screen, etc., to eliminate openings).

Plague

Described under Insects (Fleas)

Anthrax

Anthrax is an acute infectious disease caused by the spore-forming bacterium *Bacillus anthracis*. Anthrax most commonly occurs in wild and domestic lower vertebrates (cattle, sheep, goats, and other herbivores), but it can also occur in humans when they are exposed to infected animals or tissue from infected animals.

Anthrax is most common in agricultural regions where it occurs in animals. When anthrax affects humans, it is usually due to an occupational exposure to infected animals or their products. Workers who are exposed to dead animals and animal products from other countries where anthrax is more common may become infected with *B. anthracis* (industrial anthrax). Anthrax in wild livestock has occurred in the U.S.

Anthrax infection can occur in three forms: cutaneous (skin), inhalation, and gastrointestinal. *B. anthracis* spores can live in the soil for many years, and humans can become infected with anthrax by handling products from infected animals or by inhaling anthrax spores from contaminated animal products. Anthrax can also be spread by eating undercooked meat from infected animals. It is rare to find infected animals in the U.S.

Cutaneous: Most (about 95%) anthrax infections occur when the bacterium enters a cut or abrasion on the skin, such as when handling contaminated wool, hides, leather, or hair products (especially goat hair) of infected animals. Skin infection begins as a raised itchy bump that resembles an insect bite but within 1-2 days develops into a vesicle and then a painless ulcer, usually 1-3 cm in diameter, with a characteristic black necrotic (dying) area in the center. Lymph glands in the adjacent area may swell. About 20% of untreated cases of cutaneous anthrax will result in death. Deaths are rare with appropriate antimicrobial therapy.

Inhalation: Initial symptoms may resemble a common cold. After several days, the symptoms may progress to severe breathing problems and shock. Inhalation anthrax is usually fatal.

Intestinal: The intestinal disease form of anthrax may follow the consumption of contaminated meat and is characterized by an acute inflammation of the intestinal tract. Initial signs of nausea, loss of appetite, vomiting, and fever are followed by abdominal pain, vomiting of blood, and severe diarrhea. Intestinal anthrax results in death in 25% to 60% of cases.

Anthrax is not known to spread from one person to another person. Communicability is not a concern in managing or visiting patients with inhalation anthrax.

Prevention

In countries where anthrax is common and vaccination levels of animal herds are low, humans should avoid contact with livestock and animal products and avoid eating meat that has not been properly slaughtered and cooked. Also, an anthrax vaccine has been licensed for use in humans. The vaccine is reported to be 93% effective in protecting against anthrax.

Doctors can prescribe effective antibiotics. To be effective, treatment should be initiated early. If left untreated, the disease can be fatal.

Direct person-to-person spread of anthrax is extremely unlikely; however, a patient's clothing and body may be contaminated with anthrax spores. Effective decontamination of people can be accomplished by a thorough wash down with anti-microbe effective soap and water. Waste water should be treated with bleach or other anti-microbial agent. Effective decontamination of articles can be accomplished by boiling contaminated articles in water for 30 minutes or longer and using common disinfectants. Chlorine is effective in destroying spores and vegetative cells on surfaces. Burning the clothing is also effective. After decontamination, there is no need to immunize, treat, or isolate contacts of people ill with anthrax unless they also were also exposed to the same source of infection. Early antibiotic treatment of anthrax is essential–delay seriously lessens chances for survival. Treatment for anthrax infection and other bacterial infections

includes large doses of intravenous and oral antibiotics, such as fluoroquinolones, like ciprofloxacin (cipro), doxycycline, erythromycin, vancomycin, or penicillin. In possible cases of inhalation anthrax exposure to unvaccinated personnel, early antibiotic prophylaxis treatment is crucial to prevent possible death.

No skin, especially if it has any wounds or scratches, should be exposed. Disposable personal protective equipment is preferable, but if not available, decontamination can be achieved by washing any exposed equipment in hot water, bleach and detergent. Disposable personal protective equipment and filters should be burned and buried. The size of Bacillus anthracis bacillii ranges from 0.5 μm to 5.0 μm. Anyone working with anthrax in a suspected or confirmed victim should wear respiratory equipment capable of filtering this size of particle or smaller. The U.S. National Institute for Occupational Safety and Health (NIOSH) and Mine Safety and Health Administration (MSHA) approved high efficiency-respirator, such as a half-face disposable respirator with a HEPA filter, is recommended. All possibly contaminated bedding or clothing should be isolated in double plastic bags and treated as possible bio-hazard waste. Dead victims that are opened and not burned provide an ideal source of anthrax spores; the victim should be sealed in an airtight body bag. Cremating victims is the preferred way of handling body disposal. No embalming or autopsy should be attempted without a fully equipped biohazard lab and trained and knowledgeable personnel.

Delays of only a few days may make the disease untreatable and treatment should be started even without symptoms if possible contamination or exposure is suspected. Animals with anthrax often just die without any apparent symptoms. Initial symptoms may resemble a common cold – sore throat, mild fever, muscle aches and malaise. After a few days, the symptoms may progress to severe breathing problems and shock and ultimately death. Death can occur from about two days to a month after exposure with deaths apparently peaking at about 8 days after exposure. [8] Antibiotic-resistant strains of anthrax are known.

Aerial spores can be trapped by a simple HEPA or P100 filter. Inhalation of anthrax spores can be prevented with a full-face mask using appropriate filtration. Unbroken skin can be decontaminated by washing with simple soap and water. All of these procedures do not kill the spores which are very hard to kill and require extensive treatment to eradicate them. Filters, clothes, etc. exposed to possible anthrax contaminated environments should be treated with chemicals or destroyed by fire to minimize the possibility of spreading the contamination.

In recent years there have been many attempts to develop new drugs against anthrax; but the existing supply still works fine if treatment is started soon enough.

Prevention can also be accomplished through early detection. In response to the U.S. Postal Service (USPS) anthrax attacks of October 2001, the USPS has installed BioDetection Systems (BDS) in their large-scale mail cancellation facilities. BDS response plans have been formulated by the USPS in conjunction with local responders including fire, police, hospitals, and public health. Employees of these facilities have been educated about anthrax, response actions and prophylactic medication. Because of the time delay inherent in getting final verification that anthrax has been used, prophylactic antibiotics for possibly exposed personnel should commence as soon as possible.

The ultimate in prevention is vaccination against infection but this has to be done well in advance of exposure.

Anthrax spores can survive for long periods of time in the environment after release. Methods for cleaning anthrax contaminated sites commonly use oxidizing agents such as peroxides, ethylene Oxide, Sandia Foam, chlorine dioxide (used in the Hart Senate office building), and liquid bleach products containing sodium hypochlorite. These agents slowly destroy bacterial spores. A bleach solution for treating hard surfaces has been approved by the EPA and can be prepared by mixing one part bleach (5.25%-6.00%) to one part white vinegar to eight parts water. Bleach and vinegar must not be combined together directly, rather some water must first be added to the bleach (e.g., two cups water to one cup of bleach), then vinegar (e.g., one cup), and then the rest of the water (e.g., six cups). The pH of the solution should be tested with a paper test strip; and treated surfaces must remain in contact with the bleach solution for 60 minutes (repeated applications will be necessary to keep the surfaces wet).

Chlorine dioxide has emerged as the preferred biocide against anthrax-contaminated sites, having been employed in the treatment of numerous government buildings over the past decade. Its chief drawback is the need for *in situ* processes to have the reactant on demand.

To speed the process, trace amounts of a non-toxic catalyst composed of iron and tetro-amido macrocyclic ligands are combined with sodium carbonate and bicarbonate and converted into a spray. The spray formula is applied to an infested area and is followed by another spray containing tertiary-butyl hydroperoxide

Using the catalyst method, a complete destruction of all anthrax spores takes 30 minutes. A standard catalyst-free spray destroys fewer than half the spores in the same amount of time. They can be heated, exposed to the harshest chemicals, and they do not easily die.

Brucellosis

Brucellosis, also called undulant fever or Malta fever, is a zoonosis (infectious disease transmitted from animals to humans) caused by bacteria of the genus *Brucella*. It is primarily a disease of domestic animals (goats, pigs, cattle, dogs, etc.) and humans and has a worldwide distribution.

Although brucellosis can be found worldwide, it is more common in countries that do not have good standardized and effective public health and domestic animal health programs. Areas currently listed as high risk include the Caribbean.

The disease is transmitted either through contaminated or untreated milk (and its derivates) or through direct contact with infected animals, which may include dogs, pigs, camels, and ruminants, primarily sheep, goats, cattle, and bison. This also includes contact with their carcasses.

Leftovers from parturition are also extremely rich in highly virulent brucellae. Brucellae, along with leptospira have the unique property of being able to penetrate through intact human skin, so infection by mere hand contact with infectious material is likely to occur.

The disease is now usually associated with the consumption of un-pasteurized milk and soft cheeses made from the milk of infected animals and with occupational exposure of veterinarians and slaughterhouse workers. Some vaccines used in livestock, most notably *B. abortus* strain 19 also cause disease in humans if accidentally injected. Problems with vaccine induced cases in the United States declined after the release of the RB-51 strain developed in the 1990s and the relaxation of laws requiring vaccination of cattle in many states.

The incubation period of brucellosis is, usually, of one to three weeks, but some rare instances may take several months to surface.

Brucellosis induces inconstant fevers, sweating, weakness, anemia, headaches, depression and muscular and bodily pain.

The symptoms are like those associated with many other febrile diseases, but with emphasis on muscular pain and sweating. The duration of the disease can vary from a few weeks to many months or even years. In first stage of the disease, septicaemia occurs and leads to the classic triad of undulant fevers, sweating (often with characteristic smell, likened to wet hay) and migratory arthralgia and myalgia.

Prevention

The main way of preventing brucellosis is by using fastidious hygiene in producing raw milk products, or by pasteurization of all milk that is to be ingested by human beings, either in its pure form or as a derivate, such as cheese.

Provide protection from skin contact when handling potentially infected animals.

Q fever

Q fever is caused by infection with *Coxiella burnetii*. This organism is uncommon but may be found in cattle, sheep, goats and other domestic mammals, including cats and dogs. The infection results from inhalation of contaminated particles in the air, and from contact with the vaginal mucus, milk, feces, urine or semen of infected animals. The incubation period is 9-40 days. It is considered possibly the most infectious disease in the world, as a human being can be infected by a single bacterium.

The most common manifestation is flu-like symptoms with abrupt onset of fever, malaise, profuse perspiration, severe headache, myalgia (muscle pain), joint pain, loss of appetite, upper respiratory problems, dry cough, pleuritic pain, chills, confusion and gastro-intestinal symptoms such as nausea, vomiting and diarrhea. The fever lasts approximately 7-14 days.

During the course, the disease can progress to an atypical pneumonia, which can result in a life threatening acute respiratory distress syndrome (ARDS), whereby such symptoms usually occur during the first 4-5 days of infection.

Less often the Q fever causes (granulomatous) hepatitis which becomes symptomatic with malaise, fever, liver enlargement (hepatomegaly), pain in the right upper quadrant of the abdomen and jaundice (icterus).

The chronic form of the Q fever is virtually identical with the inflammation of the inner lining of the heart (endocarditis), which can occur after months or decades following the infection. It is usually deadly if untreated. However, with appropriate treatment this lethality is around 10%.

The common way of infection is inhalation of contaminated dust, contact with contaminated milk, meat, wool and particularly birthing products. Ticks can transfer the pathogenic agent to other animals. Transfer between humans seems extremely rare and has so far been described in very few cases.

Prevention

Q fever is effectively prevented by intradermal vaccination with a vaccine composed of killed *Coxiella burnetii* organisms. Skin and blood tests should be done before vaccination to identify preexisting immunity; the reason is that vaccinating subjects who already have immunity can result in a severe local reaction. After a single dose of vaccine, protective immunity lasts for many years. Revaccination is not generally required. Annual screening is typically recommended.

Wear appropriate PPE when handling potentially infected animals or materials**.**

Leptospirosis

Leptospirosis is a bacterial disease that affects humans and animals. It is caused by bacteria of the genus *Leptospira*.

The time between a person's exposure to a contaminated source and becoming sick is 2 days to 4 weeks. Illness usually begins abruptly with fever and other symptoms. Leptospirosis may occur in two phases; after the first phase, with fever, chills, headache, muscle aches, vomiting, or diarrhea, the patient may recover for a time but become ill again. If a second phase occurs, it is more severe; the person may have kidney or liver failure or meningitis. This phase is also called Weil's disease.

The illness lasts from a few days to 3 weeks or longer. Without treatment, recovery may take several months. In rare cases death occurs.

Many of these symptoms can be mistaken for other diseases. Leptospirosis is confirmed by laboratory testing of a blood or urine sample.

Leptospira organisms have been found in cattle, pigs, horses, dogs, rodents, and wild animals. Humans become infected through contact with water, food, or soil containing waste from these infected animals. This may happen by consuming contaminated food or water or through skin contact, especially with mucosal surfaces, such as the eyes or nose, or with broken skin. The disease is not known to be spread from person to person.

Leptospirosis occurs worldwide but is most common in temperate or tropical climates. It is an occupational hazard for many people who work outdoors or with animals, for example, farmers, sewer workers, veterinarians, fish workers, dairy farmers, or military personnel. It is a recreational hazard for campers or those who participate in outdoor sports in contaminated areas and has been associated with swimming, wading, and whitewater rafting in contaminated lakes and rivers. The incidence is also increasing among urban children.

The risk of acquiring leptospirosis can be greatly reduced by not swimming or wading in water that might be contaminated with animal urine.

Protective clothing or footwear should be worn by those exposed to contaminated water or soil because of their job or recreational activities.

Prevention

Avoid risky foods and drinks.

Buy it bottled or bring it to a rolling boil for 1 minute before drink it. Bottled carbonated water is safer than non-carbonated water.

Ask for drinks without ice unless the ice is made from bottled or boiled water. Avoid popsicles and flavored ices that may have been made with contaminated water.
Eat foods that have been thoroughly cooked and that are still hot and steaming

Avoid raw vegetables and fruits that cannot be peeled. Vegetables like lettuce are easily contaminated and are very hard to wash well. When eating raw fruit or vegetables that can be peeled, peel them yourself. (Wash your hands with soap first.) Do not eat the peelings.

Avoid foods and beverages from street vendors. It is difficult for food to be kept clean on the street, and many travelers get sick from food bought from street vendors.

Leptospirosis is treated with antibiotics, such as doxycycline or penicillin, which should be given early in the course of the disease. Intravenous antibiotics may be required for persons with more severe symptoms. Persons with symptoms suggestive of leptospirosis should contact a health care provider.

Ebola

Ebola is both the common term used to describe a group of viruses belonging to genus Ebolavirus, family Filoviridae, and the common name for the disease which they cause, Ebola hemorrhagic fever. Ebola viruses are morphologically similar to the Marburg virus, also in the family Filoviridae, and share similar disease symptoms. Ebola has caused a number of serious and highly publicized outbreaks since its discovery.

Despite considerable effort by the World Health Organization, no animal reservoir capable of sustaining the virus between outbreaks has been identified. However, it has been hypothesized that the most likely candidate is the fruit bat.

Ebola hemorrhagic fever is potentially lethal and encompasses a range of symptoms including fever, vomiting, diarrhea, generalized pain or malaise, and sometimes internal and external bleeding. Mortality rates are extremely high, with the human case-fatality rate ranging from 50% - 89%, according to viral subtype. [2] The cause of death is usually due to hypovolemic shock or organ failure.

Because Ebola is potentially lethal and since no approved vaccine or treatment is available, Ebola is classified as a biosafety level 4 agent, as well as a Category A bioterrorism agent by the Centers for Disease Control and Prevention.

Symptoms are varied and often appear suddenly. Initial symptoms include high fever (at least 38.8°C), severe headache, muscle joint, or abdominal pain, severe weakness and exhaustion, sore throat, nausea, and dizziness. Before an outbreak is suspected, these early symptoms are easily mistaken for malaria, typhoid fever, dysentery, influenza, or various bacterial infections, which are all far more common and less reliably fatal.

Ebola may progress to cause more serious symptoms, such as diarrhea, dark or bloody feces, vomiting blood, red eyes due to distention and hemorrhage of sclerotic arterioles, petechia, maculopapular rash, and purpura. Other secondary symptoms include hypotension (less than 90 mm Hg systolic /60 mm Hg diastolic), hypovolemia, tachycardia, organ damage (especially the kidneys, spleen, and liver) as a result of disseminated systemic necrosis, and protinuria. The interior bleeding is caused by a chemical reaction between the virus and the platelets which creates a chemical that will cut cell sized holes into the capillary walls.

Among humans, the virus is transmitted by direct contact with infected body fluids, or to a lesser extent, skin or mucus membrane contact. The incubation period can be anywhere from 2 to 21 days, but is generally between 5 and 10 days.

Although airborne transmission between monkeys has been demonstrated by an accidental outbreak in a laboratory located in Virginia, USA, there is very limited evidence for human-to-human airborne transmission in any reported epidemics.

The infection of human cases with Ebola virus has been documented through the handling of infected chimpanzees, and gorillas--both dead and alive.

So far, all epidemics of Ebola have occurred in sub-optimal hospital conditions, where practices of basic hygiene and sanitation are often either luxuries or unknown to caretakers and where disposable needles and autoclaves are unavailable or too expensive. In modern hospitals with disposable needles and knowledge of basic hygiene and barrier nursing techniques, Ebola rarely spreads on such a large scale.

Prevention

Prevention methods include good hygiene in medical settings and awareness of the virus in travel areas. There is no known effective vaccine for humans.

Prevention efforts should concentrate on avoiding contact with host or vector species. Travelers should not visit locations where an outbreak is occurring. Contact with rodents should be avoided. Minimize exposure to arthropod bites by using permethrin-impregnated bed nets and insect repellents.

Strict compliance with infection control precautions (i.e., use of disposable gloves, face shields, and disposable gowns to prevent direct contact with body fluids and splashes to mucous membranes when caring for patients or handling clinical specimens; appropriate use and disposal of sharp instruments; hand washing and use of disinfectants) is recommended to avoid health care-associated infections.

Contact with dead primates should be avoided.

Bird and Bat Borne or Enhanced Diseases

See also under Molds and Fungus

Histoplasmosis

Histoplasmosis is a fungal infection which enters the body through the lungs. The infection enters the body through the lungs. The fungus grows as a mold in the soil, and infection results from breathing in airborne particles. Soil contaminated with bird or bat droppings are known to have a higher concentration of histoplasmosis.

There may be a short period of active infection, or it can become chronic and spread throughout the body. Most people who do develop symptoms will have a flu-like syndrome (acute-fever, chills cough, and chest pain; chronic-chest pain, cough with blood, fever, shortness of breath, sweating) and lung complaints related to pneumonia or other lung involvement. Approximately 10% of the population will develop inflammation in response to the initial infection. This can effect the skin, bones or joints, or the lining of the heart (pericardium). These symptoms are not due to fungal infection of those body parts, but due to inflammation.

In a small number of patients, histoplasmosis may become widespread (disseminated) in involve the blood, brain, adrenal glands, or other organs. Very young or old are at a higher risk for

disseminated histoplasmosis. Symptoms include fevers, headache, neck stiffness, mouth sores, skin lesions.

Histoplasmosis may be prevented by reducing dust exposure in areas containing bird or bat droppings. Wear PPE and respirator when working within this environment. Institute work practices and dust control measures, i.e. moist/wet area, that eliminate or reduce dust generation which will reduce risks of infection and subsequent development of disease.

Treatment

The main treatment for histoplasmosis is antifungal drugs. Amphotericin B, itraonazole, and ketoconazole are the usual treatments. Long-term treatment with antifungal drugs may be needed.

Psittacosis

Psittacosis is a disease caused by a bacteria that is found in bird droppings and other secretions (often carried by pet birds). The bacteria is found worldwide.

Symptoms of psittacosis infection may include a low-grade fever that often becomes worse as the disease progresses, including anorexia, sore throat, light sensitivity, and a severe headache.

Ammonia and sodium hypochlorite based disinfectants are effective disinfectants for Psittacossis.

Where it is necessary to remove bat droppings from buildings prior to renovation or demolition it is prudent to assume infection and use the following precautions:

- Avoid areas that may harbor the bacteria, e.g., accumulations of bird or bat droppings.

- Areas known or suspected of being contaminated by *the organisms causing* Psittacosis such as bird roosts, attics, or even entire buildings that contain accumulations of bat or bird manure, should be posted with signs warning of the health risk. The building or area should be secured

- Before an activity is started that may disturb any material that might be contaminated by Psittacosis, workers should be informed in writing of the personal risk factors that increase an individual's chances of developing these diseases. Such a written communication should include a warning that individuals with weakened immune systems are at the greatest risk of developing severe forms of these diseases become infected. These people should seek advice from their health care provider about whether they should avoid exposure to materials that might be contaminated with these organisms.

The best way to prevent exposure is to avoid situations where material that might be contaminated can become aerosolized and subsequently inhaled. A brief inhalation exposure

highly contaminated dust may be all that is needed to cause infection and subsequent development of psittacosis. Therefore, work practices and dust control measures that eliminate or reduce dust generation during the removal of bat manure from a building will also reduce risks of infection and subsequent development of disease. For example, instead of shoveling or sweeping dry, dusty material, carefully wetting it with a water spray can reduce the amount of dust aerosolized during an activity. Adding a surfactant or wetting agent to the water might reduce further the amount of aerosolized dust.

Once the material is wetted, it can be collected in double, heavy-duty plastic bags, a 55-gallon drum, or some other secure container for immediate disposal. An alternative method is use of an industrial vacuum cleaner with a high-efficiency filter to *bag* contaminated material. Truck-mounted or trailer-mounted vacuum systems are recommended for buildings with large accumulations of bat or bird manure. These high-volume systems can remove tons of contaminated material in a short period. Using long, large-diameter hoses, such a system can also remove contaminated material located several stories above its waste hopper. This advantage eliminates the risk of dust exposure that can happen when bags tear accidentally or containers break during their transfer to the ground.

The removal of all material that might be contaminated from a building and immediate waste disposal will eliminate any further risk that someone might be exposed to aerosolized spores. Air sampling, surface sampling, or the use of any other method intended to confirm that no infectious agents remain following removal of bat manure is unnecessary in most cases. However, before a removal activity is considered finished, the cleaned area should be inspected visually to ensure that no residual dust or debris remains.

Spraying 1:10 bleach to water mixture on droppings and allowing it to dry is also a recommended practice for the psittacosis organisms.

Because work practices and dust control measures to reduce worker exposures to these organisms have not been fully evaluated, using personal protective equipment is still necessary during some activities. During removal of an accumulation of bat or bird manure from an enclosed area such as an attic, dust control measures should be used, but wearing a NIOSH-approved respirator and other items of personal protective equipment is also recommended to reduce further the risk of exposure to the organisms that cause Psittacosis.

Treatment

Psittacosis is often hard to diagnoses and while a concern, it does not occur with great frequency. Knowledge of the symptoms and of potential exposure is important when seeking medical follow-up for potential exposure.

There are various medical treatments for psittacosis based on extent of infection. The sooner the disease is diagnosed and treatment is begun the more effective the treatment will be.

APPENDIX A
Dangerous Animals - Wildlife Hazard Recognition and Protection

GENERAL

Work in remote areas inhabited by wild animals that have been known to cause injury and kill human beings, requires that companies working in these areas carefully plan for wildlife encounters. This procedure outlines actions that when properly implemented should provide a high degree of protection for employees and wildlife.
These procedures apply to employees who prepare Health and Safety Plans or perform fieldwork in environments in which wild animals may be encountered. However, due to the unpredictable nature of wild animals this single document cannot possibly cover all potential risks or protective measures. Therefore, prior to entering remote areas inhabited by dangerous wildlife, contact local wildlife agencies to gather additional information concerning local risks and protective measures.

ATTACHMENTS

Attachments 1 and 2 outline behavioral characteristics of and outline controls that will minimize human injury, loss of property, and unnecessary destruction of wildlife, while ensuring a safe work environment.

WILDLIFE AVOIDANCE AND BASIC PROTECTIVE MEASURES

The best protective measure is simply avoidance. Large numbers of humans present deterrence to wild animals; therefore, whenever possible teams in the field should work together in groups of four or more. Whenever practical, fieldwork should be scheduled around the seasonal cycles of wildlife in the area. When wild animal avoidance cannot be achieved through scheduling, personnel involved in field activities in which encounters with wild animals may result, will take the following steps and will be equipped and trained, as set forth below.

CLEAR THE AREA

Evaluate and control the area before entry by

- Determine areas of recent sightings through local Fish and Game, state troopers, etc.;
- Conduct a site observation from an off-site elevated point, if possible;
- Conduct a controlled walk through in the area by a trained observer;
- Arrange a briefing by a local specialist, e. g., Fish and Game, etc.; and
- Utilizing appropriate noisemakers.

BASIC EQUIPMENT

Employees entering an environment where encounters with wild animals are possible should be provided, as a minimum:

- Noisemakers, such as air horns, bells, etc.; and
- Bear spray of not less than 16-ounce capacity (with holster), equivalent to capsicum pepper (red pepper extract), which is capable of spraying at least 15 feet. (Notes: Normally cannot be transported in side aircraft passenger compartments and may be

considered a hazardous material, check with airlines and hazardous material shippers for current information).

TRAINING

Prior to entering and / or working in areas inhabited by dangerous wildlife each employee should receive training as outlined in this procedure. At a minimum, training must include information related to:

- Wildlife present, habitat, behavior patterns, including when wild animals are most active, etc.
- Warning signs, such as tracks, bedding areas, scat, claw marks, offspring, paths, etc.,
- Avoidance measures
- Other hazards, precautions, and protective measures as outlined in the Attachments,
- (At the jobsite) spray demonstration and safety instructions which include location of and persons designated as "bear watch"

An outline of the training content should be reviewed and approved by the Divisional EHS manager and should be documented. A record of the training will be maintained at the job site, filed with the SSHSP and in the employee's training records.

VEHICLE SAFETY

Use extreme caution, particularly in darkness, when operating vehicles in areas where wild animals may be present. Collisions with large animals have been known to cause significant property damage and personal injuries to vehicle passengers, including fatalities.

ATTACHMENT 1

BEAR SAFETY – HAZARD RECOGNITION AND PRECAUTIONS

On occasion fieldwork may be conducted in a location where bears may be encountered. The following technical information, precautions, and guidelines for operations in which bears could be encountered are based on experience and conditions for field work. Bears are intelligent, wild animals and are potentially dangerous, and would rather be left alone. The more bears are understood the less they will be feared. This attachment is intended to provide information that will enable Weston to plan for bear encounters and to properly address face-to-face encounters.

Bear Life History

Although bears are creatures of habit, they are also intelligent, and each has its own personality. The way a bear reacts is often dictated by what it has learned from its mother, the experience it has had on its own, and the instincts nature has provided. Like other intelligent animals, we can make general statements about bears, but few people can accurately predict their behavior.

Bears have an incredible sense of smell, and seem to trust it more than any other sense. Hearing and sight are also important, but to a lesser degree. A bear's hearing is probably better than ours, but not as keen as a dog's hearing. Their sight is probably comparable to that of a human. Black bears tend to favor forested habitats.

Bears are opportunists, relying on their intelligence and their senses to find food. They use different habitats throughout the year, depending on the availability of food and other necessities. The area a bear covers in a given year is partially dependent on how far it has to go to satisfy these basic needs. In some areas, individual bears have home ranges of less than a square mile; in other areas ranges can encompass hundreds of square miles. Males usually range over larger areas than females.

In spring, bears begin coming out of hibernation. Males are usually the first bears to emerge, usually in April, and females with new cubs are usually the last, sometimes as late as late June. When bears emerge from their dens, they are lethargic for the first few days, frequently sleeping near their dens and not eating. When they do start eating, they seek carrion (deer, etc.), roots, and emerging vegetation. In coastal areas, beaches become travel corridors as bears seek these foods.

In early summer, bears eat new grasses and forage as they develop in higher elevations. In coastal areas, salmon are the most important food from June through September. This period is one of the few times that bears are found in large groups, and it is the time that most people see bears. Bears often travel, eat, and sleep along streams for weeks at a time.

Other summer foods for bears include grasses and ground squirrels. When bears kill or scavenge large prey, they commonly cover the portions they cannot eat with sticks and duff. A bear may remain near a food cache for days and it will defend it from intruders.

During the late summer and early fall, bears move inland and consume large amounts of blueberries, and other succulent fruits. As the seasons progress towards winter, a bear's diet becomes more varied. This is the time that bears are adding final deposits of fat before their long winter naps.

In October and November, bears move into their denning areas and begin preparing a suitable den. Black bears usually den in holes under large trees or rock outcrops, or in small natural cavities. Dens are just large enough for the bears to squeeze into. Bears rarely eat, drink, urinate, or defecate while they are denning. They sleep deeply, but do not truly hibernate, and they can be awakened by loud noises or disturbances.

Cubs are born in the den, usually in January. Black bear cubs usually stay with their mothers for a year and a half. Black bears are sexually mature at age 2. Mating season is in the spring (May or June) and both species are polygamous (multiple mates). Black bears can live for 25 – 30 years, although most live less than 20 years.

BEAR AND HUMAN INTERACTIONS

Bears generally prefer to be left alone, but they share their homes with other creatures, including humans, who intrude on virtually every aspect of the bear's life. Bears are normally tolerant of these activities and generally find a secure way to avoid them. Humans can help bears make a graceful retreat and avoid many close encounters by letting them know we are coming. Walking in groups, talking, and wearing noise making devices, such as bear bells, all serve to warn a bear of your approach. When possible, avoid hiking and camping in areas where bears are common, such as bear trails through heavy brush or along salmon streams. Always keep an eye out for bears and bear signs. If you happen upon a dead animal, especially one that is covered with sticks and duff (a bear cache), immediately retreat the way you came, but do not run, and make a detour around the area. If you see a cub up a tree or a small bear walking alone, immediately retreat and detour around the area. Like all young animals, cubs wander away from their mothers, but females are furiously protective when they believe their cubs are threatened. Even if we do everything possible to avoid meeting a bear, sometimes bears come to us.

Bears are both intelligent and opportunistic, and they express these qualities through their curiosity. This curiosity frequently brings them into "human habitat." When this happens, we often feel vulnerable, and the bear is sometimes viewed as a threat or nuisance. In most cases, a curious bear will investigate a "human sign," perhaps test it out (chew on a raft, bite into some cans, etc.), and leave, never to return. If the bear was rewarded during his investigation by finding something to eat, it is hard to stop them from returning once they have had a food-reward. That is why we emphasize the importance of keeping human food and garbage away from bears. When in bear country, always think about the way you store, cook, and dispose of your food. **Never feed bears!** This is both illegal and foolish. Food should be stored in airtight containers, preferably away from living and sleeping areas. Garbage should be thoroughly incinerated as soon as possible. Fish and game should be cleaned well away from camp, and clothing that smells of fish and game should be stored away from sleeping areas. Menstruating women should take extra precautions to keep themselves as clean as possible, and soiled tampons and pads should

be treated as another form of organic garbage. Once a bear has obtained food from people, it may continue to frequent areas occupied by people. If a bear does not find food or garbage after the next few tries, it may give up and move back into a more natural feeding pattern. Occasionally, though, the bear will continue to seek human foods and can become a "problem bear." Some bears become bold enough to raid campsites and break into cabins to search for human food. Shooting bears in the rump with cracker shells, flares, rubber bullets, and birdshot are common methods of "aversive conditioning." These are also very dangerous techniques, because they may seriously injure a bear if not done properly and/or they may cause a bear to attack the shooter.

BLACK BEARS

Black Bear Identification: Black bears are the smallest and most abundant of the bear species. They are five to six feet long and stand about two to three feet high at the shoulders. They weigh from 200 to 500 pounds. While they are most commonly black, other color phases include brown (cinnamon), and, rarely, gray (blue), and white. Muzzles are usually brown. Black bears can be distinguished from brown bears by:

- Their head shape (a black bear's nose is straight in profile, a brown bear's is dished);
- Their claws (black bear's claws are curved and smaller, brown bears are relatively straight and longer);
- Their body shape (when standing, a black bear's rump seems to be higher than its shoulders; a brown bear's shoulders are usually higher than its rump); and

Typical Habitat: Black bears occupy a wide range of habitats, but seem to be most common in forested areas.

AVOIDING BEAR ENCOUNTERS WHEN

- The Bear sees you but you do not know the bear is around: The bear will likely avoid detection people and will simply move away when they sense a human.
- You see a bear and it does not know you are there: Move away slowly. Avoid intercepting the bear if it is walking. If possible, detour around the bear. If the bear is close to you, stand where you are or back away slowly. Do not act threateningly toward the bear, it may know you are there but it has chosen to ignore you as long as you are not a threat.
- You see the bear and the bear sees you: Do not act threateningly, but let the bear know you are human. Wave your arms slowly, talk in a calm voice, and walk away slowly in a lateral direction, keeping an eye on the bear. Unless you are very close to a car or a building, never run from bears. In a bear's world, when something runs it is an open invitation to chase it. Bears will chase a running object even if they have no previous intention of catching it. Bears can run as fast as a racehorse, so humans have little or no chance of outrunning a bear.
- You see a bear; the bear sees you and stands on its hind legs: This means that the bear is seeking more information. Bears stand on their hind legs to get a better look, or smell, at something they are uncertain of. It is your cue to help it figure

out what you are. Help the bear by waving your arms slowly and talking to it. Standing is not a precursor to an attack. Bears do not attack on their hind legs. It is also important to remember that when a bear goes back down on all fours from a standing position, it may come towards you a few steps. This is normal, and probably not an aggressive act.

- The bear sees you, recognizes you as a human, but continues to come towards you slowly: This may mean several things, depending on the bear and the situation. It may mean that the bear does not see you as a threat, and just wants to get by you (especially if the bear is used to humans, as in a National Park); the bear wants to get food from you (if it has gotten food from people before); the bear wants to test your dominance (it views you as another bear); or may be stalking you as food (more common with black bear, but a rare occurrence). In all cases, your reaction should be to back off the trail very slowly, stand abreast if you are in a group, talk loudly, and/or use a noise-making device. If the bear continues to advance, you should stop. At this point, it is important to give the bear the message that if he continues to advance it will cost him. Continue to make loud noises and present a large visual image to the bear (standing abreast, open your coat). In bear language, bears assert themselves by showing their size. If an adult brown bear continues to come at you, climbing 20 feet or higher up a tree may also be an option if one is next to you (remember, never run from bears). Keep in mind, though, black bears can climb trees.
- The bear recognizes you as a human and acts nervous or aggressive: When bears are nervous or stressed they can be extremely dangerous. This is when it is important to try to understand what is going on in the bears mind. Nervous bears growl, woof, make popping sounds with their teeth, rock back and forth on their front legs, and often stand sideways to their opponent. A universal sign of a nervous bear is excessive salivation (sometimes it looks like they have white lips). When a bear shows any of these signs, stand where you are and talk in a calm voice. Do not try to imitate bear sounds, this may only serve to confuse and further agitate the bear. If you are in a group, stand abreast.
- The bear charges: If all other signals fail, a bear will charge. Surprisingly, most bear charges are just another form of their language. The majority of these are "bluff charges," that is; the bear stops before making contact with their opponent. There are many different types of bluff charges ranging from a loping uncertain gait to a full-blown charge. If a bear charges, stand still.
- The bear attacks: When all else fails, a bear may attack. Attacks may be preceded by all of the behaviors previously described or they may be sudden. Seemingly unprovoked attacks are often the result of a bear being surprised (and feeling threatened), a bear defending its food cache, or a female defending her cubs. When a bear attacks, it typically runs with its body low to the ground, legs are stiff, ears are flattened, hair on the nape of the neck is up, and the bear moves in a fast, determined way. Front paws are often used to knock the opponent down and jaws are used to subdue it.

AFTER A BEAR ENCOUNTER

Black bears have been known to view humans as prey, and if you struggle with the attacking black bear, it will probably go elsewhere for its meal.

- Bear Sprays: Are easy to carry and use, little risk of permanent damage to bears and humans, effective in many situations. However, using a spray may change a false charge into a real charge, they are ineffective at ranges greater than 20 feet, ineffective in windy conditions, dangerous if accidentally discharged in a closed area such as an aircraft cockpit.

The most effective tool you have against an attacking bear is your brain. Although bears are intelligent animals, we are smarter and can often think our way out of a bad situation if we try.

ATTACHMENT 2

HAZARDS AND PRECAUTIONS – DEER

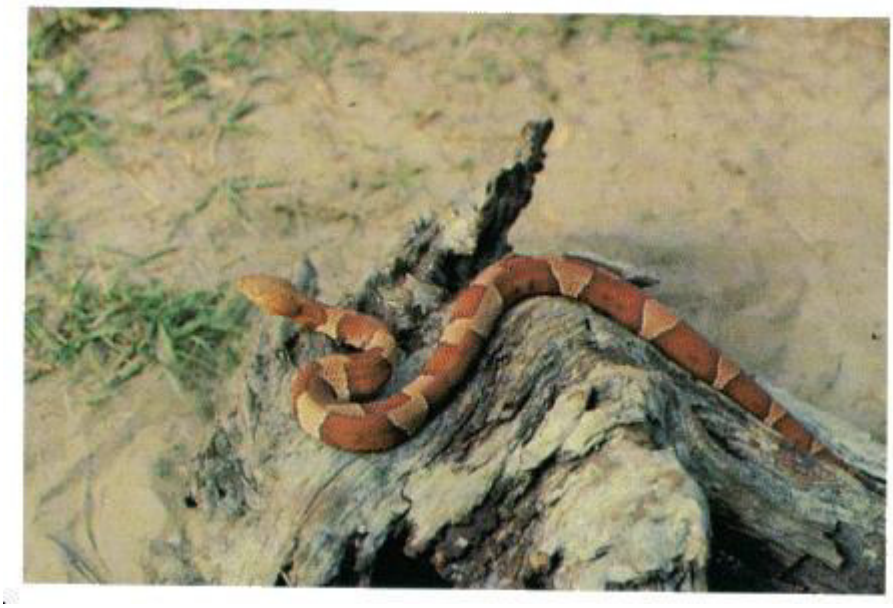
The following technical information, precautions, and guidelines for operations in which Deer may be encountered. The more the species are understood, the easier it will be to avoid contact with them thus preventing injury to ourselves and to the animals. All big game species are unpredictable and can be dangerous under certain conditions. This attachment is intended to provide information that will enable Weston to plan for encounters and to properly address face-to-face encounters.

WHITE-TAILED DEER

The White-tailed deer found thought the eastern and western part of the United States have been known to attack people on many occasions. It is unknown whether Black-tailed deer have made any such attacks, but it is possible for someone to be injured by an irate buck in the breeding season (late fall). Deer are well equipped to injure humans. They are very fast. Bucks have sharp antlers and can clear amazingly high obstacles with graceful, arching leaps. They can run with remarkable speed, even in dense cover, and have excellent camouflage. When working in areas populated with deer, it is just common sense not to approach any large wild animal too closely. It is unlikely that an attack from a deer would be fatal but it is possible and serious injury is likely.

APPENDIX B - PICTURES OF POISONOUS SNAKES AND LIZARDS

Americas



American copperhead

Cotton Mouth – East and Southeast US

Timber Rattlesnake – Eastern US

FLD 43 B INSECTS

Sting and Biting Insects

Contact with stinging insects may result in site personnel experiencing adverse health affects that range from being mildly uncomfortable to being life threatening. Therefore, stinging insects present a serious hazard to site personnel and extreme caution must be exercised whenever site and weather conditions increase the risk of encountering stinging insects. These include the following:

- Bees (Honeybees, bumble bees, wasps, and hornets and wingless wasps)
- Scorpions
- Fire ants
- Spiders
- Ticks
- Deer Flies
- Mosquito
- Fleas
- Bed Bugs

Bees, Wasps, Hornets and Yellow Jacket*s*

The severity of an insect sting reaction varies from person to person. A normal reaction will result in pain, swelling and redness confined to the sting site. Simply disinfect the area (washing with soap and water will do) and apply ice to reduce the swelling.

A large local reaction will result in swelling that extends beyond the sting site. For example, a sting on the forearm could result in the entire arm swelling twice its normal size.

Although alarming in appearance, this condition is often treated the same as a normal reaction. An unusually painful or very large local reaction may need medical attention. Because this condition may persist for two to three days, antihistamines and corticosteroids are sometimes prescribed to lessen the discomfort.

Yellow jackets, hornets and wasps can sting repeatedly. Honeybees have barbed stingers that are left behind in their victim's skin. These stingers are best removed by a scraping action, rather than a pulling motion, which may actually squeeze more venom into the skin.

Scorpions (Caribbean)

Scorpion stings are a major public health problem in many underdeveloped tropical countries. For every person killed by a poisonous snake, 10 are killed by a poisonous scorpion. In the United States, only 4 deaths in 11 years have occurred as a result of scorpion stings. Furthermore, scorpions can be found outside their normal range of distribution, ie, when they

accidentally crawl into luggage, boxes, containers, or shoes and are unwittingly transported home via human travelers.

Out of 1,500 scorpion species, 50 are dangerous to humans. Scorpion stings cause a wide range of conditions, from severe local skin reactions to neurologic, respiratory, and cardiovascular collapse.

Almost all of these lethal scorpions belong to the scorpion family called the Buthidae. The Buthidae are small to mid-size scorpions (0.8 inch to 5.0 inches) and normally uniformly colored without patterns or shapes. Poisonous scorpions also tend to have weak-looking pincers, thin bodies, and thick tails, as opposed to the strong heavy pincers, thick bodies, and thin tails seen in nonlethal scorpions. The lethal members of the Buthidae family include the genera of *Tityus* which can be found in the Caribbean.

A scorpion has a flattened elongated body and can easily hide in cracks. Scorpions are members of the Arachnid (spider) family. The bodies consist of 3-segments, they also have 4 pairs of legs, a pair of claws, and a segmented tail that has a poisonous spike at the end. Scorpions vary in size from 1-20 cm in length.

However, scorpions may be found outside their habitat range of distribution when inadvertently transported with luggage and cargo.

Prevention

Preventive measures include awareness of scorpions, shaking out clothing and boots before putting them on looking before reaching into likely hiding places and wearing gloves, long sleeved shirts and pants.

Symptoms

In mild cases, the only symptom may be a mild tingling or burning at site of sting.

In severe cases, symptoms may include:

- Eyes and ears - Double vision
- Lungs - Difficulty breathing, No breathing, Rapid breathing,
- Nose, mouth, and throat – Drooling, Spasm of the voice box, Thick-feeling tongue
- Heart and blood - High blood pressure, Increased or decreased heart rate, Irregular heartbeat
- Kidneys and bladder Urinary incontinence, Urine output, decreased
- Muscles and joints - Muscle spasms
- Nervous system – Paralysis, Random movements of head, eye, or neck, Restlessness, Seizures, Stiffness
- Stomach and intestinal tract - Abdominal cramps, Fecal incontinence
- Other -Convulsions

Treatment

1. Recognize scorpion sting symptoms:
2. Wash the area with soap and water.
3. Apply a cool compress on the area of the scorpion sting. Ice (wrapped in a washcloth or other suitable covering) may be applied to the sting location for 10 minutes. Remove compress for 10 minutes and repeat as necessary.
4. Call the Poison Control Center. If you develop symptoms of a poisonous scorpion sting, go to the nearest emergency care facility.
5. Keep your tetanus shots and boosters current.

Fire Ants (Caribbean)

Fire ants are aggressive, reddish-brown to black ants that are 1/8 inch to 1/4 inch long. They construct nests, which are often visible as dome-shaped mounds of soil, sometimes as large as 3 feet across and 1 1/2 feet in height. In sandy soils, mounds are flatter and less visible. Fire ants usually build mounds in sunny, open areas such as lawns, pastures, cultivated fields and meadows, but they are not restricted to these areas. Mounds or nests may be located in rotting logs, around trees and stumps, under pavement and buildings, and occasionally indoors.

Fire ants use their stingers to immobilize or kill prey and to defend ant mounds from disturbance by larger animals, such as humans. Any disturbance sends hundreds of workers out to attack anything that moves. The ant grabs its victim with its mandibles (mouthparts) and then inserts its stinger. The process of stinging releases a chemical, which alerts other ants, inducing them to sting. In addition, one ant can sting several times without letting go with its mandibles.

Once stung, humans experience a sharp pain that lasts a couple of minutes, then after a while the sting starts itching and a welt appears. Fire ant venom contains alkaloids and a relatively small amount of protein. The alkaloids kill skin cells; this attracts white blood cells, which form a pustule within a few hours of being stung. The fluid in the pustule is sterile, but if the pustule is broken, the wound may become infected. The protein in the venom can cause allergic reactions that may require medical attention.

Some of the factors related to stinging insects that increase the risk associated with accidental contact are:

- The nests for these insects are frequently found in remote wooded or grassy areas and hidden in cavities
- The nests can be situated in trees, rocks, bushes or in the ground, and are usually difficult to see
- Accidental contact with these insects is highly probable, especially during warm weather conditions when the insects are most active
- If a site worker accidentally disturbs a nest, the worker may be inflicted with multiple stings, causing extreme pain and swelling which can leave the worker incapacitated and in need of medical attention

- Some people are hypersensitive to the toxins injected by a sting, and when stung, experience a violent and immediate allergic reaction resulting in a life-threatening condition known as anaphylactic shock
- Anaphylactic shock manifests itself very rapidly and is characterized by extreme swelling of the body, eyes, face, mouth and respiratory passages
- The hypersensitivity needed to cause anaphylactic shock, can in some people, accumulate over time and exposure, therefore, even if someone has been stung previously, and not experienced an allergic reaction, there is no guarantee that they will not have an allergic reaction if they are stung again

With these things in mind, and with the high probability of contact with stinging insects, use the following safe work practices:

- If a worker knows that he is hypersensitive to bee, wasp or hornet stings, inform the site Safety officer of this condition prior to participation in site activities
- All site personnel will be watchful for the presence of stinging insects and their nests, and will advise the Site Safety officer if a stinging insect nest is located or suspected in the area
- Any nests located on site will be flagged off and site personnel will be notified of its presence
- If attacked, site personnel will immediately seek shelter and stay there. Do not jump in water (bees will still be in the area when you come up). Once safe, remove stings from your skin, it does not matter how you do it, but do it as quickly as possible to reduce the amount of venom they inject. Obtain first aid treatment and contact the safety officer who will observe for signs of allergic reaction

Treatment for fire ant stings is aimed at preventing secondary bacterial infection, which may occur if the pustule is scratched or broken. Clean the blisters with soap and water to prevent secondary infection. Do not break the blister. Topical corticosteroid ointments and oral antihistamines may relieve the itching associated with these reactions.

Site personnel with a known hypersensitivity to stinging insects will keep required emergency medication on or near their person at all times

Spiders

A large variety of spiders may be encountered during site activities. Extreme caution must be used when lifting logs and debris, since spiders are typically found in these areas.

While most spider bites merely cause localized pain, swelling, reddening, and in some cases, tissue damage, there are a few spiders that, due to the severity of the physiological affects caused by their venom, are dangerous.

Black Widow: The black widow is a coal-black bulbous spider 3/4 to 1 1/2 inches in length, with a bright red hourglass on the under side of the abdomen. The black widow is usually found in dark moist locations, especially under rocks, rotting logs and may even be found in outdoor toilets where they inhabit the underside of the seat. Victims of a black widow bite may exhibit the following signs or symptoms:

- Sensation of pinprick or minor burning at the time of the bite
- Appearance of small punctures (but sometimes none are visible)
- After 15 to 60 minutes, intense pain is felt at the site of the bite which spreads quickly, and is followed by profuse sweating, rigid abdominal muscles, muscle spasms, breathing difficulty, slurred speech, poor coordination, dilated pupils and generalized swelling of face and extremities

Brown Recluse: The brown or violin spider is brownish to tan in color, rather flat, and 1/2 to 5/8 inches long. However, unlike the typical species, this spider has been encountered without a violin or "fiddle" shaped mark on the top of the head. Of the brown spider, there are three varieties found in the United States that present a problem to site personnel. These are the brown recluse, the desert violin and the Arizona violin. These spiders may be found in a variety of locations including trees, rocks or in dark locations. Victims of a brown or violin spider bite may exhibit the following signs or symptoms:

- Blistering at the site of the bite, followed by a local burning at the site 30 to 60 minutes after the bite
- Formation of a large, red, swollen, postulating lesion with a bull's-eye appearance
- Systemic affects may include a generalized rash, joint pain, chills, fever, nausea and vomiting
- Pain may become severe after 8 hours, with the onset of tissue necrosis

There is no effective first aid treatment for either of these bites. Except for very young, very old or weak victims, spider bites are not considered to be life threatening. However, medical treatment must be sought to reduce the extent of damage caused by the injected toxins.

Brown Recluse Spider

Black Widow Spider

First aid should include:

- If possible, catch the spider to confirm its identity. Even if the body is crushed, save it for identification
- Clean the bitten area with soap and water or rubbing alcohol
- To relieve pain, place an ice pack over the bite
- Keep the victim quiet and monitor breathing

Seek immediate medical attention

Sensitivity Reaction to Insect Stings or Bites

A sensitivity reaction is one of the more dangerous and acute effects of insect bites or stings. It is the most common cause of fatalities from bites, particularly from bees, wasps, and spiders. Anaphylactic shock due to stings can lead to severe reactions in the circulatory, respiratory, and central nervous system. This can also result in death.

Site personnel must be questioned regarding their allergic reaction to insect bites. Anyone knowingly allergic should be required to carry and know how to use a response kit (e.g., Epi-Kit). First aid providers must be instructed on how to use the kit also. The kit must be inspected to ensure it is updated.

Administer first aid and observe persons reporting stings for signs of allergic reaction, such as unusual swelling, nausea, dizziness, and shock. At the first sign of these symptoms, take the individual to a medical facility for attention.

Insect Borne Diseases

Diseases that are spread by insects include the following: Lyme Disease (tick); Bubonic and other forms of Plaque (fleas); Malaria, West Nile Virus and Equine Encephalitis (mosquito).

Tick Borne Diseases

Lyme disease is the second most rapidly spreading disease in the U.S.

Lyme Disease

1. Facts

Definition:

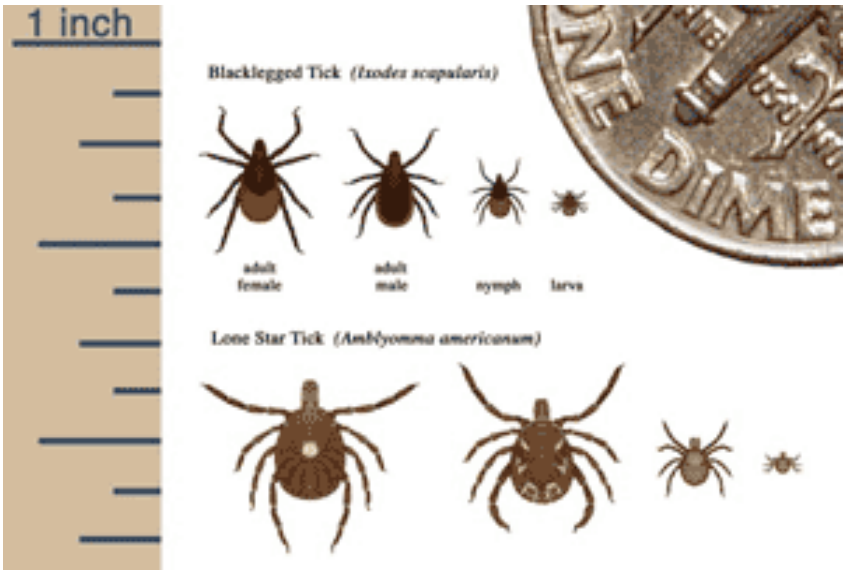
- Bacterial infection transmitted by the bite of an infected black-legged tick more popularly known as the deer tick.

- Prevalence (nationwide and other countries).

- Three stages/sizes of deer ticks:
    - Larvae
    - Nymph
    - Adult

Tick season is May through October.

Not all ticks transmit Lyme disease (Black legged or deer tick [upper] compared to the Lone Star tick [lower])



- Ticks must be attached for several hours before Lyme disease can be transmitted.
- Being bitten by a tick does not mean you will get Lyme disease.

2. Prevention and Protection:

- Wear light-colored, tight-knit clothing.
- Wear long pants and long-sleeved shirts.
- Tuck pant legs into shoes or boots.
- Wear a hat.
- Use insect repellant containing DEET ((follow manufacturer's instructions for use).
- Check yourself daily for ticks after being in grassy, wooded areas.
- Request information from the Health and Safety Medical Section regarding Lyme Disease.

3. If Bitten:

- Remove the tick immediately with fine-tipped tweezers. Grasp the tick as close to the skin as possible. Pull gently but firmly without twisting or crushing the tick.
- Wash your hands and dab the bite with an antiseptic.

- Save the tick in a jar in some alcohol. Label the jar with the date of the bite, the area where you picked up the tick and the spot on your body where you were bitten.
- Monitor the bite for any signs of infection or rash.

4. Symptoms:

Early Signs (may vary from person to person)

- Expanding skin rash.

- Flu-like symptoms during summer or early fall that include the following:
  - Chills, fever, headache, swollen lymph nodes.
  - Stiff neck, aching joints, and muscles.
  - Fatigue.

- Later signs
  - Nervous system problems.
  - Heart problems.
  - Arthritis, especially in knees.

5. Upon Onset of Symptoms:

- Notify your Safety Officer (SO) and your supervisor.

Ehrlichiosis

Ehrlichiosis is the general name used to describe several bacterial diseases that affect animals and humans. These diseases are caused by the organisms in the genus *Ehrlichia*. Worldwide, there are currently four ehrlichial species that are known to cause disease in humans.

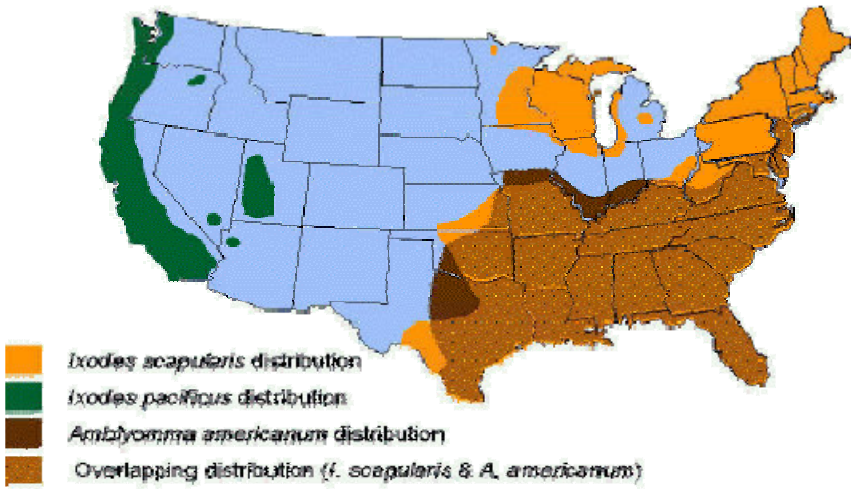
In the United States, ehrlichiae are transmitted by the bite of an infected tick. The lone star tick (*Amblyomma americanum*) and the blacklegged tick (*Ixodes scapularis)* are known vectors of ehrlichiosis.

The symptoms of ehrlichiosis may resemble symptoms of various other infectious and non-infectious diseases. These clinical features generally include fever, headache, fatigue, and muscle aches. Other signs and symptoms may include nausea, vomiting, diarrhea, cough, joint pains, confusion, and occasionally rash. Symptoms typically appear after an incubation period of 5-10 days following the tick bite. It is possible that many individuals who become infected with ehrlichiae do not become ill or they develop only very mild symptoms.

Most cases of ehrlichiosis are reported within the geographic distribution of the vector ticks (see map below). Occasionally, cases are reported from areas outside the distribution of the tick vector. In most instances, these cases have involved persons who traveled to areas where the diseases are endemic, and who had been bitten by an infected tick and developed symptoms after

returning home. Therefore, if you traveled to an ehrlichiosis-endemic area 2 weeks prior to becoming ill, you should tell your doctor where you traveled.

Figure 20. Areas where human ehrlichiosis may occur based on approximate distribution of vector tick species



A diagnosis of ehrlichiosis is based on a combination of clinical signs and symptoms and confirmatory laboratory tests. Blood samples can be sent to a reference laboratory for testing. However, the availability of the different types of laboratory tests varies considerably. Other laboratory findings indicative of ehrlichiosis include low white blood cell count, low platelet count, and elevated liver enzymes.

Ehrlichiosis is treated with a tetracycline antibiotic, usually doxycycline.

Very little is known about immunity to ehrlichial infections. Although it has been proposed that infection with ehrlichiae confers long-term protection against reinfection, there have been occassional reports of laboratory-confirmed reinfection. Short-term protection has been described in animals infected with some *Ehrlichia* species and this protection wanes after about 1 year. Clearly, more studies are needed to determine the extent and duration of protection against reinfection in humans.

Limiting exposure to ticks reduces the likelihood of infection in persons exposed to tick-infested habitats. Prompt careful inspection of your body and removal of crawling or attached ticks is an important method of preventing disease. It may take 24–48 hours of attachment before microorganisms are transmitted from the tick to you.

Preventive measures - Follow protection protocols for Lyme disease

Babesiosis

Babesiosis is an intraerythrocytic parasitic infection caused by protozoa of the genus *Babesia* and transmitted through the bite of the *Ixodes* tick, the same vector responsible for transmission of Lyme disease. While most cases are tick-borne, transfusion and transplacental transmission

have been reported. In the United States, babesiosis is usually an asymptomatic infection in healthy individuals. Several groups of patients become symptomatic, and, within these subpopulations, significant morbidity and mortality occur. The disease most severely affects patients who are elderly, immunocompromised, or asplenic. Among those symptomatically infected, the mortality rate is 10% in the United States.

The primary vectors of the parasite are ticks of the genus *Ixodes*. In the United States, the black-legged tick, *Ixodes scapularis* (also known as *Ixodes dammini*) is the primary vector for the parasite. The *Ixodes* tick vector for *Babesia* is the same vector that locally transmits *Borrelia burgdorferi*, the agent implicated in Lyme disease. The primary US animal reservoir is the white-footed mouse, *Peromyscus leucopus*. Additionally, white-tailed deer serve as transport hosts for the adult tick vector, *I scapularis*.

The Ixodid ticks ingest *Babesia* during feeding from the host, multiply the protozoa in their gut wall, and concentrate it in their salivary glands. The tick inoculates a new host when feeding again. The parasite then infects red blood cells (RBCs) and differentiated and undifferentiated trophozoites are produced. The former produce 2-4 merozoites that disrupt the RBC and go on to invade other RBCs. This leads to hemolytic anemia, thrombocytopenia, and atypical lymphocyte formation. Alterations in RBC membranes cause decreased conformability and increased red cell adherence, which can lead to development of acute respiratory distress syndrome (ARDS) among those severely affected.

The signs and symptoms mimic malaria and range in severity from asymptomatic to septic shock.

Symptoms include: Generalized weakness, fatigue, depression, fever, anorexia and weight loss, CNS - Headache, photophobia, neck stiffness, altered sensorium, pulmonary - Cough, shortness of breath, GI - Nausea, vomiting, abdominal pain, Musculoskeletal - Arthralgia and myalgia and Renal - Dark urine

Prevention

Prevention measures are the same as for Lyme and other insect borne diseases

Tularemia

Tularemia (also known as "rabbit fever") is a serious infectious disease caused by the bacterium *Francisella tularensis*. The disease is endemic in North America. The primary vectors are ticks and deer flies, but the disease can also be spread through other arthropods. Animals such as rabbits, prairie dogs, hares and muskrats serve as reservoir hosts.

Depending on the site of infection, tularemia has six characteristic clinical syndromes: ulceroglandular, glandular, oropharyngeal, pneumonic, oculoglandular, and typhoidal.

The disease has a very rapid onset, with headache, fatigue, dizziness, muscle pains, loss of appetite and nausea. Face and eyes redden and become inflamed. Inflammation spreads to the

lymph nodes, which enlarge and may suppurate (mimicking bubonic plague). Lymph node involvement is accompanied by a high fever. Death may result.

Francisella tularensis is one of the most infective bacteria known; fewer than ten organisms can cause disease leading to severe illness. The bacteria penetrate into the body through damaged skin and mucous membranes, or through inhalation. Humans are most often infected by tick bite or through handling an infected animal. Ingesting infected water, soil, or food can also cause infection. Tularemia can also be acquired by inhalation; hunters are at a higher risk for this disease because of the potential of inhaling the bacteria during the skinning process. Tularemia is not spread directly from person to person.

No vaccine is available to the general public The best way to prevent tularemia infection is to wear rubber gloves when handling or skinning rodents or lagomorphs (as rabbits), avoid ingesting uncooked wild game and untreated water sources, and wearing long-sleeved clothes and using an insect repellant to prevent tick bites.

Prevention

No vaccine is available to the general public The best way to prevent tularemia infection is to wear rubber gloves when handling or skinning rodents or lagomorphs (as rabbits), avoid ingesting uncooked wild game and untreated water sources, and wearing long-sleeved clothes and using an insect repellant to prevent tick bites.

Other diseases primarily transmitted by Arthropods (Ticks, mites, lice etc.)

Thyphus (Not to be confused with Typhoid Fever [discussed in these FLDs])

For the unrelated disease caused by Salmonella typhi, see Typhoid fever. For the unrelated disease caused by Salmonella paratyphi, please refer to Paratyphoid fever. For the monster of Greek mythology, see Typhus (monster).

Typhus is any one of several similar diseases caused by louse-borne bacteria. The name comes from the Greek *typhos*, meaning smoky or lazy, describing the state of mind of those affected with typhus. *Rickettsia* is endemic in rodent hosts, including mice and rats, and spreads to humans through mites, fleas and body lice. The arthropod vector flourishes under conditions of poor hygiene, such as those found in prisons or refugee camps, amongst the homeless, or until the middle of the 20th century, in armies in the field. In tropical countries, typhus is often mistaken for dengue fever.

Endemic typhu

Endemic typhus (also called "flea-borne typhus" and "murine typhus" or "rat flea typhus") is caused by the bacteria *Rickettsia typhi*, and is transmitted by the flea that infest rats. Symptoms of endemic typhus include headache, fever, chills, myalgia, nausea, vomiting, and cough.

Endemic typhus is highly treatable with antibiotics. Most people recover fully, but death may occur in the elderly, severely disabled or patients with a depressed immune system.

Encephalitis Arboviral Encephalitides

Perspectives

Arthropod-borne viruses, i.e., arboviruses, are viruses that are maintained in nature through biological transmission between susceptible vertebrate hosts by blood feeding arthropods (mosquitoes, psychodids, ceratopogonids, and ticks). Vertebrate infection occurs when the infected arthropod takes a blood meal. The term 'arbovirus' has no taxonomic significance. Arboviruses that cause human encephalitis are members of three virus families: the *Togaviridae* (genus Alphavirus, *Flaviviridae*, and *Bunyaviridae*.

All arboviral encephalitides are zoonotic, being maintained in complex life cycles involving a nonhuman primary vertebrate host and a primary arthropod vector. These cycles usually remain undetected until humans encroach on a natural focus, or the virus escapes this focus via a secondary vector or vertebrate host as the result of some ecologic change. Humans and domestic animals can develop clinical illness but usually are "dead-end" hosts because they do not produce significant viremia, and do not contribute to the transmission cycle. Many arboviruses that cause encephalitis have a variety of different vertebrate hosts and some are transmitted by more than one vector. Maintenance of the viruses in nature may be facilitated by vertical transmission (e.g., the virus is transmitted from the female through the eggs to the offspring).

Arboviral encephalitides have a global distribution, but there are four main virus agents of encephalitis in the United States, all of which are transmitted by mosquitoes. A new Powassan-like virus has recently been isolated from deer ticks. Its relatedness to Powassan virus and its ability to cause disease has not been well documented. Most cases of arboviral encephalitis occur from June through September, when arthropods are most active. In milder (i.e., warmer) parts of the country, where arthropods are active late into the year, cases can occur into the winter months.

There is expanded discussion of several of these diseases (West Nile and Eastern Equien Encephalitis elsewhere in this document. A more general discussion is found in Attachment 2.

Mosquito Borne Diseases

Malaria

Malaria is a mosquito-borne disease caused by a parasite. Four kinds of malaria parasites can infect humans: *Plasmodium falciparum, P. vivax, P. ovale,* and *P. malariae*.

People with malaria often experience fever, chills, and flu-like illness. Left untreated, they may develop severe complications and die. Each year 350-500 million cases of malaria occur worldwide. Infection with any of the malaria species can make a person feel very ill; infection with *P. falciparum*, if not promptly treated, may be fatal. Although malaria can be a fatal disease, illness and death from malaria are largely preventable.

This sometimes fatal disease can be prevented and cured. Bed nets, insecticides, and anti-malarial drugs are effective tools to fight malaria in areas where it is transmitted. Travelers to a malaria-risk area should avoid mosquito bites and take a preventive anti-malarial drug. Malaria was eradicated from the United States in the early 1950s. However, malaria is common in many developing countries and travelers who visit these areas risk getting malaria.

Returning travelers and arriving immigrants could also reintroduce the disease in the United States if they are infected with malaria when they return. The mosquito that transmits malaria, *Anopheles*, is found throughout much of the United States. If local mosquitoes bite an infected person, those mosquitoes can, in turn, infect local residents (*introduced malaria*).

Because the malaria parasite is found in red blood cells, malaria can also be transmitted through blood transfusion, organ transplant, or the shared use of needles or syringes contaminated with blood. Malaria may also be transmitted from a mother to her fetus before or during delivery ("congenital" malaria).

Malaria is not transmitted from person to person like a cold or the flu. You cannot get malaria from casual contact with malaria-infected people.

Prevention and control

You can prevent malaria by:

- keeping mosquitoes from biting you, especially at night
- taking anti-malarial drugs to kill the parasites
- eliminating places where mosquitoes breed
- spraying insecticides on walls to kill adult mosquitoes that come inside
- sleeping under bed nets - especially effective if they have been treated with insecticide,
- wearing insect repellent and long-sleeved clothing if out of doors at night

The surest way for you and your health-care provider to know whether you have malaria is to have a diagnostic test where a drop of your blood is examined under the microscope for the presence of malaria parasites. If you are sick and there is any suspicion of malaria (for example, if you have recently traveled in a malaria-risk area) the test should be performed without delay.

The disease should be treated early in its course, before it becomes severe and poses a risk to the patient's life. Several good anti-malarial drugs are available, and should be administered early on. The most important step is to think about malaria, so that the disease is diagnosed and treated in time.

West Nile Virus

West Nile virus (WNV) is a potentially serious illness. Experts believe WNV is established as a seasonal epidemic in North America that flares up in the summer and continues into the fall. This fact sheet contains important information that can help you recognize and prevent WNV.

The easiest and best way to avoid WNV is to prevent mosquito bites.

- When you are outdoors, use insect repellent containing an EPA-registered active ingredient. Follow the directions on the package.

- Many mosquitoes are most active at dusk and dawn. Be sure to use insect repellent and wear long sleeves and pants at these times or consider staying indoors during these hours.

- Make sure you have good screens on your windows and doors to keep mosquitoes out.

- Get rid of mosquito breeding sites by emptying standing water from buckets, barrels and drainage ditches.

About one in 150 people infected with WNV will develop severe illness. The severe symptoms can include high fever, headache, neck stiffness, stupor, disorientation, coma, tremors, convulsions, muscle weakness, vision loss, numbness and paralysis. These symptoms may last several weeks, and neurological effects may be permanent.

Up to 20 percent of the people who become infected have symptoms such as fever, headache, and body aches, nausea, vomiting, and sometimes swollen lymph glands or a skin rash on the chest, stomach and back. Symptoms can last for as short as a few days, though even healthy people have become sick for several weeks.

Approximately 80 percent of people (about 4 out of 5) who are infected with WNV will not show any symptoms at all. Most often, WNV is spread by the bite of an infected mosquito. Mosquitoes become infected when they feed on infected birds. Infected mosquitoes can then spread WNV to humans and other animals when they bite.

In a very small number of cases, WNV also has been spread through blood transfusions, organ transplants, breastfeeding and even during pregnancy from mother to baby.

WNV is not spread through casual contact such as touching or kissing a person with the virus.

Symptoms typically develop between 3 - 14 days after being bitten by an infected mosquito.

There is no specific treatment for WNV infection. In cases with milder symptoms, people experience symptoms such as fever and aches that pass on their own, although even healthy people have become sick for several weeks. In more severe cases, people usually need to go to the hospital where they can receive supportive treatment including intravenous fluids, help with breathing and nursing care.

Milder WNV illness improves on its own, and people do not necessarily need to seek medical attention for this infection though they may choose to do so. If you develop symptoms of severe WNV illness, such as unusually severe headaches or confusion, seek medical attention immediately. Severe WNV illness usually requires hospitalization. Pregnant women and nursing mothers are encouraged to talk to their doctor if they develop symptoms that could be WNV. People over the age of 50 are more likely to develop serious symptoms of WNV if they do get sick and should take special care to avoid mosquito bites.

The more time you're outdoors, the more time you could be bitten by an infected mosquito. Pay attention to avoiding mosquito bites if you spend a lot of time outside, either working or playing.

All donated blood is checked for WNV before being used. The risk of getting WNV through blood transfusions and organ transplants is very small, and should not prevent people who need surgery from having it. If you have concerns, talk to your doctor.

Equine Encephalitis

Eastern equine encephalitis (EEE) is a mosquito-borne viral disease. EEE virus (EEEV) occurs in the eastern half of the United States where it causes disease in humans, horses, and some bird species. Because of the high mortality rate, EEE is regarded as one of the most serious mosquito-borne diseases in the United States.

EEEV is transmitted to humans through the bite of an infected mosquito. It generally takes from 3 to 10 days to develop symptoms of EEE after being bitten by an infected mosquito. The main EEEV transmission cycle is between birds and mosquitoes.

Many species of mosquitoes can become infected with EEEV. The most important mosquito species in maintaining the bird-mosquito transmission cycle is *Culiseta melanura*, which reproduces in freshwater hardwood swamps. *Culiseta melanura*, however, is not considered to be an important vector of EEEV to horses or humans because it feeds almost exclusively on birds.

Transmission to horses or humans requires mosquito species capable of creating a "bridge" between infected birds and uninfected mammals such as some *Aedes*, *Coquillettidia*, and *Culex* species.

Horses are susceptible to EEE and some cases are fatal. EEEV infections in horses, however, are not a significant risk factor for human infection because horses are considered to be "dead-end" hosts for the virus (i.e., the amount of EEEV in their bloodstreams is usually insufficient to infect mosquitoes).

Eastern equine encephalitis virus is a member of the family Togaviridae, genus *Alphaviru c*losely related to Western equine encephalitis virus and Venezuelan equine encephalitis virus

Many persons infected with EEEV have no apparent illness. In those persons who do develop illness, symptoms range from mild flu-like illness to inflammation of the brain, coma and death.

The mortality rate from EEE is approximately one-third, making it one of the most deadly mosquito-borne diseases in the United States.

There is no specific treatment for EEE; optimal medical care includes hospitalization and supportive care (for example, expert nursing care, respiratory support, prevention of secondary bacterial infections, and physical therapy, depending on the situation).

Approximately half of those persons who survive EEE will have mild to severe permanent neurologic damage.

Incidence rate includes:

- Approximately 220 confirmed cases in the US 1964-2004, Average of 5 cases/year, with a range from 0-15 cases

- States with largest number of cases includes New Jersey.

- EEEV transmission is most common in and around freshwater hardwood swamps in the Atlantic Coast states and the Great Lakes region.

- Human cases occur relatively infrequently, largely because the primary transmission cycle takes place in and around swampy areas where human populations tend to be limited.

Risk Groups:

- Residents of and visitors to endemic areas (areas with an established presence of the virus)

- People who engage in outdoor work and recreational activities in endemic areas.

- Persons over age 50 and younger than age 15 seem to be at greatest risk for developing severe EEE when infected with the virus.

Prevention

- A vaccine is available to protect equines.

- People should avoid mosquito bites by employing personal and workplace protection measures, such as using an EPA-registered repellent according to manufacturers' instructions, wearing protective clothing, avoiding outdoor activity when mosquitoes are active (some bridge vectors of EEEV are aggressive day-biters), and removing standing water that can provide mosquito breeding sites.

- There are laboratory tests to diagnosis EEEV infection including serology, especially IgM testing of serum and cerebrospinal fluid (CSF), and neutralizing antibody testing of acute- and convalescent-phase serum.

Meningitis

Meningitis is a viral disease that can affect the central nervous system that is transmitted through the bite from an infected mosquito.

Symptoms can be nonexistent or severe and flu-like, with fever, chills, tiredness, headache, nausea and vomiting. If not treated promptly the disease can be fatal.

Prevention

- A vaccine is available. It's 80% effective after a single dose and 97.5% effective after a second dose.

  Use precautions as for other mosquito borne diseases. Avoid mosquito bites by employing personal and workplace protection measures, such as using an EPA-registered repellent according to manufacturers' instructions, wearing protective clothing, avoiding outdoor activity when mosquitoes are active and removing standing water that can provide mosquito breeding sites.

Deer Flies (See Tularemia above)

Fleas

Flea is a common name for insects of the order Siphonaptera which are wingless insects with mouthparts adapted for piercing skin and sucking blood. Fleas are external parasites, living by hematophagy off the blood of mammals (including humans). Some species include the cat flea (*Ctenocephalides felis*), dog flea (*Ctenocephalides canis*), and human flea (*Pulex irritans*).

Fleas are small (1.5 to 3.3 mm) long, agile, dark-colored, wingless insect with tube-like mouth parts adapted to feeding on the blood of their hoists. Their legs are long, with the hind pair well adapted for jumping. A flea can jump vertically up to seven inches and horizontally up to 13 inches. The flea body is hard, polished, and covered with many hairs and short spines directed backwards which assists its movement on the host. The body is able to withstand great pressure. Hard squeezing between the fingers is not normally sufficient to kill a flea.

Fleas lay tiny white oval-shaped eggs. The larva is small, pale, has bristles covering its worm-like body, lacks eyes, and has mouthparts adapted to chewing.

Fleas can cause medical problems include flea allergy dermatitis, secondary skin irritations and, in extreme cases, anemia, tapeworms, and stomach flu. Fleas can transmit murine typhus (endemic typhus) fever among animals and from animal to humans. Fleas can also transmit bubonic plague. Tapeworms normally infest in human severe cases. Although the bite is rarely felt, it is the resulting irritation caused by the flea salivary secretions that varies among individuals. Some result in a severe reaction including a general rash or inflammation resulting in secondary infections caused by scratching the irritated shin. Most bites are found on the feet and legs with the formation of small, hard, red, slightly raised itching spots with a single puncture point in the center of each spot.

Treatment

Flea bites can be treated with anti-itch creams, usually antihistamines or hydrocortisone.

Bed Bugs

Bed bugs are small parasitic insects that feed on human blood. A number of health effects may occur due to bed bugs including skin rashes, prominent blisters, psychological effects and allergic symptoms. Diagnosis involves finding the bed bugs and the occurrence of compatible symptoms. Treatment is otherwise symptomatic.

Adult bed bugs are reddish-brown, flattened, oval and wingless. Bed bugs have microscopic hairs that give them a banded appearance. Adults grow to 4-5mm in length and 1.5-3 mm wide. A bed bug pierces the skin of its host with two hollow feeding tubes shaped like tongues. The one tube injects its saliva, which contains anticoagulants and anesthetics, while the other draws blood of its host. After feeding for approximately five minutes, the bug returns to its hiding place. Although bed bugs can live for a year without feeding, they normally feed every five to ten days.

Eradication of bed bugs frequently requires a combination of pesticide and non-pesticide approaches. Pyrethroids, dichlorvos, and malathion have historically been effective. Mechanical approaches include vacuuming and heat treating or wrapping mattresses have also been recommended.

ATTACHMENT 1

RICKETTSIAL INFECTIONS

Rickettsial Infections

Description

Many species of Rickettsia can cause illnesses in humans (Table below). The term "rickettsiae" conventionally embraces a polyphyletic group of microorganisms in the class Proteobacteria, comprising species belonging to the genera *Rickettsia*, *Ehrlichia, Coxiella*, and *Bartonella*. These agents are usually not transmissible directly from person to person except by blood transfusion or organ transplantation, although sexual and placental transmission has been proposed for *Coxiella*. Transmission generally occurs via an infected arthropod vector or through exposure to an infected animal reservoir host. However, sennetsu fever is acquired following consumption of raw fish products. The clinical severity and duration of illnesses associated with different rickettsial infections vary considerably, even within a given antigenic group. Rickettsioses range in severity from diseases that are usually relatively mild (cat scratch disease) to those that can be life-threatening (murine typhus) and they vary in duration from those that can be self-limiting to chronic (Q fever and bartonelloses) or recrudescent (Brill-Zinsser disease). Most patients with rickettsial infections recover with timely use of appropriate antibiotic therapy.

Travelers may be at risk for exposure to agents of rickettsial diseases if they engage in occupational or recreational activities which bring them into contact with habitats that support the vectors or animal reservoir species associated with these pathogens.

The geographic distribution and the risks for exposure to rickettsial agents are described below and in the Table below.

Trench Fever

Trench fever, which is caused by *Bartonella quintanta*, is transmitted from one person to another by the human body louse. Contemporary outbreaks of both diseases are rare in most developed countries and generally occur only in communities and populations in which body louse infestations are frequent, especially during the colder months when louse-infested clothing is not laundered. Foci of trench fever have also been recognized among homeless populations in urban centers of industrialized countries. Travelers who are not at risk of exposure to body lice or to persons with lice are unlikely to acquire these illnesses. However, health-care workers who care for these patients may be at risk for acquiring louse-borne illnesses through inhalation or inoculation of infectious louse feces into the skin or conjunctiva.

Murine Typhus

Murine typhus, which is caused by infection with *Rickettsia typhi*, is transmitted to humans by rat fleas, particularly during exposure in rat-infested buildings (3). Flea-infested rats can be found throughout the year in humid tropical environments, especially in harbor or riverine environments. In temperate regions, they are most common during the warm summer months.

Travelers who participate in outdoor activities in grassy or wooded areas (e.g., trekking, camping, or going on safari) may be at risk for acquiring tick-borne illnesses, including those caused by *Rickettsia,* and *Ehrlichia* species (see below).

TABLE Epidemiologic features and symptoms of rickettsial diseases

ANTIGENIC GROUP	DISEASE	AGENT	PREDOMINANT SYMPTOMS*	VECTOR OR ACQUISITION MECHANISM	ANIMAL RESERVOIR	GEOGRAPHIC DISTRIBUTION OUTSIDE THE US
Typhus fevers	Murine typhus	*R. typhi*	As above, generally less severe	Rat flea	Rats, mice	Worldwide
Spotted fevers						
Coxiella	Q fever	*Coxiella burnetii*	Fever, headache, chills, sweating, pneumonia, hepatitis, endocarditis	Most human infections are acquired by inhalation of infectious aerosols; tick	Goats, sheep, cattle, domestic cats, other	Worldwide
Bartonella	Cat-scratch disease	*Bartonella henselae*	Fever, adenopathy, neuroretinitis, encephalitis	Cat flea	Domestic cats	Worldwide
	Trench fever	*B. quintana*	Fever, headache, pain in shins, splenomegaly, disseminated rash	Human body louse	Humans	Worldwide
Ehrlichia	Ehrlichosis	*Ehrlichia chaffeensis*[#]	Fever, headache, nausea, occasionally rash	Tick	Various large and small mammals, including deer and rodents	Worldwide

This represents only a partial list of symptoms. Patients may have different symptoms or only a few of those listed.

Anaplasmosis aznd Ehrlichiosis

Human ehrlichiosis and anaplasmosis are acute tick-borne diseases, associated with the lone star tick, *Amblyomma americanum*, and *Ixodes* ticks, respectively. Because one tick may be infected with more than one tick-borne pathogen (e.g. *Borrelia burgdorferi*, the causative agent of Lyme disease, or various *Babesia* species, agent of human babesiosis), patients may be present with

atypical clinical symptoms that complicate treatment. Ehrlichioses and anaplasmosis are characterized by infection of different types of leukocytes, where the causative agent multiplies in cytoplasmic membrane-bound vacuole called morulae. Morulae can sometimes be detected in Giemsa-stained blood smears.

Q FEVER

Q fever occurs worldwide, most often in persons who have contact with infected goat, sheep, cat and cattle, particularly parturient animals (especially farmers, veterinarians, butchers, meat packers, and seasonal workers). Travelers who visit farms or rural communities can be exposed to *Coxiella burnetii*, the agent of Q fever, through airborne transmission (via animal-contaminated soil and dust) or less commonly through consumption of unpasteurized milk products or by exposure to infected ticks. These infections may initially result in only mild and self-limiting influenza-like illnesses, but if untreated, infections may become chronic, particularly in persons with preexisting heart valve abnormalities or with prosthetic valves. Such persons can develop chronic and potentially fatal endocarditis.

Cat-Scratch Disease

Cat-scratch disease is contracted through scratches and bites from domestic cats, particularly kittens, infected with *Bartonella henselae*, and possibly from their fleas (3, 4). Exposure can therefore occur wherever cats are found.

Symptoms

Clinical presentations of rickettsial illnesses vary (Table above), but common early symptoms, including fever, headache, and malaise, are generally nonspecific. Illnesses resulting from infection with rickettsial agents may go unrecognized or are attributed to other causes. Atypical presentations are common and may be expected with poorly characterized non-indigenous agents, so appropriate samples for examination by specialized reference laboratories should be obtained. A diagnosis of rickettsial diseases is based on two or more of the following: 1) clinical symptoms and an epidemiologic history compatible with a rickettsial disease, 2) the development of specific convalescent-phase antibodies reactive with a given pathogen or antigenic group, 3) a positive polymerase chain reaction test result, 4) specific immunohistologic detection of rickettsial agent, or 5) isolation of a rickettsial agent. Ascertaining the likely place and the nature of potential exposures is particularly helpful for accurate diagnostic testing.

Prevention

With the exception of the louse-borne diseases described above, for which contact with infectious arthropod feces is the primary mode of transmission (through autoinoculation into a wound, conjunctiva, or inhalation), travelers and health-care providers are generally not at risk for becoming infected via exposure to an ill person. Limiting exposures to vectors or animal reservoirs remains the best means for reducing the risk for disease. Travelers and persons working in areas where organisms may be present should implement prevention based on avoidance of vector-infested habitats, use of repellents and protective clothing, prompt detection and removal of arthropods from clothing and skin, and attention to hygiene.

Q fever and *Bartonella* group diseases may pose a special risk for persons with abnormal or prosthetic heart valves, and *Rickettsia, Ehrlichia*, and *Bartonella* for persons who are immuno-compromised.

ATTACHMENT 2

ENCEPHALITIS ARBOVIRAL ENCEPHALITIDES

Encephalitis Arboviral Encephalitides

Perspectives

Arthropod-borne viruses, i.e., arboviruses, are viruses that are maintained in nature through biological transmission between susceptible vertebrate hosts by blood feeding arthropods (mosquitoes, psychodids, ceratopogonids, and ticks). Vertebrate infection occurs when the infected arthropod takes a blood meal. The term 'arbovirus' has no taxonomic significance. Arboviruses that cause human encephalitis are members of three virus families: the *Togaviridae* (genus Alphavirus, *Flaviviridae*, and *Bunyaviridae*.

All arboviral encephalitides are zoonotic, being maintained in complex life cycles involving a nonhuman primary vertebrate host and a primary arthropod vector. These cycles usually remain undetected until humans encroach on a natural focus, or the virus escapes this focus via a secondary vector or vertebrate host as the result of some ecologic change. Humans and domestic animals can develop clinical illness but usually are "dead-end" hosts because they do not produce significant viremia, and do not contribute to the transmission cycle. Many arboviruses that cause encephalitis have a variety of different vertebrate hosts and some are transmitted by more than one vector. Maintenance of the viruses in nature may be facilitated by vertical transmission (e.g., the virus is transmitted from the female through the eggs to the offspring).

Arboviral encephalitides have a global distribution which is transmitted by mosquitoes. Powassan, is a minor cause of encephalitis in the northern United States, and is transmitted by ticks. A new Powassan-like virus has recently been isolated from deer ticks. Its relatedness to Powassan virus and its ability to cause disease has not been well documented. Most cases of arboviral encephalitis occur from June through September, when arthropods are most active. In milder (i.e., warmer) parts of the country, where arthropods are active late into the year, cases can occur into the winter months.

The majority of human infections is asymptomatic or may result in a nonspecific flu-like syndrome. Onset may be insidious or sudden with fever, headache, myalgias, malaise and occasionally prostration. Infection may, however, lead to encephalitis, with a fatal outcome or permanent neurologic sequelae. Fortunately, only a small proportion of infected persons progress to frank encephalitis.

Experimental studies have shown that invasion of the central nervous system (CNS), generally follows initial virus replication in various peripheral sites and a period of viremia. Viral transfer from the blood to the CNS through the olfactory tract has been suggested. Because the arboviral encephalitides are viral diseases, antibiotics are not effective for treatment and no effective antiviral drugs have yet been discovered.

Prevention

Arboviral encephalitis can be prevented in two major ways: personal protective measures and public health measures to reduce the population of infected mosquitoes. Personal measures include reducing time outdoors particularly in early evening hours, wearing long pants and long sleeved shirts and applying mosquito repellent to exposed skin areas. Public health measures often require spraying of insecticides to kill juvenile (larvae) and adult mosquitoes.

Selection of mosquito control methods depends on what needs to be achieved; but, in most emergency situations, the preferred method to achieve maximum results over a wide area is aerial spraying. In many states aerial spraying may be available in certain locations as a means to control nuisance mosquitoes. Such resources can be redirected to areas of virus activity. When aerial spraying is not routinely used, such services are usually contracted for a given time period. Financing of aerial spraying costs during large outbreaks is usually provided by state emergency contingency funds. Federal funding of emergency spraying is rare and almost always requires a federal disaster declaration. Such disaster declarations usually occur when the vector-borne disease has the potential to infect large numbers of people, when a large population is at risk and when the area requiring treatment is extensive. Special large planes maintained by the United States Air Force can be called upon to deliver the insecticide(s) chosen for such emergencies. Federal disaster declarations have relied heavily on risk assessment by the CDC.

There are no commercially available human vaccines for these U.S. diseases.

Powassan Encephalitis

Powassan (POW) virus is a flavivirus and currently the only well documented tick-borne transmitted arbovirus occurring in the United States and Canada. Recently a Powassan-like virus was isolated from the deer tick, *Ixodes scapularis*. Its relationship to POW and its ability to cause human disease has not been fully elucidated. POW's range in the United States is primarily in the upper tier States. In addition to isolations from man, the virus has been recovered from ticks *(Ixodes marxi, I. cookei* and *Dermacentor andersoni*) and from the tissues of a skunk (*Spiligale putorius*). It is a rare cause of acute viral encephalitis. POW virus was first isolated from the brain of a 5-year-old child who died in Ontario in 1958. Patients who recover may have residual neurological problems.

Other Arboviral Encephalitides

Many other arboviral encephalitides occur throughout the world. Most of these diseases are problems only for those individuals traveling to countries where the viruses are endemic.

West Nile Encephalitis

Discussed elsewhere in this document

FLD 43 D HAZARDOUS PLANTS

A number of hazardous plants may be encountered during field operations. The ailments associated with these plants range from mild hay fever to contact dermatitis. Plants that present the greatest risk to site workers are those that produce allergic reactions and tissue injury.

Plants That Cause Skin and Tissue Injury

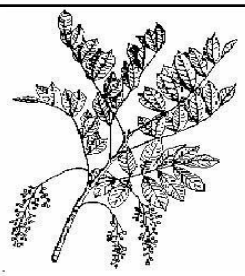
Contact with sharp leaves and thorns are of special concern to site personnel. This concern stems from the fact that punctures, cuts, and even minor scrapes caused by accidental contact may result in skin lesions and the introduction of fungi or bacteria through the skin. This is especially important in light of the fact that the warm moist environment created inside protective clothing is ideal for the propagation of fungal and bacterial infection. Personnel receiving any of the injuries listed above, even minor scrapes shall report immediately for continued observation and care. Keeping the skin covered as much as possible (i.e., long pants and long sleeved shirts) in areas where these plants are known to exist will limit much of the potential exposure.

Plants That Cause an Allergic Reaction

The poisonous plants of greatest concern are poison ivy, poison oak, and poison sumac. Contact with the poisonous sap of these plants produces a severe rash characterized by redness, blisters, swelling, and intense burning and itching. The victim also may develop a high fever and may be very ill. Ordinarily, the rash begins within a few hours after exposure, but it may be delayed for 24 to 48 hours.

The most distinctive features of poison ivy and poison oak are their leaves, which are composed of three leaflets each. In certain seasons, both plants also have greenish-white flowers and berries that grow in clusters. Poison sumac is a tall shrub or small tree with 6 to 12 leaflets arranged in pairs with a single leaflet at the end. This plant grows in wooded, swampy areas.

Poison Ivy/Poison Oak/Poison Sumac

Poison Ivy	Poison Oak	Poison Sumac
		

The reaction associated with exposure to these plants will generally cause the following signs and symptoms:

- Blistering at the site of contact, usually occurring within 12 to 48 hours after contact
- Reddening, swelling, itching and burning at the site of contact
- Pain, if the reaction is severe
- Conjunctivitis, asthma, and other allergic reactions if the person is extremely sensitive to the poisonous plant toxin

If the rash is scratched, secondary infections can occur. Preventive measures that are effective for most site personnel include:

- Avoid contact with any poisonous plants on site, and keep a steady watch to identify, report and mark poisonous plants found on site
- Wash hands, face or other exposed areas at the beginning of each break period and at the end of each workday
- Avoid contact with, and wash on a daily basis, contaminated tools, equipment and clothing
- Barrier creams, detoxification/wash solutions and orally administered desensitization may prove effective and should be tried to find the best preventive solution

Keeping the skin covered as much as possible (i.e., long pants and long sleeved shirts) in areas where these plants are known to exist will limit much of the potential exposure.

Plants That are Poisonous

There are a number of plants worldwide beside poison ivy, oak and sumac which have poisonous properties. In many cases consumption of these plants or parts of these plants can result in poisoning. In other cases, contact with the plants may be poisonous. The following is a listing with pertinent information on poisonous properties and locations of a number of plants.

In general, when working in the outdoors or where you may come in contact with household plants or where your families may come in contact with these plants, it is important that as soon as possible after contact the area or areas should be thoroughly washed and hands must be thoroughly washed before eating drinking, smoking or any other hand to mouth contact.

In keeping with our 24/7 BBS concept, it is important to remember that children are particularly vulnerable to many of the poisonous parts of these plants. Many of these poisonous parts resemble non-poisonous food items such as berries and are attractive.

As with most lists there is extensive information but the list may not include all poisonous plants.

It is important to remember that this document is a starting point to be supplemented with local information. The majority of this information is from a list found in Wikipedia an on line Dictionary readily accessible via Google. The website has pictures of these plants as well as links to other information sources.

POISONOUS PLANTS

From Wikipedia,

This is a list of plants containing poisonous parts that pose a serious risk of illness, injury, or death to humans.

Poisonous Food Plants

- Apple (*Malus domestica*) **Found worldwide in cooler climates**. Seeds contain cyanogenic glycosides; although the amount found in most apples won't kill a person.

- Cherry (*Prunus cerasus*), as well as other species (*Prunus spp*) such as peach (*Prunus persica*), plum (*Prunus domestica*), almond (*Prunus dulcis*) and apricot (*Prunus armeninaca*). **There are around 430 species of *Prunus*, spread throughout the northern temperate regions of the globe.** Leaves and seeds contain cyanogenic glycosides

- Rhubarb (*Rheum rhaponticum*) **Found worldwide**. Leaves, but not stems, contain oxalic acid salts, causing kidney disorders, convulsions, and coma. Rarely fatal.

- Tomato (*Solanum lycopersicum*) **Found worldwide.** Foliage and vines contain alkaloid poisons which cause digestive upset and nervous excitement.

Other Poisonous Plants

- Autumn crocus. **Found in North America.** The bulbs are poisonous and cause nausea, vomiting, diarrhea. **Can be fatal**.

- Azalea **Found Worldwide.** All parts of the plant are poisonous and cause nausea, vomiting, depression, breathing difficulties, and coma. Rarely fatal.

- Bittersweet nightshade N**aturalized in North America.** All parts are poisonous, containing solanine and causing fatigue, paralysis, convulsions and diarrhea. Rarely fatal.

- Bleeding heart / Dutchman's breeches. **Found in North America.** Leaves and roots are poisonous and cause convulsions and other nervous symptoms.

- Black locust. **Naturalized in North America**. Pods are toxic

- Caladium / Elephant ear. **Ornamental plants in North America.** All parts of the plant are poisonous. Symptoms are generally irritation, pain, and swelling of tissues. If the mouth or tongue swells, breathing may be fatally blocked.

- Castor Oil Plant (*Ricinus communis*) Castor Oil Plant. **Found Worldwide.** The phytotoxin is **ricin**, an extremely toxic water soluble protein, which is concentrated in the seed. Also present are ricinine, an alkaloid, and an irritant oil. Causes burning in mouth and throat, convulsions, and is **often fatal.**

- Daffodil. **Found worldwide.** The bulbs are poisonous and cause nausea, vomiting, and diarrhea. **Can be fatal**.

- Daphne (*Daphne sp.*) **Ornamental plant worldwide**. The berries (either red or yellow) are poisonous, causing burns to mouth and digestive tract, followed by coma. **Often fatal.**

- Darnel/Poison Ryegrass (*Lolium temulentum*) **Usually grows in the same production zones as wheat and is considered a weed.** The seeds and seed heads of this common garden weed may contain the alkaloids temuline and loliine. Some experts also point to the fungus ergot or fungi of the genus endoconidium both of which grow on the seed heads of rye grasses as an additional source of toxicity.

- Deadly nightshade (*Atropa belladonna*) **Naturalized in parts of North America**. All parts of the plant contain the toxic alkaloid atropine. The young plants and seeds are especially poisonous, causing nausea, muscle twitches, paralysis; **often fatal**.

- Dumbcane / dieffenbachia. **Found in tropical areas and popular as house plants.** All parts are poisonous, causing intense burning, irritation, and immobility of the tongue, mouth, and throat. Swelling can be severe enough to block breathing leading to death.

- Ivy**. Native to North America** where winters are not severe. The leaves and berries are poisonous, causing stomach pains, labored breathing, possible coma.
- Jerusalem cherry **United States** All parts, especially the berries, are poisonous, causing nausea and vomiting. **Looks like a cherry tomato**. It is occasionally fatal, especially to children.

- Lilies **Worldwide** There are some 3500 species that comprise the lily (Lilaceae) family. Some are beneficial including (foods such as onion, shallot, garlic, chives [all *Allium* spp] and asparagus) and some with medicinal uses (colchicine and red squill) Many produce alkalids which are poisonous, especially to cats.

- Manchineel (*Hippomane mancinella*) **Native to the Caribbean (including Puerto Rico and the Virgin Islands).** It is one of the most poisonous trees in the world All parts of this tree including the fruit contain toxic phorbol esters typical of the Euphorbiacea. Sap may cause burning of the skin and smoke form burning may cause eye irritation and blindness. Fruits, which are similar in appearance to an apple, are green or greenish-yellow when ripe.

- Oak Worldwide Most species foliage and acorns are mildly poisonous, causing digestive upset, heart trouble, contact dermatitis. Rarely fatal.

- Poison-ivy (*Toxicodendron radicans*), Poison-oak (*T. diversilobum*), and Poison Sumac (*T.vernix*) **North America** All parts of these plants contain a highly irritating oil with urushiol (this is actually not a poison but an allergen). Skin reactions can include blisters and rashes. It spreads readily to clothes and back again, and has a very long life. Infections can follow scratching.

- Pokeweed (*Phytolacca sp.*) **Native to North America.** Leaves, berries and roots contain phytolaccatoxin and phytolaccigenin - toxin in young leaves is reduced with each boiling and draining.

Appendix B

Site-Specific UFP Quality Assurance Project Plan

Weston Solutions, Inc.
Suite 201
1090 King Georges Post Road
Edison, New Jersey 08837-3703
732-585-4400 • Fax: 732-225-7037
www.westonsolutions.com

The Trusted Integrator for Sustainable Solutions

REMOVAL SUPPORT TEAM 3
EPA CONTRACT EP-S2-14-01

May 18, 2016

Mr. Cris D'Onofrio, On-Scene Coordinator
U.S. Environmental Protection Agency
Response & Prevention Branch
2890 Woodbridge Avenue
Edison, NJ 08837

EPA CONTRACT NO: EP-S2-14-01
TDD NO: TO-0006-0202
DOCUMENT CONTROL NO: RST3-02-D-0271
SUBJECT: SITE-SPECIFIC UFP QUALITY ASSURANCE PROJECT PLAN - BALDWINSVILLE NY RESIDENTIAL HG SITE, BALDWINSVILLE, ONONDAGA COUNTY, NEW YORK

Dear Mr. D'Onofrio,

Enclosed please find the Site-Specific UFP Quality Assurance Project Plan (QAPP) for the Removal Action soil sampling activities to be conducted at the Baldwinsville NY Residential Hg Site located in Baldwinsville, Onondaga County, New York beginning on May 18, 2016.

If you have any questions or comments, please do not hesitate to contact me at (908) 565-2987.

Sincerely,

Weston Solutions, Inc.

For Michael Beuthe
RST 3 Site Project Manager

Enclosure
cc: TDD File No.: TO-0006-0202

SITE-SPECIFIC UFP QUALITY ASSURANCE PROJECT PLAN
BALDWINSVILLE NY RESIDENTIAL HG SITE
BALDWINSVILLE, ONONDAGA COUNTY, NEW YORK

Prepared By:

Removal Support Team 3
Weston Solutions, Inc.
Federal East Division
Edison, New Jersey 08837

DC No.: RST3-02-D-0271
TDD No.: TO-0006-0202
EPA Contract No.: EP-S2-14-01

May 2016

TABLE OF CONTENTS

CROSSWALK **1**
QAPP WORKSHEET #1: TITLE AND APPROVAL PAGE **4**
QAPP WORKSHEET #2 QAPP IDENTIFYING INFORMATION **5**
QAPP WORKSHEET #3: DISTRIBUTION LIST **6**
QAPP WORKSHEET #4: PROJECT PERSONNEL SIGN-OFF SHEET **7**
QAPP WORKSHEET #5: PROJECT ORGANIZATIONAL CHART **8**
QAPP WORKSHEET #6: COMMUNICATION PATHWAYS **9**
QAPP WORKSHEET #7: PERSONNEL RESPONSIBILITIES AND QUALIFICATIONS TABLE **10**
QAPP WORKSHEET #8: SPECIAL PERSONNEL TRAINING REQUIREMENTS TABLE **11**
QAPP WORKSHEET #9: PROJECT SCOPING SESSION PARTICIPANTS SHEET **11**
QAPP WORKSHEET #10: PROBLEM DEFINITION **13**
QAPP WORKSHEET #11: PROJECT QUALITY OBJECTIVES/SYSTEMATIC PLANNING PROCESS STATEMENT **15**
QAPP WORKSHEET #12: MEASUREMENT PERFORMANCE CRITERIA TABLE **16**
QAPP WORKSHEET #13: SECONDARY DATA CRITERIA AND LIMITATIONS TABLE **17**
QAPP WORKSHEET #14: SUMMARY OF PROJECT TASKS **18**
QAPP WORKSHEET #15: REFERENCE LIMITS AND EVALUATION TABLE **21**
QAPP WORKSHEET #16: PROJECT SCHEDULE/TIMELINE TABLE **22**
QAPP WORKSHEET #17: SAMPLING DESIGN AND RATIONALE **23**
QAPP WORKSHEET #18: SAMPLING LOCATIONS AND METHODS/SOP REQUIREMENTS TABLE **24**
QAPP WORKSHEET #19: ANALYTICAL SOP REQUIREMENTS TABLE **25**
QAPP WORKSHEET #20: FIELD QUALITY CONTROL SAMPLE SUMMARY TABLE **26**
QAPP WORKSHEET #21: PROJECT SAMPLING SOP REFERENCES TABLE **27**
QAPP WORKSHEET #22: FIELD EQUIPMENT CALIBRATION, MAINTENANCE, TESTING, AND INSPECTION TABLE **28**
QAPP WORKSHEET #23: ANALYTICAL SOP REFERENCES TABLE **29**
QAPP WORKSHEET #24: ANALYTICAL INSTRUMENT CALIBRATION TABLE **30**
QAPP WORKSHEET #25: ANALYTICAL INSTRUMENT AND EQUIPMENT MAINTENANCE, TESTING, AND INSPECTION TABLE **31**
QAPP WORKSHEET #26: SAMPLE HANDLING SYSTEM **32**
QAPP WORKSHEET #27: SAMPLE CUSTODY REQUIREMENTS **33**
QAPP WORKSHEET #28: QC SAMPLES TABLE **35**
QAPP WORKSHEET #29: PROJECT DOCUMENTS AND RECORDS TABLE **36**
QAPP WORKSHEET #30: ANALYTICAL SERVICES TABLE **37**
QAPP WORKSHEET #31: PLANNED PROJECT ASSESSMENTS TABLE **38**
QAPP WORKSHEET #32: ASSESSMENT FINDINGS AND CORRECTIVE ACTION RESPONSES **39**
QAPP WORKSHEET #33: QA MANAGEMENT REPORTS TABLE **40**
QAPP WORKSHEET #34: VERIFICATION (STEP I) PROCESS TABLE **41**
QAPP WORKSHEET #35: VALIDATION (STEPS IIA AND IIB) PROCESS TABLE **42**
QAPP WORKSHEET #36 VALIDATION (STEPS IIA AND IIB) SUMMARY TABLE **43**
QAPP WORKSHEET #37: USABILITY ASSESSMENT **44**

LIST OF ATTACHMENTS

ATTACHMENT A: Figure 1: Site Location Map

ATTACHMENT B: Sampling SOPs
EPA ERT SOP # 2001: General Field Sampling Guidelines
EPA ERT SOP # 2012: Soil Sampling

LIST OF ACRONYMS

ADR	Automated Data Review
ANSETS	Analytical Services Tracking System
AOC	Acknowledgment of Completion
ASTM	American Society for Testing and Materials
CEO	Chief Executive Officer
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CLP	Contract Laboratory Program
CFM	Contract Financial Manager
CO	Contract Officer
COI	Conflict of Interest
COO	Chief Operations Officer
CRDL	Contract Required Detection Limit
CRTL	Core Response Team Leader
CRQL	Contract Required Quantitation Limit
CQLOSS	Corporate Quality Leadership and Operations Support Services
CWA	Clean Water Act
DCN	Document Control Number
DESA	Division of Environmental Science and Assessment
DI	Deionized Water
DPO	Deputy Project Officer
DQI	Data Quality Indicator
DQO	Data Quality Objective
EM	Equipment Manager
EDD	Electronic Data deliverable
ENVL	Environmental Unit Leader
EPA	Environmental Protection Agency
ERT	Environmental Response Team
FASTAC	Field and Analytical Services Teaming Advisory Committee
GC/ECD	Gas Chromatography/Electron Capture Detector
GC/MS	Gas Chromatography/Mass Spectrometry
HASP	Health and Safety Plan
HRS	Hazard Ranking System
HSO	Health and Safety Officer
ITM	Information Technology Manager
LEL	Lower Explosive Limit
MSA	Mine Safety Appliances
MS/MSD	Matrix Spike/Matrix Spike Duplicate
NELAC	National Environmental Laboratory Accreditation Conference
NELAP	National Environmental Laboratory Accreditation Program
NIOSH	National Institute for Occupational Safety and Health
NIST	National Institute of Standards and Technology
OSC	On-Scene Coordinator
OSHA	Occupational Safety and Health Administration

LIST OF ACRONYMS (Concluded)

OSWER	Office of Solid Waste and Emergency Response
PARCCS	Precision, Accuracy, Representativeness, Completeness, Comparability, Sensitivity
PAH	Polynuclear Aromatic Hydrocarbons
PCB	Polychlorinated Biphenyls
PIO	Public Information Officer
PM	Program Manager
PO	Project Officer
PRP	Potentially Responsible Party
PT	Proficiency Testing
QA	Quality Assurance
QAL	Quality Assurance Leader
QAPP	Quality Assurance Project Plan
QMP	Quality Management Plan
QA/QC	Quality Assurance/Quality Control
QC	Quality Control
RC	Readiness Coordinator
RCRA	Resource Conservation and Recovery Act
RPD	Relative Percent Difference
RSCC	Regional Sample Control Coordinator
RST	Removal Support Team
SARA	Superfund Amendments and Reauthorization Act
SEDD	Staged Electronic Data Deliverable
SOP	Standard Operating Practice
SOW	Statement of Work
SPM	Site Project Manager
START	Superfund Technical Assessment and Response Team
STR	Sampling Trip Report
TAL	Target Analyte List
TCL	Total Compound List
TDD	Technical Direction Document
TDL	Technical Direction Letter
TO	Task Order
TQM	Total Quality Management
TSCA	Toxic Substances Control Act
UFP	Uniform Federal Policy
VOA	Volatile Organic Analysis

CROSSWALK

The following table provides a "cross-walk" between the QAPP elements outlined in the Uniform Federal Policy for Quality Assurance Project Plans (UFP-QAPP Manual), the necessary information, and the location of the information within the text document and corresponding QAPP Worksheet. Any QAPP elements and required information that are not applicable to the project are circled.

QAPP Element(s) and Corresponding Section(s) of UFP-QAPP Manual	Required Information	Crosswalk to QAPP Section	Crosswalk to QAPP Worksheet No.
Project Management and Objectives			
2.1 Title and Approval Page	- Title and Approval Page	Approval Page	1
2.2 Document Format and Table of Contents 2.2.1 Document Control Format 2.2.2 Document Control Numbering System 2.2.3 Table of Contents 2.2.4 QAPP Identifying Information	- Table of Contents - QAPP Identifying Information	TOC Approval Page	 2
2.3 Distribution List and Project Personnel Sign-Off Sheet 2.3.1 Distribution List 2.3.2 Project Personnel Sign-Off Sheet	- Distribution List - Project Personnel Sign-Off Sheet	Approval Page	3 4
2.4 Project Organization 2.4.1 Project Organizational Chart 2.4.2 Communication Pathways 2.4.3 Personnel Responsibilities and Qualifications 2.4.4 Special Training Requirements and Certification	- Project Organizational Chart - Communication Pathways - Personnel Responsibilities and Qualifications - Special Personnel Training Requirements	2	5 6 7 8
2.5 Project Planning/Problem Definition 2.5.1 Project Planning (Scoping) 2.5.2 Problem Definition, Site History, and Background	- Project Planning Session Documentation (including Data Needs tables) - Project Scoping Session Participants Sheet - Problem Definition, Site History, and Background - Site Maps (historical and present)	1	 9 10
2.6 Project Quality Objectives and Measurement Performance Criteria 2.6.1 Development of Project Quality Objectives Using the Systematic Planning Process 2.6.2 Measurement Performance Criteria	- Site-Specific PQOs - Measurement Performance Criteria	3	11 12
2.7 Secondary Data Evaluation	- Sources of Secondary Data and Information - Secondary Data Criteria and Limitations	1 2	 13

QAPP Element(s) and Corresponding Section(s) of UFP-QAPP Manual	Required Information	Crosswalk to QAPP Section	Crosswalk to QAPP Worksheet No.
2.8 Project Overview and Schedule 2.8.1 Project Overview 2.8.2 Project Schedule	- Summary of Project Tasks - Reference Limits and Evaluation - Project Schedule/Timeline	4	14 15 16
Measurement/Data Acquisition			
3.1 Sampling Tasks 3.1.1 Sampling Process Design and Rationale 3.1.2 Sampling Procedures and Requirements 3.1.2.1 Sampling Collection Procedures 3.1.2.2 Sample Containers, Volume, and Preservation 3.1.2.3 Equipment/Sample Containers Cleaning and Decontamination Procedures 3.1.2.4 Field Equipment Calibration, Maintenance, Testing, and Inspection Procedures 3.1.2.5 Supply Inspection and Acceptance Procedures 3.1.2.6 Field Documentation Procedures	- Sampling Design and Rationale - Sample Location Map - Sampling Locations and Methods/SOP Requirements - Analytical Methods/SOP Requirements - Field Quality Control Sample Summary - Sampling SOPs - Project Sampling SOP References - Field Equipment Calibration, Maintenance, Testing, and Inspection	5	17 18 19 20 21 22
3.2 Analytical Tasks 3.2.1 Analytical SOPs 3.2.2 Analytical Instrument Calibration Procedures 3.2.3 Analytical Instrument and Equipment Maintenance, Testing, and Inspection Procedures 3.2.4 Analytical Supply Inspection and Acceptance Procedures	- Analytical SOPs - Analytical SOP References - Analytical Instrument Calibration - Analytical Instrument and Equipment Maintenance, Testing, and Inspection	6	23 24 25
3.3 Sample Collection Documentation, Handling, Tracking, and Custody Procedures 3.3.1 Sample Collection Documentation 3.3.2 Sample Handling and Tracking System 3.3.3 Sample Custody	- Sample Collection Documentation Handling, Tracking, and Custody SOPs - Sample Container Identification - Sample Handling Flow Diagram - Example Chain-of-Custody Form and Seal	7	26 27
3.4 Quality Control Samples 3.4.1 Sampling Quality Control Samples 3.4.2 Analytical Quality Control Samples	- QC Samples - Screening/Confirmatory Analysis Decision Tree	5	28

QAPP Element(s) and Corresponding Section(s) of UFP-QAPP Manual	Required Information	Crosswalk to QAPP Section	Crosswalk to QAPP Worksheet No.
3.5 Data Management Tasks 3.5.1 Project Documentation and Records 3.5.2 Data Package Deliverables 3.5.3 Data Reporting Formats 3.5.4 Data Handling and Management 3.5.5 Data Tracking and Control	- Project Documents and Records - Analytical Services - Data Management SOPs	6	29 30
Assessment/Oversight			
4.1 Assessments and Response Actions 4.1.1 Planned Assessments 4.1.2 Assessment Findings and Corrective Action Responses	- Assessments and Response Actions - Planned Project Assessments - Audit Checklists - Assessment Findings and Corrective Action Responses	8	31 32
4.2 QA Management Reports	- QA Management Reports		33
4.3 Final Project Report	- Final Report(s)		
Data Review			
5.1 Overview			
5.2 Data Review Steps 5.2.1 Step I: Verification 5.2.2 Step II: Validation 5.2.2.1 Step IIa Validation Activities 5.2.2.2 Step IIb Validation Activities 5.2.3 Step III: Usability Assessment 5.2.3.1 Data Limitations and Actions from Usability Assessment 5.2.3.2 Activities	- Verification (Step I) Process - Validation (Steps IIa and IIb) Process - Validation (Steps IIa and IIb) Summary - Usability Assessment	9	34 35 36 37

QAPP Worksheet #1: Title and Approval Page

Title: Site-Specific UFP Quality Assurance Project Plan
Site Name/Project Name: Baldwinsville NY Residential Hg Site
Site Location: Baldwinsville, Onondaga County, New York
Revision Number: 00
Revision Date: Not Applicable

Weston Solutions, Inc.
Lead Organization

Michael Beuthe
Weston Solutions, Inc.
1090 King Georges Post Road, Suite 201
Edison, NJ 08837
Email: michael.beuthe@westonsolutions.com
Preparer's Name and Organizational Affiliation

18 May 2016
Preparation Date (Day/Month/Year)

Site Project Manager: _____
Signature

for Michael Beuthe/Weston Solutions, Inc.
Printed Name/Organization/Date

QA Officer/Technical Reviewer: _____
Signature

Smita Sumbaly/Weston Solution, Inc.
Printed Name/Organization/Date

EPA, Region II On-Scene Coordinator (OSC): _____
Signature

Cris D'Onofrio/EPA, Region II
Printed Name/Organization/Date

EPA, Region II Quality Assurance Officer (QAO): _____
Signature

Printed Name/Organization/Date

Document Control Number: RST3-02-D-0271

QAPP Worksheet #2: QAPP Identifying Information

Site Name/Project Name: : Baldwinsville NY Residential Hg Site
Site Location: Baldwinsville, Onondaga County, New York
Operable Unit: 00
Title: Site-Specific UFP Quality Assurance Project Plan
Revision Number: 00
Revision Date: Not Applicable

1. **Identify guidance used to prepare QAPP:**
   Uniform Federal Policy for Quality Assurance Project Plans. Refer to EPA DESA methods.
2. **Identify regulatory program:** EPA, Region II
3. **Identify approval entity:** EPA, Region II
4. **Indicate whether the QAPP is a generic or a site-specific QAPP.**
5. **List dates of scoping sessions that were held:** May 17, 2016
6. **List dates and titles of QAPP documents written for previous site work, if applicable:**

   Not applicable
7. **List organizational partners (stakeholders) and connection with lead organization:**

   None
8. **List data users:** EPA, Region II (see Worksheet #4 for individuals)
9. **If any required QAPP elements and required information are not applicable to the project, then provide an explanation for their exclusion below:** None
10. **Document Control Number:** RST3-02-D-0271

QAPP Worksheet #3: Distribution List

[List those entities to which copies of the approved site-specific QAPP, subsequent QAPP revisions, addenda, and amendments are sent]

QAPP Recipient	Title	Organization	Telephone Number	Fax Number	E-mail Address	Document Control Number
Cris D'Onofrio	On-Scene Coordinator	EPA, Region II	(908) 420-4475	(732) 906-6182	donofrio.cris@epa.gov	RST3-02-D-0271
Michael Beuthe	Site Project Manager	Weston Solutions, Inc., RST 3	(908) 565-2987	(732) 225-7037	michael.beuthe@westonsolutions.com	RST3-02-D-0271
Smita Sumbaly	QA Officer	Weston Solutions, Inc., RST 3	(732) 585-4410	(732) 225-7037	S.Sumbaly@westonsolutions.com	RST3-02-D-0271
Site TDD File	RST 3 Site TDD File	Weston Solutions, Inc., RST 3	Not Applicable	Not Applicable	Not Applicable	-

QAPP Worksheet #4: Project Personnel Sign-Off Sheet

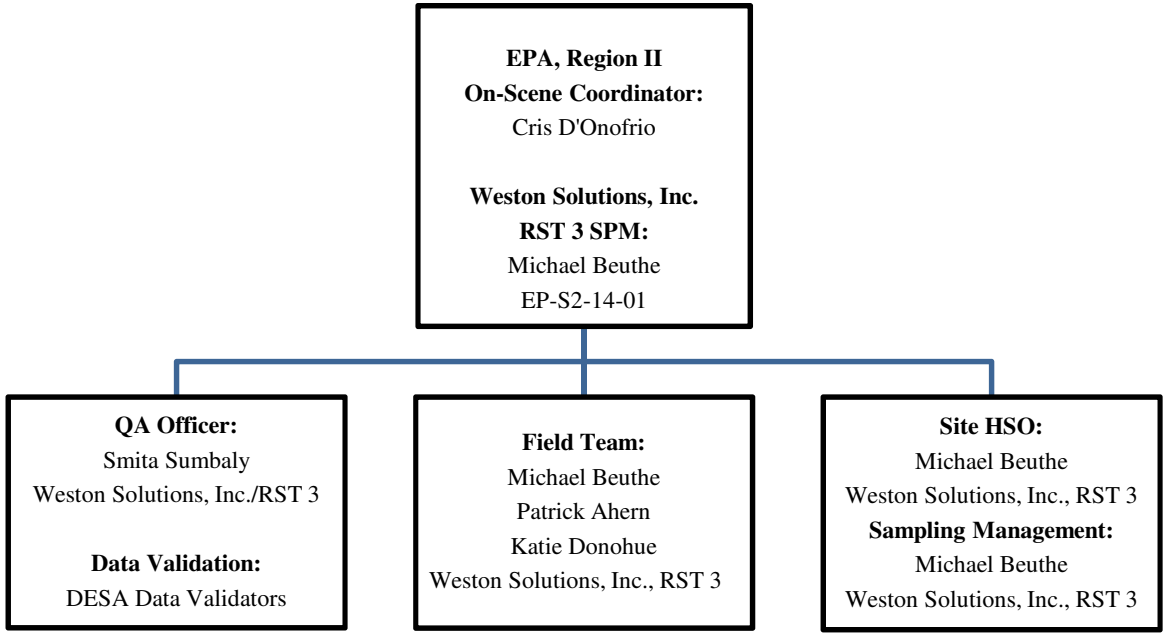
[Copies of this form signed by key project personnel from each organization to indicate that they have read the applicable sections of the site-specific QAPP and will perform the tasks as described; add additional sheets as required. Ask each organization to forward signed sheets to the central project file.]

Organization: Weston Solutions, Inc., RST 3

Project Personnel	Title	Telephone Number	Signature	Date QAPP Read
Cris D'Onofrio	EPA OSC	(908) 420-4475		
Smita Sumbaly	QAO, RST 3	(732) 585-4410	Smita Sumbaly	5/18/16
Timothy Benton	Operations Leader /HSO	(908) 565-2973		5/18/16
Michael Beuthe	Site Project Manager, RST 3	(908) 565-2987		
Patrick Ahern	Field Personnel, RST 3	(908) 510-9551		
Katie Donohue	Field Personnel, RST 3	(732) 570-4943		

QAPP Worksheet #5: Project Organizational Chart

Identify reporting relationship between all organizations involved in the project, including the lead organization and all contractor and subcontractor organizations. Identify the organizations providing field sampling, on-site and off-site analysis, and data review services, including the names and telephone numbers of all project managers, project team members, and/or project contacts for each organization.



Acronyms:
EPA: U.S. Environmental Protection Agency
RST 3: Removal Support Team 3
SPM: Site Project Manager
QA: Quality Assurance
DESA: Division of Environmental Science and Assessment
HSO: Health & Safety Officer

QAPP Worksheet #6: Communication Pathways

Communication Drivers	Responsible Entity	Name	Phone Number	Procedure
Point of contact with EPA OSC	Site Project Manager, Weston Solutions, Inc., RST 3	Michael Beuthe, SPM	(908) 565-2987	All technical, QA and decision-making matters in regard to the project (verbal, written or electronic)
Adjustments to QAPP	Site Project Manager, Weston Solutions, Inc., RST 3	Michael Beuthe, SPM	(908) 565-2987	QAPP approval dialogue
Health and Safety On-Site Meeting	HSO, Weston Solutions, Inc., RST 3	Michael Beuthe, SPM	(908) 565-2987	Explain Site hazards, personnel protective equipment, hospital location, etc.

Acronyms:
EPA: U.S. Environmental Protection Agency
OSC: On-Scene Coordinator
QAPP: Quality Assurance Project Plan
RST 3: Removal Support Team 3
SPM: Site Project Manager
HSO: Health and Safety Officer
QA: Quality Assurance

QAPP Worksheet #7: Personnel Responsibilities and Qualifications Table

Name	Title	Organizational Affiliation	Responsibilities	Education and Experience Qualifications
Cris D'Onofrio	EPA On-Scene Coordinator	EPA, Region II	All project coordination, direction and decision making.	NA
Michael Beuthe	SPM/Field Personnel, RST 3	Weston Solutions, Inc.	Project Manager, HSO, EPA point of contact	5 Years*
Patrick Ahern	Field Personnel, RST 3	Weston Solutions, Inc.	Sample collection, sample management	5 Years*
Katie Donohue	Field Personnel, RST 3	Weston Solutions, Inc.	Sample collection, sample management	1 Year*

*All RST 3 members, including subcontractor's resumes, are in the possession of the RST 3 Program Manager, EPA Project Officer, and EPA Contracting Officer.

QAPP Worksheet #8: Special Personnel Training Requirements Table

Project Function	Specialized Training By Title or Description of Course	Training Provider	Training Date	Personnel / Groups Receiving Training	Personnel Titles / Organizational Affiliation	Location of Training Records / Certificates[1]
[Specify location of training records and certificates for samplers]						
QAPP Training	This training is presented to all RST 3 personnel to introduce the provisions, requirements, and responsibilities detailed in the UFP QAPP. The training presents the relationship between the site-specific QA Project Plans (QAPPs), SOPs, work plans, and the Generic QAPP. QAPP refresher training will be presented to all employees following a major QAPP revision.	Weston Solutions, Inc., QAO	As needed	All RST 3 field personnel upon initial employment and as refresher training	Weston Solutions, Inc.	Weston Solutions, Inc., EHS Database
Health and Safety Training	Health and safety training will be provided to ensure compliance with Occupational Safety and Health Administration (OSHA) as established in 29 CFR 1910.120.	Weston Solutions, Inc., HSO	Yearly at a minimum	All Employees upon initial employment and as refresher training every year	Weston Solutions, Inc.	Weston Solutions, Inc., EHS Database
Others	Scribe, ICS 100 and 200, and Air Monitoring Equipment Trainings provided to all employees	Weston Solutions, Inc., QAO/Group Leader's	Upon initial employment and as needed			
	Dangerous Goods Shipping	Weston Solutions, Inc., HSO	Every 2 years			

All team members are trained in the concepts and procedures in recognizing opportunities for continual improvement, and the approaches required to improve procedures while maintaining conformance with legal, technical, and contractual obligations.

[1] All RST 3 members, including subcontractor's, certifications are in possession of the RST 3 HSO.

QAPP Worksheet #9: Project Scoping Session Participants Sheet

Site Name/Project Name: Baldwinsville NY Residential Hg Site
Site Location: Baldwinsville, Onondaga County, New York
Operable Unit: 00
Date of Sessions: 5/17/2016
Scoping Session Purpose: To discuss questions, comments, and assumptions regarding technical issues involved with the sampling activities.

Name	Title	Affiliation	Phone #	E-mail Address	*Project Role
Cris D'Onofrio	EPA OSC	EPA, Region II	(732) 906-6827	donofrio.cris@epa.gov	OSC
Patrick Ahern	Field Personnel	Weston Solutions, Inc., RST 3	(908) 510-9551	pat.ahern@westonsolutions.com	Field Personnel
Timothy Benton	HSO	Weston Solutions, Inc., RST 3	(908) 565-2973	tim.benton@westonsolutions.com	Health and Safety

Comments/Decisions: As part of the Emergency Removal Action being conducted at the Baldwinsville NY Residential Hg Site (the Site), Weston Solutions, Inc., Removal Support Team 3 (RST 3) has been tasked with providing soil sampling support to the U.S. Environmental Protection Agency (EPA). RST 3 has been tasked with the field screening of soil utilizing a Lumex Mercury Vapor Analyzer (MVA) with the RP-91C soil sampling attachment and also with the collection of confirmation soil samples to be submitted for mercury analysis. RST 3 is tasked with the collection of 5-point composite soil samples from locations identified by the EPA On-Scene Coordinator (OSC) in areas throughout the three impacted residential properties associated with the Site. The soil samples will be field screened with the Lumex MVA and attachment and up to five samples will be submitted to the EPA Division of Environmental Science and Assessment (DESA) laboratory located in Edison, New Jersey for confirmation mercury analysis. The soil samples will be collected from depth intervals determined by the EPA OSC in areas of the three properties that have potentially been impacted by the mercury release. The soil samples are being collected to confirm that all impacted areas of the properties have been effectively remediated. The samples will be collected for a definitive data quality assurance/quality control (QA/QC) objective. Field duplicate and matrix spike/matrix spike duplicate (MS/MSD) samples will be collected at a rate of one per 20 soil samples.

Action Items: Contract Laboratory Program (CLP) Request Form was submitted by RST 3 on May 17, 2016.

Consensus Decisions: The sampling is scheduled to begin on May 18, 2016 and last up to one week.

QAPP Worksheet #10: Problem Definition

PROBLEM DEFINITION

A 7 year-old boy was given a jar of liquid mercury that belonged to his grandfather who was a chemist. On Tuesday, April 5, 2016 at approximately 7:00 pm the 7 year-old boy and another 13 year-old boy visited a neighbor's 12 year-old son at their residence (3249 Greenleafe Drive, Baldwinsville, New York). Without the knowledge of the parents the three boys played with the mercury, throwing it at each other, contaminating their shoes and clothing while releasing the mercury onto the floor, garage, and nearby walls. The three children then tracked the mercury via their shoes and clothing to their respective homes.

The purpose of this sampling event is to evaluate the soil conditions after the remediation of potentially impacted areas to determine if the removal effectively removed any areas of mercury-contaminated soil on the three residential properties.

SITE HISTORY/CONDITIONS

At 1850 hours on April 8, 2016, the EPA activated RST 3 to provide emergency response support at the Site. RST 3 was tasked with mobilizing two Core Response Team (CRT) members to the scene of the release on April 9, 2016 to conduct mercury vapor monitoring activities.

A 7 year-old boy was given a jar of liquid mercury that belonged to his grandfather who was a chemist. On Tuesday, April 5, 2016 at approximately 7:00 pm the 7 year old boy and another 13 year old boy visited a neighbor's 12 year-old son at their residence (3249 Greenleafe Drive, Baldwinsville, New York). Without the knowledge of the parents the three boys played with the mercury, throwing it at each other, contaminating their shoes and clothing while releasing the mercury onto the floor, garage, and nearby walls. The three children then tracked the mercury via their shoes and clothing to their respective homes. The parents started to collect the mercury from the driveway and garage into the jar with eye droppers. The two boys went home between 7:00 pm - 7:30 pm. The three impacted residences are:

- 3244 Greenleafe Drive (where mercury originated)
- 3240 Greenleafe Drive
- 3249 Greenleafe Drive

After researching the properties of mercury, between 9:00 - 9:30 pm on April 5, 2016, the property owner (3249 Greenleafe Drive) contacted the Poison Control Center who instructed the parents to remove the boys' contaminated clothing and to shower, which was already done, and told to call 911, the New York State Department of Environmental Conservation (NYSDEC) and the Center for Disease Control (CDC). The local police department, City of Phoenix, fire department, and ambulances responded within 15 minutes. The fire department tried to sweep the mercury with a broom which further spread the material and the property owners were told to go back into their house. NYSDEC was not notified on Tuesday, April 5, 2016.

QAPP Worksheet #10: Problem Definition (Continued)

On Wednesday, April 6, 2016, the property owner noticed that mercury was present throughout the garage floor and called the authorities for assistance. The Onondaga County Department of Health (DOH) was contacted. The NYSDEC Region 7 Office was also contacted and responded immediately by hiring a remediation contractor, NRC, to respond. The NRC took readings, placed a tarp on the driveway and told everyone to evacuate the house. Readings ranged from 0.1 to 0.6 milligrams per cubic meter (mg/m^3); they were highest in the boy's bedroom and lower downstairs inside the residence.

On Thursday, April 7, 2016, the DOH contractor (NRC) took mercury readings which were zero, and the residences re-entered the house and opened the windows. As a result of the zero mercury readings, the residents were told they can move back into their house with the exception of their 2 year-old daughter who should not return until the NRC samples the house again later in the today. The NRC began conducting cleanups of the two neighbors' houses where the boys had tracked the mercury on their shoes and clothing into their homes. This included the driveways, clothing, and other mercury contaminated belongings.

On April 22, 2016, the EPA assumed the lead for the response action and immediately moved into the Emergency Removal Action phase of the response. The EPA mobilized their Emergency and Rapid Response Services (ERRS) Contractor and additional support from RST 3 to initiate the action. The ERRS Contractor has been remediating the interior of the three residential properties since that time while RST 3 has been providing mercury screening activities and overall site documentation.

PROJECT DESCRIPTION

As part of the Emergency Removal Action being conducted at the Site), RST 3 has been tasked with providing soil sampling support to the EPA. RST 3 has been tasked with the field screening of soil utilizing a Lumex MVA with the RP-91C soil sampling attachment and also with the collection of confirmation soil samples to be submitted for mercury analysis. RST 3 is tasked with the collection of 5-point composite soil samples from locations identified by the EPA in areas throughout the three impacted residential properties associated with the Site. The soil samples will be field screened with the Lumex MVA and attachment and up to five samples will be submitted to the EPA DESA laboratory located in Edison, New Jersey for confirmation mercury analysis. The soil samples will be collected from depth intervals determined by the EPA OSC in areas of the three properties that have potentially been impacted by the mercury release. The samples will be collected for a definitive data QA/QC objective. Field duplicate and MS/MSD samples will be collected at a rate of one per 20 soil samples.

PROJECT DECISION STATEMENTS

The objective of this sampling event is to confirm that all impacted areas of the properties have been effectively remediated.

QAPP Worksheet #11: Project Quality Objectives/Systematic Planning Process Statement

Overall project objectives include: The purpose of this sampling event is to evaluate the soil conditions after the remediation of potentially impacted areas to determine if the removal effectively removed any areas of mercury-contaminated soil on the three residential properties.

Who will use the data? Data will be used by EPA, Region II OSC.

What will the data be used for? The analytical data from this investigation will be used to assist the EPA in determining post-remediation conditions.

What types of data are needed?
Matrix: Soil
Type of Data: Definitive data
Analytical Techniques: Field survey equipment for soil and off-site confirmation laboratory analyses.
Parameters: Mercury
Type of survey/sampling equipment: Lumex MVA with the RP-91C soil sampling attachment, plastic scoops, and sample jars.
Access Agreement: To be provided by EPA, Region II OSC.
Sampling locations: To be Determined; locations will be selected by the EPA OSC.

How much data are needed? Up to five confirmation soil samples will be collected and submitted for off-site laboratory analysis.

How "good" does the data need to be in order to support the environmental decision?
Sampling/analytical measurement performance criteria for Precision, Accuracy, Representativeness, Completeness, and Comparability (PARCC) parameters will be established. Refer to Worksheet #12, criteria for performance measurement for definitive data.

Where, when, and how should the data be collected/generated? Soil samples will be collected from locations identified by the EPA OSC. All samples will be collected using methods outlined in the EPA Environmental Response Team (ERT) Standard Operating Procedures (SOPs). The sampling event is scheduled to begin on May 18, 2016.

Who will collect and generate the data? All samples will be collected by RST 3 and will be analyzed by the EPA DESA laboratory. Data will be validated by EPA DESA data validators.

How will the data be reported? All data will be reported by the assigned laboratory (Preliminary, Electronic, and Hard Copy format). The Site Project Manager will provide a Sampling Trip Report, Status Reports, Maps/Figures, Analytical Report, and Data Validation Report to the EPA OSC.

How will the data be archived? Electronic data deliverables will be archived in a Scribe database.

QAPP Worksheet #12: Measurement Performance Criteria Table
Worksheet # 12A: Mercury

(UFP-QAPP Manual Section 2.6.2)
Complete this worksheet for each matrix, analytical group, and concentration level. Identify the data quality indicators (DQI), measurement performance criteria (MPC) and QC sample and/or activity used to assess the measurement performance for both the sampling and analytical measurement systems. Use additional worksheets if necessary. If MPC for specific DQI vary within an analytical parameter, i.e., MPC are analyte-specific, then provide analyte-specific MPC on an additional worksheet.

Matrix	Soil
Analytical Group	Mercury
Concentration Level	Medium

Sampling Procedure[1]	Analytical Method/SOP[2]	Data Quality Indicators (DQIs)	Measurement Performance Criteria	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling (S), Analytical (A) or both (S&A)
See Worksheet #21	See Worksheet #23 and #28	Precision	% RPD < 20(Aq), % RPD <25(Soil)	LCS Duplicate	A
		Accuracy	Limits: Average Recovery ± 20% aqueous, ± 25% Soil)	LCS	A
		Accuracy	± 20% aqueous, ± 25% Soil)	Matrix spike	A
		Accuracy	< RL	Method Blank	A

[1] Reference number from QAPP Worksheet #21
[2] Reference numbers from QAPP Worksheet #23 and #28

QAPP Worksheet #13: Secondary Data Criteria and Limitations Table

Any data needed for project implementation or decision making that are obtained from non-direct measurement sources such as computer databases, background information, technologies and methods, environmental indicator data, publications, photographs, topographical maps, literature files and historical data bases will be compared to the DQOs for the project to determine the acceptability of the data. Thus, for example, analytical data from historical surveys will be evaluated to determine whether they satisfy the validation criteria for the project and to determine whether sufficient data was provided to allow an appropriate validation to be done. If not, then a decision to conduct additional sampling for the site may be necessary.

Secondary Data	Data Source (Originating Organization, Report Title, and Date)	Data Generator(s) (Originating Org., Data Types, Data Generation/ Collection Dates)	How Data May Be Used (if deemed usable during data assessment stage)	Limitations on Data Use
None	Not Applicable	Not Applicable	Not Applicable	Not Applicable

QAPP Worksheet #14: Summary of Project Tasks

Sampling Tasks: As part of the Emergency Removal Action being conducted at the Site), RST 3 has been tasked with providing soil sampling support to the EPA. RST 3 has been tasked with the field screening of soil utilizing a Lumex MVA with the RP-91C soil sampling attachment and also with the collection of confirmation soil samples to be submitted for mercury analysis. RST 3 is tasked with the collection of 5-point composite soil samples from locations identified by the EPA in areas throughout the three impacted residential properties associated with the Site. The soil samples will be field screened with the Lumex MVA and attachment and up to five samples will be submitted to the EPA DESA laboratory located in Edison, New Jersey for confirmation mercury analysis. The soil samples will be collected from depth intervals determined by the EPA OSC in areas of the three properties that have potentially been impacted by the mercury release. The samples will be collected for a definitive data QA/QC objective. Field duplicate and MS/MSD samples will be collected at a rate of one per 20 soil samples.

RST 3 will be responsible for sample and laboratory management. This includes collecting samples, completing chains of custody (COC), shipping, and entry into the Scribe database. RST 3 will utilize global positioning system (GPS) technology to document sampling locations.

Analysis Tasks:

Mercury – DESA Method Reference Nos. C-110

Quality Control Tasks:

All samples will be collected for definitive data QA objective. Field duplicate and MS/MSD samples will be collected at a rate of one per 20 soil samples.

Data Management Tasks:

Activities under this project will be reported in status and trip reports and other deliverables (e.g., analytical reports, final reports) described herein. Activities will also be summarized in appropriate format for inclusion in monthly and annual reports.

The following deliverables will be provided under this project:

Trip Report: A trip report will be prepared to provide a detailed accounting of what occurred during each sampling mobilization. The trip report will be prepared within two weeks of the last day of each sampling mobilization. Information will be provided on time of major events, dates, and personnel on-site (including affiliations).

Maps/Figures: Maps depicting site layout, contaminant source areas, and sample locations will be included in the trip report, as appropriate.

Analytical Report: An analytical report will be prepared for samples analyzed under this plan. Information regarding the analytical methods or procedures employed, sample results, QA/QC results, chain-of-custody documentation, laboratory correspondence, and raw data will be provided within this deliverable.

QAPP Worksheet #14: Summary of Project Tasks (Continued)

Data Review: A review of the data generated under this plan will be undertaken. The assessment of data acceptability or usability will be provided separately, or as part of the analytical report.

Documentation and Records:

All sample documents will be completed legibly, in ink. Any corrections or revisions will be made by lining through the incorrect entry and by initialing the error.

Field Logbook: The field logbook is essentially a descriptive notebook detailing site activities and observations so that an accurate account of field procedures can be reconstructed in the writer's absence. Field logbook will be bound and paginated. All entries will be dated and signed by the individuals making the entries, and should include (at a minimum) the following:

1. Site name and project number
2. Name(s) of personnel on-site
3. Dates and times of all entries (military time preferred)
4. Descriptions of all site activities, site entry and exit times
5. Noteworthy events and discussions
6. Weather conditions
7. Site observations
8. Sample and sample location identification and description*
9. Subcontractor information and names of on-site personnel
10. Date and time of sample collections, along with chain of custody information
11. Record of photographs
12. Site sketches

* The description of the sample location will be noted in such a manner as to allow the reader to reproduce the location in the field at a later date.

Sample Labels: Sample labels will clearly identify the particular sample, and should include the following:

1. Site/project number.
2. Sample identification number.
3. Sample collection date and time.
4. Designation of sample (grab or composite).
5. Sample preservation.
6. Analytical parameters.
7. Name of sampler.

Sample labels will be written in indelible ink and securely affixed to the sample container. Tie-on labels can be used if properly secured.

Custody Seals: Custody seals demonstrate that a sample container has not been tampered with or opened. The individual in possession of the sample(s) will sign and date the seal, affixing it in such a manner that the container cannot be opened without breaking the seal. The name of this individual, along with a description of the sample packaging, will be noted in the field logbook.

QAPP Worksheet #14: Summary of Project Tasks (Concluded)

Assessment/Audit Tasks: No performance audit of field operations is anticipated at this time. If conducted, performance and system audit will be in accordance with the project plan.

Data Review Tasks: All data will be validated by DESA data validator personnel. The data generated under this QA/QC Sampling Plan will be evaluated according to guidance in the Uniform Federal Policy for Implementing Environmental Quality Systems: Evaluating, Assessing and Documenting Environmental Data Collection and Use Programs Part 1: UFP-QAPP (EPA-105-B-04-900A, March 2005); Part 2B: Quality Assurance/Quality Control Compendium: Minimum QA/QC Activities (EPA-105-B-04-900B, March 2005). Laboratory analytical results will be assessed by the data reviewer for compliance with required precision, accuracy, completeness, representativeness, and sensitivity.

QAPP Worksheet #15: Reference Limits and Evaluation Table
Worksheet #15A: Soil – Mercury

Matrix: Soil
Analytical Group: Mercury
Concentration Level: Medium

Analyte	CAS Number	Project (PRP) Quantitation Limit	Method CRQLs mg/kg	Achievable Laboratory (DESA) Limits	
				MDLs mg/kg	RLs mg/kg
Mercury	7439-97-6	NS	0.1	0.001	0.05

QAPP Worksheet #16: Project Schedule/Timeline Table

Activities	Organization	Dates (MM/DD/YY)		Deliverable	Deliverable Due Date
		Anticipated Date(s) of Initiation	Anticipated Date of Completion		
Preparation of QAPP	RST 3 Contractor Site Project Manager	Prior to sampling date	5/18/2016	QAPP	5/18/2016
Review of QAPP	RST 3 Contractor QAO and/or Group Leader	Prior to sampling date	5/18/2016	Approved QAPP	5/18/2016
Preparation of Health and Safety Plan	RST 3 Contractor Site Project Manager	Prior to sampling date	NA	HASP	NA
Procurement of Field Equipment	RST 3 Contractor Site Project Manager and/or Equipment Officer	Prior to sampling date	5/18/2016	-	-
Laboratory Request	Not Applicable	Prior to sampling date	5/17/2016	CLP Request Form	NA
Field Reconnaissance/Access	RST 3 Contractor Site Project Manager; or EPA Region II OSC	5/18/2016	5/27/2016	NA	NA
Collection of Field Samples	RST 3 Contractor Site Project Manager	5/18/2016	5/27/2016	NA	NA
Laboratory Electronic Data Received	DESA	5/20/2016	5/29/2016	Preliminary Data	5/29/2016
Laboratory Package Received	DESA	5/26/2016	6/4/2016	Validated Data	TBD
Validation of Laboratory Results	DESA data validators	TBD	TBD	Final Report	TBD
Data Evaluation/ Preparation of Final Report	RST 3 Contractor Site Project Manager	TBD	TBD	Final Report	TBD

QAPP Worksheet #17: Sampling Design and Rationale

Sampling Tasks:

As part of the Emergency Removal Action being conducted at the Site), RST 3 has been tasked with providing soil sampling support to the EPA. RST 3 has been tasked with the field screening of soil utilizing a Lumex MVA with the RP-91C soil sampling attachment and also with the collection of confirmation soil samples to be submitted for mercury analysis. RST 3 is tasked with the collection of 5-point composite soil samples from locations identified by the EPA in areas throughout the three impacted residential properties associated with the Site. The soil samples will be field screened with the Lumex MVA and attachment and up to five samples will be submitted to the EPA DESA laboratory located in Edison, New Jersey for confirmation mercury analysis. The soil samples will be collected from depth intervals determined by the EPA OSC in areas of the three properties that have potentially been impacted by the mercury release. The samples will be collected for a definitive data QA/QC objective. Field duplicate and MS/MSD samples will be collected at a rate of one per 20 soil samples.

Field screening activities will be conducted in accordance with the instrument user manual and per the direction of the EPA OSC.

Confirmation Soil Sampling:

Soil sampling will be conducted as per EPA ERT SOP # 2001 General Field Sampling Guidelines, and SOP # 2012 Soil Sampling from the Compendium of ERT Soil Sampling and Surface Geophysics Procedures. Up to five confirmation soil samples will be collected from locations determined by the EPA OSC.

Soil samples will be collected in plastic Ziploc™ bags using dedicated plastic scoops. The soil samples will be homogenized in the Ziploc™ bags and debris and rocks will be removed. The soil samples will then be transferred into 8-oz. glass jars. The soil samples will be collected for a definitive data QA Objective. Field duplicate and MS/MSD soil samples will be collected at a rate of one per 20 soil samples.

All soil sample information will be entered into a Scribe database for the generation of the chain of custody and sample labels.

The following laboratory will provide the analyses indicated:

Lab Name/Location	Sample Type	Parameters
EPA DESA Laboratory 2890 Woodbridge Ave. Bldg. 209, MS-230 Edison, NJ 08837 Tel.: (732) 906-6886	Soil	Mercury

Refer to Worksheet #20 for QA/QC samples, sampling methods, and SOPs.

QAPP Worksheet #18: Sampling Locations and Methods/SOP Requirements Table

Matrix	Sampling Location(s)	Units	Analytical Group(s)	Concentration Level	No. of Samples (identify field duplicates)	Sampling SOP Reference	Rationale for Sampling Location
Soil	Up to 5	mg/kg	Mercury	Medium	1/20 duplicate sample per matrix	SOP# 2001 and 2012	Field Screening Confirmation

The website for EPA ERT SOPs is: http://www.ert.org/mainContent.asp?section=Products&subsection=List

QAPP Worksheet #19: Analytical SOP Requirements Table

Matrix	Analytical Group	Concentration Level	Analytical and Preparation Method/SOP Reference1	Sample Volume	Containers (number, size, and type)	Preservation Requirements (chemical, temperature, light protected)	Maximum Holding Time (preparation/ analysis)
Soil	Mercury	Medium	C-110 (Ref: EPA 200.7)	1 X 250ml 1 X 250ml(QC)	Rigid/Glass, wide mouth	Cool, 4ºC	28 days

QAPP Worksheet #20: Field Quality Control Sample Summary Table

Matrix	Analytical Group	Concentration Level	Analytical and Preparation SOP Reference	No. of Sampling Locations	No. of Field Duplicate Pairs	No. of Extra Volume Laboratory QC (e.g., MS/MSD) Samples[1]	No. of Field Blanks[1]	No. of Trip. Blanks	No. of PE Samples
Soil	Mercury	Medium	C-110 (Ref: EPA 200.7)	Up to 5	1 per 20 samples	1 per 20 samples	1 daily	NR	NR

NR – Not Required

[1] Only required if non-dedicated sampling equipment to be used.

QAPP Worksheet #21: Project Sampling SOP References Table

Reference Number	Title, Revision Date and/or Number	Originating Organization	Equipment Type	Modified for Project Work? (Y/N)	Comments
SOP #2012	Soil Sampling; Rev. 0.0 February 2000	EPA/OSWER/ERT	Plastic scoops, aluminum trays, and appropriate sample jars	N	--

See Attachment B for SOP # 2001 and 2012
www.ert.org/mainContent.asp?section=Products&subsection=List

QAPP Worksheet #22: Field Equipment Calibration, Maintenance, Testing, and Inspection Table

Field Equipment	Calibration Activity	Maintenance Activity	Testing/ Inspection Activity	Frequency	Acceptance Criteria	Corrective Action	Responsible Person	SOP Reference
Trimble® GeoXT™ handheld	N/A	Recharge daily	N/A	Prior to event and each night during event	Per manufacturer's instructions	Replace battery if charge doesn't hold	RST 3 sampling team members	Manufacturer's Instructions

QAPP Worksheet #23: Analytical SOP References Table

Reference Number	Title, Revision Date, and/or Number	Definitive or Screening Data	Analytical Group	Instrument	Organization Performing Analysis	Modified for Project Work? (Y/N)
C-110	Mercury analysis in water and soil/sediments by CVAAs, Rev 2.3	Definite	Mercury	CVAA	EPA DESA LAB	N

QAPP Worksheet #24: Analytical Instrument Calibration Table

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action	Person Responsible for CA	SOP Reference
CVAAS	See SOP C-110	See SOP C-110	See SOP C-110	See SOP C-110	Assigned Lab personnel	SOP C-110

QAPP Worksheet #25: Analytical Instrument and Equipment Maintenance, Testing, and Inspection Table

Instrument/ Equipment	Maintenance Activity	Testing Activity	Inspection Activity	Frequency	Acceptance Criteria	Corrective Action	Responsible Person	SOP Reference[1]
See list of Instrument given in Worksheet #24	See LQMP, G-10, G-11, G-12, G-19	See LQMP, G-10, G-11, G-12, G-19	See LQMP, G-10, G-11, G-12, G-19	See LQMP, G-10, G-11, G-12, G-19	See LQMP, G-10, G-11, G-12, G-19	See LQMP, G-10, G-11, G-12, G-19	See LQMP, G-10, G-11, G-12, G-19	See LQMP, G-10, G-11, G-12, G-19

[1]Specify the appropriate reference letter or number from the Analytical SOP References table (Worksheet #23).

QAPP Worksheet #26: Sample Handling System

SAMPLE COLLECTION, PACKAGING, AND SHIPMENT
Sample Collection (Personnel/Organization): RST 3 Site Project Manager, Weston Solutions, Inc., Region II
Sample Packaging (Personnel/Organization): RST 3 Site Project Manager and sampling team members, Weston Solutions, Inc., Region II
Coordination of Shipment (Personnel/Organization): RST 3 Site Project Manager, sampling team members, Weston Solutions, Inc., Region II
Type of Shipment/Carrier: FedEx
SAMPLE RECEIPT AND ANALYSIS
Sample Receipt (Personnel/Organization): Sample Custodian, DESA
Sample Custody and Storage (Personnel/Organization): Sample Custodian, DESA
Sample Preparation (Personnel/Organization): Sample Technicians, DESA
Sample Determinative Analysis (Personnel/Organization): Sample Technicians, DESA
SAMPLE ARCHIVING
Field Sample Storage (No. of days from sample collection): Samples to be shipped same day of collection, and arrive at laboratory within 24 hours (1 day) of sample shipment
Sample Extract/Digestate Storage (No. of days from extraction/digestion): As per analytical methodology; see Worksheet #19
SAMPLE DISPOSAL
Personnel/Organization: Sample Technicians, DESA
Number of Days from Analysis: Up to 60 days; Until analysis and QA/QC checks are completed; as per analytical methodology; see Worksheet #19.

QAPP Worksheet #27: Sample Custody Requirements

Sample Identification Procedures Each sample collected by RST 3 will be identified by a property number (P001), a sample location number (001), the matrix identifier of the sample collected (SS for soil sample), the depth interval from where the sample was collected will be identified as a range (1824), and the sample number (01). The last number will represent the sample number collected from each location. Duplicate samples will be identified in the same manner but will be the next sequential sample number (in most cases 02).

e.g. P001-SS001-1824-01: whereas, P001 = Property Number 001, SS001 = Soil Sample Location 001, 1824 = Soil sample collected at 18 to 24 inches, 01 = Sample Number 01

Location of the sample collected will be recorded in the project database and site logbook. A duplicate sample will be identified in the same manner as other samples and will be distinguished and documented in the field logbook. Each sample will also be labeled with a non-CLP assigned number. Depending on the type of sample, additional information such as sampling round, date, etc. will be added.

Field Sample Custody Procedures (sample collection, packaging, shipment, and delivery to laboratory): Each sample will be individually identified and labeled after collection, then sealed with custody seals and enclosed in a plastic cooler. The sample information will be recorded on chain-of custody (COC) forms, and the samples shipped to the appropriate laboratory via overnight delivery service or courier. Chain-of-custody records must be prepared in Scribe to accompany samples from the time of collection and throughout the shipping process. Each individual in possession of the samples must sign and date the sample COC Record. The chain-of-custody record will be considered completed upon receipt at the laboratory. A traffic report and chain-of-custody record will be maintained from the time the sample is taken to its final deposition. Every transfer of custody must be noted and signed for, and a copy of this record kept by each individual who has signed. When samples are not under direct control of the individual responsible for them, they must be stored in a locked container sealed with a custody seal. Specific information regarding custody of the samples projected to be collected on the weekend will be noted in the field logbook. The chain-of-custody record should include (at minimum) the following: 1) Sample identification number; 2) Sample information; 3) Sample location; 4) Sample date; 5) Sample Time; 6) Sample Type Matrix; 7) Sample Container Type; 8) Sample Analysis Requested; 9) Name(s) and signature(s) of sampler(s); and 10) Signature(s) of any individual(s) with custody of samples.

A separate chain-of-custody form must accompany each cooler for each daily shipment. The chain-of-custody form must address all samples in that cooler, but not address samples in any other cooler. This practice maintains the chain-of-custody for all samples in case of mis-shipment.

QAPP Worksheet #27: Sample Custody Requirements (Concluded)

Laboratory Sample Custody Procedures (receipt of samples, archiving, and disposal): A sample custodian at the laboratory will accept custody of the shipped samples, and check them for discrepancies, proper preservation, integrity, etc. If noted, issues will be forwarded to the laboratory manager for corrective action. The sample custodian will relinquish custody to the appropriate department for analysis. At this time, no samples will be archived at the laboratory. Disposal of the samples will occur only after analyses and QA/QC checks are completed.

QAPP Worksheet #28: QC Samples Table
QAPP Worksheet #28A: Mercury

(UFP-QAPP Manual Section 3.4)
Complete a separate worksheet for each sampling technique, analytical method/SOP, matrix, analytical group, and concentration level. If method/SOP QC acceptance limit exceed the measurement performance criteria, the data obtained may be unusable for making project decisions.

Matrix	Soil
Analytical Group	Mercury
Concentration Level	Medium (mg/kg)
Sampling SOP(s)	SOP Nos. 2001 and 2012
Analytical Method/SOP Reference	DESA Method C-110
Sampler's Name	RST 3
Field Sampling Organization	Weston Solutions, Inc.
Analytical Organization	DESA Laboratory
No. of Sample Locations	Up to 5

Lab QC Sample:	Frequency/Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Preparation Blank	1 per ≤ 20 samples	No constituent > CRQL	Suspend analysis until source rectified; redigest and reanalyze affected samples	DESA Laboratory ICP-AES/ICP-MS Technician	Accuracy	No constituent > CRQL
Spike	1 per ≤ 20 samples	75-125%R*	Flag outliers	DESA Laboratory ICP-AES/ICP-MS Technician	Accuracy	75-125%R*
Duplicate	1 per ≤ 20 samples	± 20% RPD**	Flag outliers	DESA Laboratory ICP-AES/ICP-MS Technician	Precision	± 20% RPD**
Post-Digestion Spike	after any analyte (except Ag) fails spike %R	75-125%R	Flag outliers	DESA Laboratory ICP-AES/ICP-MS Technician	Accuracy	75-125%R
Laboratory Control Sample	1 per ≤ 20 samples	70-130%R	Suspend analysis until source rectified; redigest and reanalyze affected samples	DESA Laboratory ICP-AES/ICP-MS Technician	Accuracy	70-130%R

*except when the sample concentration is greater than 4 times the spike concentration, then disregard the recoveries; no data validation action taken.
**except when the sample and/or duplicate concentration is less than 5 times the CRQL, then ± CRQL.

QAPP Worksheet #29: Project Documents and Records Table

Sample Collection Documents and Records	Analysis Documents and Records	Data Assessment Documents and Records	Other
• Field logbooks (not hard cover notebooks or logbooks treated with waterproofing) • COC forms • Field data sheets • Photo-documentation • GPS data	• Sample receipt logs • Internal and external COC forms • Equipment calibration logs • Sample preparation worksheets/logs • Sample analysis worksheets/run logs • Telephone/email logs • Corrective action documentation	• Data validation reports • Field inspection checklist(s) • Review forms for electronic entry of data into database • Corrective action documentation	• CLP request form

QAPP Worksheet #30: Analytical Services Table

Matrix	Analytical Group	Concentration Level	Analytical SOP	Data Package Turnaround Time	Laboratory/Organization (Name and Address, Contact Person and Telephone Number)	Backup Laboratory/Organization (Name and Address, Contact Person and Telephone Number)
Soil	Mercury	Medium	DESA Method Reference No. C-110	48 week preliminary & 6 week validated	EPA DESA Laboratory 2890 Woodbridge Ave. Bldg. 209, MS-230 Edison, NJ 08837 Tel.: (732) 906-6886	NA

NA – Not Applicable

QAPP Worksheet #31: Planned Project Assessments Table

Assessment Type	Frequency	Internal or External	Organization Performing Assessment	Person(s) Responsible for Performing Assessment (Title and Organizational Affiliation)	Person(s) Responsible for Responding to Assessment Findings (Title and Organizational Affiliation)	Person(s) Responsible for Identifying and Implementing Corrective Actions (Title and Organizational Affiliation)	Person(s) Responsible for Monitoring Effectiveness of Corrective Actions (Title and Organizational Affiliation)
PT	Semiannually	External	NELAC	PT provider	Lab Personnel	Lab Personnel	Lab QA Officer
NELAC	Every two years	External	NELAC	Florida DOH	Lab QA Officer	Lab Personnel	Florida DOH
INTERNAL AUDIT	Monthly	Internally	DESA Lab	Lab QA Officer	Lab Personnel	Lab Personnel	Lab QA Officer

QAPP Worksheet #32: Assessment Findings and Corrective Action Responses

Assessment Type	Nature of Deficiencies Documentation	Individual(s) Notified of Findings (Name, Title, Organization)	Timeframe of Notification	Nature of Corrective Action Response Documentation	Individual(s) Receiving Corrective Action Response (Name, Title, Org.)	Timeframe for Response
Proficiency Testing (PT)	Letter with PT failure indicated	Lab QA Officer	30 days after the audit	Investigate the reason for the PT failure	Lab QA Officer	45 days after the CA report
NELAC	Audit Report with Non-conformance to QAPP, SOPs, NELAC+LQMP	Lab Management	30 days after the audit	Investigate and have a corrective action plan for the deficiencies	Florida DOH	30 days after receiving notification
INTERNAL	Audit Report with Non-conformance to QAPP, SOPs, NELAC Regulations	Lab Management	30 days after the audit	Investigate and have a corrective action plan for the deficiencies	Lab QA Officer	45 days after the CA report

QAPP Worksheet #33: QA Management Reports Table

Type of Report	Frequency (Daily, weekly, monthly, quarterly, annually, etc.)	Projected Delivery Date(s)	Person(s) Responsible for Report Preparation (Title and Organizational Affiliation)	Report Recipient(s) (Title and Organizational Affiliation)
DESA Laboratory Data (preliminary)	As performed	Two weeks from the sampling date	DESA Data Validators	RST 3 Site Project Manager and OSC, EPA Region II
DESA Laboratory Data (validated)	As performed	Up to 14 days after receipt of preliminary data	DESA Data Validators	RST 3 Site Project Manager and OSC, EPA Region II
Laboratory Technical Systems/ Performance Audits	As performed	Unknown	EPA or other Regulatory Agency	DESA
Performance Evaluation Samples	As performed	Unknown	EPA or other Regulatory Agency	DESA
On-Site Field Inspection	As performed	7 calendar days after completion of the inspection	Site Project Manager, Weston Solutions, Inc.	Site Project Manager, Weston Solutions, Inc.
Field Change Request	As required per field change	Three days after identification of need for field change	Site Project Manager, Weston Solutions, Inc.	EPA OSC
Final Report	As performed	One week after receipt of EPA approval of data package	Site Project Manager, Weston Solutions, Inc.	EPA OSC

QAPP Worksheet #34: Verification (Step I) Process Table

Verification Input	Description	Internal/ External	Responsible for Verification (Name, Organization)
Chain of Custody	Chain-of-custody forms will be verified against the sample cooler they represent. Sample Acceptance Checklist is completed. The OSCAR staff supervisor utilizes the analyses request information and the external COC to review the accuracy and completeness of LIMS log-in entries, as reflected on the LIMS Sample Receipt Form Details can be found in Laboratory Quality Management Plan, SOP G-25	Internal	OSCAR Personnel DESA LAB
Analytical data package/ Final Report	The procedures for data review : 1- Data reduction/review by Primary Analyst. 2- Review complete data package (raw data) by independent Peer Reviewer 3- The Sample Project Coordinator reviews the project documentation for completeness followed by a QA review by the QAO 4- Final review by Branch Chief/Section Chief prior to release, this review is to ensure completeness and general compliance with the objectives of the project. This final review typically does not include a review of raw data. Details can be found in Laboratory Quality Management Plan.	Internal	Primary Analyst, Peer Reviewer, Sample Project Coordinator, Quality Assurance Officer, Section Chief/ Branch Chief. DESA LAB

QAPP Worksheet #35: Validation (Steps IIa and IIb) Process Table

Step IIa/IIb	Validation Input	Description	Responsible for Validation (Name, Organization)
IIa	Chain of Custody	Chain-of-custody forms will be verified against the sample cooler they represent. Sample Acceptance Checklist is completed. The OSCAR staff supervisor utilizes the analyses request information and the external COC to review the accuracy and completeness of LIMS log-in entries, as reflected on the LIMS Sample Receipt Form Details can be found in Laboratory Quality Management Plan, SOP G-25	OSCAR Personnel DESA LAB
IIa/IIb	Analytical data package/ Final Report	The procedures for data review : 1- Data reduction/review by Primary Analyst. 2- Review complete data package (raw data) by independent Peer Reviewer 3- The Sample Project Coordinator reviews the project documentation for completeness followed by a QA review by the QAO 4- Final review by Branch Chief/Section Chief prior to release, this review is to ensure completeness and general compliance with the objectives of the project. This final review typically does not include a review of raw data. Details can be found in Laboratory Quality Management Plan.	Primary Analyst, Peer Reviewer, Sample Project Coordinator, Quality Assurance Officer, Section Chief/ Branch Chief. DESA LAB

QAPP Worksheet #36 Validation (Steps IIa and IIb) Summary Table

Step IIa/IIb	Matrix	Analytical Group	Concentration Level	Validation Criteria	Data Validator (title and organizational affiliation)
IIa / IIb	Soil	Mercury	Medium	Data Validation SOP for Inorganic analysis at low/medium concentrations. ICP-AES under DESA SOP C-109, C-110, and C-116	DESA Data Validation Personnel

QAPP Worksheet #37: Usability Assessment

Summarize the usability assessment process and all procedures, including interim steps and any statistics, equations, and computer algorithms that will be used: Data, whether generated in the field or by the laboratory, are tabulated and reviewed for Precision, Accuracy, Representativeness, Completeness, and Comparability (PARCCS) by the SPM for field data or the data validator for laboratory data. The review of the PARCC Data Quality Indicators (DQI) will compare with the DQO detailed in the site-specific QAPP, the analytical methods used and impact of any qualitative and quantitative trends will be examined to determine if bias exists. A hard copy of field data is maintained in a designated field or site logbook. Laboratory data packages are validated, and final data reports are generated. All documents and logbooks are assigned unique and specific control numbers to allow tracking and management.

Where applicable, the following documents will be followed to evaluate data for fitness in decision making: EPA QA/G-4, *Guidance on Systematic Planning using the Data Quality Objectives Process,* EPA/240/B-06/001, February 2006, and EPA QA/G-9R, *Guidance for Data Quality Assessment*, A reviewer's Guide EPA/240/B-06/002, February 2006.

Describe the evaluative procedures used to assess overall measurement error associated with the project:
As delineated in the ***Uniform Federal Policy for Implementing Environmental Quality Systems: Evaluating, Assessing and Documenting Environmental Data Collection and Use Programs Part 1: UFP-QAPP (EPA-505-B-04-900A, March 2005); Part 2A: UFP-QAPP Workbook (EPA-505-B-04-900C, March 2005); Part 2B: Quality Assurance/Quality Control Compendium: Non-Time Critical QA/QC Activities (EPA-505-B-04-900B, March 2005);*** "Graded Approach" will be implemented for data collection activities that are either exploratory or where specific decisions cannot be identified, since this guidance indicates that the formal DQO process is not necessary.

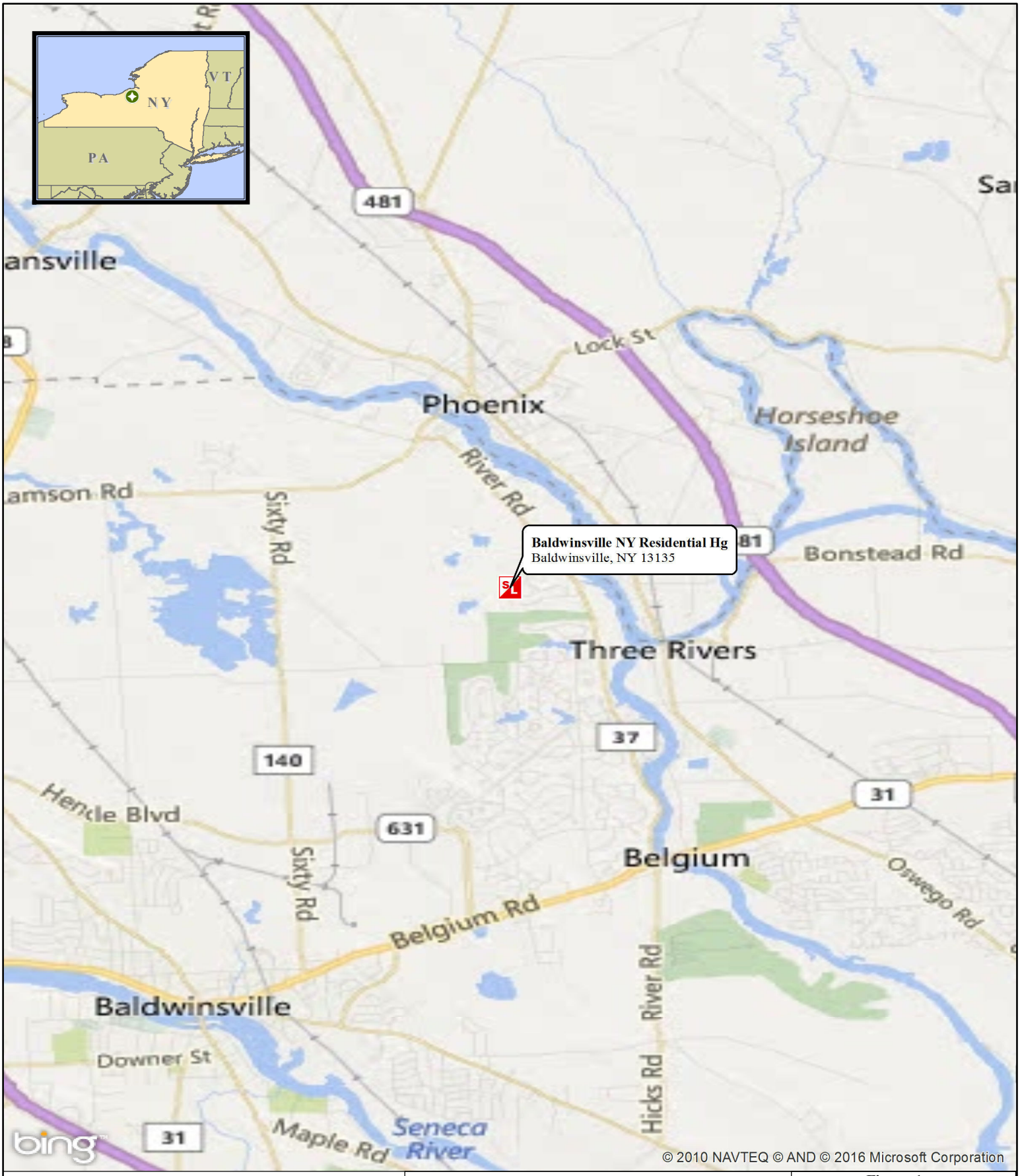
The objective of this sampling event is to confirm that all impacted areas of the properties have been effectively remediated.

Identify the personnel responsible for performing the usability assessment: Site Project Management Team, Data Validation Personnel, and EPA Region 2 OSC

Describe the documentation that will be generated during usability assessment and how usability assessment results will be presented so that they identify trends, relationships (correlations), and anomalies:
A copy of the most current approved QAPP, including any graphs, maps and text reports developed will be provided to all personnel identified on the distribution list.

ATTACHMENT A

Figure 1: Site Location Map



Legend

Site Location

N

0 0.35 0.7 1.4 2.1 2.8 Miles

Weston Solutions, Inc.
Federal East Division

In Association With
Scientific and Environmental Associates, Inc.,
Environmental Compliance Consultants, Inc.,
Avatar Environmental, LLC, On-Site Environmental,
Inc.and Sovereign Consulting, Inc

Figure 1:
Site Location Map

Baldwinsville NY Residential Hg Site
Baldwinsville, New York

U.S. ENVIRONMENTAL PROTECTION AGENCY
REMOVAL SUPPORT TEAM 3
CONTRACT # EP-S2-14-01

DATE MODIFIED: 5/18/2016

GIS ANALYST:	T. Benton
EPA OSC:	C. D'Onofrio
RST SPM:	M. Beuthe
FILENAME:	160518_SITELOCATIONMAP.MXD

\\FSED2DATA1\GISDATA\RST_3\00060202\MXD\160518_SITELOCATIONMAP.MXD

ATTACHMENT B

Sampling SOPs

EPA ERT SOP #s 2001 and 2012

GENERAL FIELD SAMPLING GUIDELINES

SOP#: 2001
DATE: 08/11/94
REV. #: 0.0

1.0 SCOPE AND APPLICATION

The purpose of this Standard Operating Procedure (SOP) is to provide general field sampling guidelines that will assist REAC personnel in choosing sampling strategies, location, and frequency for proper assessment of site characteristics. This SOP is applicable to all field activities that involve sampling.

These are standard (i.e., typically applicable) operating procedures which may be varied or changed as required, dependent on site conditions, equipment limitations or limitations imposed by the procedure. In all instances, the ultimate procedures employed should be documented and associated with the final report.

Mention of trade names or commercial products does not constitute U.S. EPA endorsement or recommendation for use.

2.0 METHOD SUMMARY

Sampling is the selection of a representative portion of a larger population, universe, or body. Through examination of a sample, the characteristics of the larger body from which the sample was drawn can be inferred. In this manner, sampling can be a valuable tool for determining the presence, type, and extent of contamination by hazardous substances in the environment.

The primary objective of all sampling activities is to characterize a hazardous waste site accurately so that its impact on human health and the environment can be properly evaluated. It is only through sampling and analysis that site hazards can be measured and the job of cleanup and restoration can be accomplished effectively with minimal risk. The sampling itself must be conducted so that every sample collected retains its original physical form and chemical composition. In this way, sample integrity is insured, quality assurance standards are maintained, and the sample can accurately represent the larger body of material under investigation.

The extent to which valid inferences can be drawn from a sample depends on the degree to which the sampling effort conforms to the project's objectives. For example, as few as one sample may produce adequate, technically valid data to address the project's objectives. Meeting the project's objectives requires thorough planning of sampling activities, and implementation of the most appropriate sampling and analytical procedures. These issues will be discussed in this procedure.

3.0 SAMPLE PRESERVATION, CONTAINERS, HANDLING, AND STORAGE

The amount of sample to be collected, and the proper sample container type (i.e., glass, plastic), chemical preservation, and storage requirements are dependent on the matrix being sampled and the parameter(s) of interest. Sample preservation, containers, handling, and storage for air and waste samples are discussed in the specific SOPs for air and waste sampling techniques.

4.0 INTERFERENCES AND POTENTIAL PROBLEMS

The nature of the object or materials being sampled may be a potential problem to the sampler. If a material is homogeneous, it will generally have a uniform composition throughout. In this case, any sample increment can be considered representative of the material. On the other hand, heterogeneous samples present problems to the sampler because of changes in the material over distance, both laterally and vertically.

Samples of hazardous materials may pose a safety threat to both field and laboratory personnel. Proper health and safety precautions should be implemented when handling this type of sample.

Environmental conditions, weather conditions, or non-target chemicals may cause problems and/or interferences when performing sampling activities or when sampling for a specific parameter. Refer to the specific SOPs for sampling techniques.

5.0 EQUIPMENT/APPARATUS

The equipment/apparatus required to collect samples must be determined on a site specific basis. Due to the wide variety of sampling equipment available, refer to the specific SOPs for sampling techniques which include lists of the equipment/apparatus required for sampling.

6.0 REAGENTS

Reagents may be utilized for preservation of samples and for decontamination of sampling equipment. The preservatives required are specified by the analysis to be performed. Decontamination solutions are specified in ERT SOP #2006, Sampling Equipment Decontamination.

7.0 PROCEDURE

7.1 Types of Samples

In relation to the media to be sampled, two basic types of samples can be considered: the environmental sample and the hazardous sample.

Environmental samples are those collected from streams, ponds, lakes, wells, and are off-site samples that are not expected to be contaminated with hazardous materials. They usually do not require the special handling procedures typically used for concentrated wastes. However, in certain instances, environmental samples can contain elevated concentrations of pollutants and in such cases would have to be handled as hazardous samples.

Hazardous or concentrated samples are those collected from drums, tanks, lagoons, pits, waste piles, fresh spills, or areas previously identified as contaminated, and require special handling procedures because of their potential toxicity or hazard. These samples can be further subdivided based on their degree of hazard; however, care should be taken when handling and shipping any wastes believed to be concentrated regardless of the degree.

The importance of making the distinction between environmental and hazardous samples is two-fold:

(1) Personnel safety requirements: Any sample thought to contain enough hazardous materials to pose a safety threat should be designated as hazardous and handled in a manner which ensures the safety of both field and laboratory personnel.

(2) Transportation requirements: Hazardous samples must be packaged, labeled, and shipped according to the International Air Transport Association (IATA) Dangerous Goods Regulations or Department of Transportation (DOT) regulations and U.S. EPA guidelines.

7.2 Sample Collection Techniques

In general, two basic types of sample collection techniques are recognized, both of which can be used for either environmental or hazardous samples.

Grab Samples

A grab sample is defined as a discrete aliquot representative of a specific location at a given point in time. The sample is collected all at once at one particular point in the sample medium. The representativeness of such samples is defined by the nature of the materials being sampled. In general, as sources vary over time and distance, the representativeness of grab samples will decrease.

Composite Samples

Composites are nondiscrete samples composed of more than one specific aliquot collected at various sampling locations and/or different points in time. Analysis of this type of sample produces an average value and can in certain instances be used as an alternative to analyzing a number of individual grab samples and calculating an average value. It should be noted, however, that compositing can mask problems by diluting isolated concentrations of some hazardous compounds below detection limits.

Compositing is often used for environmental samples and may be used for hazardous samples under certain conditions. For example, compositing of hazardous waste is often performed after compatibility tests have

been completed to determine an average value over a number of different locations (group of drums). This procedure generates data that can be useful by providing an average concentration within a number of units, can serve to keep analytical costs down, and can provide information useful to transporters and waste disposal operations.

For sampling situations involving hazardous wastes, grab sampling techniques are generally preferred because grab sampling minimizes the amount of time sampling personnel must be in contact with the wastes, reduces risks associated with compositing unknowns, and eliminates chemical changes that might occur due to compositing.

7.3 Types of Sampling Strategies

The number of samples that should be collected and analyzed depends on the objective of the investigation. There are three basic sampling strategies: random, systematic, and judgmental sampling.

Random sampling involves collection of samples in a nonsystematic fashion from the entire site or a specific portion of a site. Systematic sampling involves collection of samples based on a grid or a pattern which has been previously established. When judgmental sampling is performed, samples are collected only from the portion(s) of the site most likely to be contaminated. Often, a combination of these strategies is the best approach depending on the type of the suspected/known contamination, the uniformity and size of the site, the level/type of information desired, etc.

7.4 QA Work Plans (QAWP)

A QAWP is required when it becomes evident that a field investigation is necessary. It should be initiated in conjunction with, or immediately following, notification of the field investigation. This plan should be clear and concise and should detail the following basic components, with regard to sampling activities:

- Objective and purpose of the investigation.
- Basis upon which data will be evaluated.
- Information known about the site including location, type and size of the facility, and length of operations/abandonment.
- Type and volume of contaminated material, contaminants of concern (including concentration), and basis of the information/data.
- Technical approach including media/matrix to be sampled, sampling equipment to be used, sample equipment decontamination (if necessary), sampling design and rationale, and SOPs or description of the procedure to be implemented.
- Project management and reporting, schedule, project organization and responsibilities, manpower and cost projections, and required deliverables.
- QA objectives and protocols including tables summarizing field sampling and QA/QC analysis and objectives.

Note that this list of QAWP components is not all-inclusive and that additional elements may be added or altered depending on the specific requirements of the field investigation. It should also be recognized that although a detailed QAWP is quite important, it may be impractical in some instances. Emergency responses and accidental spills are prime examples of such instances where time might prohibit the development of site-specific QAWPs prior to field activities. In such cases, investigators would have to rely on general guidelines and personal judgment, and the sampling or response plans might simply be a strategy based on preliminary information and finalized on site. In any event, a plan of action should be developed, no matter how concise or informal, to aid investigators in maintaining a logical and consistent order to the implementation of their task.

7.5 Legal Implications

The data derived from sampling activities are often introduced as critical evidence during litigation of a hazardous waste site cleanup. Legal issues in which sampling data are important may include cleanup cost recovery, identification of pollution sources and responsible parties, and technical validation of remedial design methodologies. Because of the potential for involvement in legal actions, strict adherence to technical and administrative SOPs is essential during both the development and implementation of sampling activities.

Technically valid sampling begins with thorough planning and continues through the sample collection and analytical procedures. Administrative requirements involve thorough, accurate

documentation of all sampling activities. Documentation requirements include maintenance of a chain of custody, as well as accurate records of field activities and analytical instructions. Failure to observe these procedures fully and consistently may result in data that are questionable, invalid and non-defensible in court, and the consequent loss of enforcement proceedings.

8.0 CALCULATIONS

Refer to the specific SOPs for any calculations which are associated with sampling techniques.

9.0 QUALITY ASSURANCE/ QUALITY CONTROL

Refer to the specific SOPs for the type and frequency of QA/QC samples to be analyzed, the acceptance criteria for the QA/QC samples, and any other QA/QC activities which are associated with sampling techniques.

10.0 DATA VALIDATION

Refer to the specific SOPs for data validation activities that are associated with sampling techniques.

11.0 HEALTH AND SAFETY

When working with potentially hazardous materials, follow U.S. EPA, OSHA, and corporate health and safety procedures.

U. S. EPA ENVIRONMENTAL RESPONSE TEAM

STANDARD OPERATING PROCEDURES

SOIL SAMPLING

CONTENTS

1.0 SCOPE AND APPLICATION

2.0 METHOD SUMMARY

3.0 SAMPLE PRESERVATION, CONTAINERS, HANDLING, AND STORAGE

4.0 POTENTIAL PROBLEMS

5.0 EQUIPMENT

6.0 REAGENTS

7.0 PROCEDURES

- 7.1 Preparation
- 7.2 Sample Collection
  - 7.2.1 Surface Soil Samples
  - 7.2.2 Sampling at Depth with Augers and Thin Wall Tube Samplers
  - 7.2.3 Sampling at Depth with a Trier
  - 7.2.4 Sampling at Depth with a Split Spoon (Barrel) Sampler
  - 7.2.5 Test Pit/Trench Excavation

8.0 CALCULATIONS

9.0 QUALITY ASSURANCE/QUALITY CONTROL

10.0 DATA VALIDATION

11.0 HEALTH AND SAFETY

12.0 REFERENCES

13.0 APPENDIX
Figures

SUPERCEDES: SOP #2012; Revision 0.0; 11/16/94; U.S. EPA Contract 68-C4-0022.

1.0 SCOPE AND APPLICATION

The purpose of this standard operating procedure (SOP) is to describe the procedures for the collection of representative soil samples. Sampling depths are assumed to be those that can be reached without the use of a drill rig, direct-push, or other mechanized equipment (except for a back-hoe). Analysis of soil samples may determine whether concentrations of specific pollutants exceed established action levels, or if the concentrations of pollutants present a risk to public health, welfare, or the environment.

These are standard (i.e., typically applicable) operating procedures which may be varied or changed as required, dependent upon site conditions, equipment limitations or limitations imposed by the procedure. In all instances, the actual procedures used should be documented and described in an appropriate site report.

Mention of trade names or commercial products does not constitute U.S. Environmental Protection Agency (EPA) endorsement or recommendation for use.

2.0 METHOD SUMMARY

Soil samples may be collected using a variety of methods and equipment depending on the depth of the desired sample, the type of sample required (disturbed vs. undisturbed), and the soil type. Near-surface soils may be easily sampled using a spade, trowel, and scoop. Sampling at greater depths may be performed using a hand auger, continuous flight auger, a trier, a split-spoon, or, if required, a backhoe.

3.0 SAMPLE PRESERVATION, CONTAINERS, HANDLING, AND STORAGE

Chemical preservation of solids is not generally recommended. Samples should, however, be cooled and protected from sunlight to minimize any potential reaction. The amount of sample to be collected and proper sample container type are discussed in ERT/REAC SOP #2003 Rev. 0.0 08/11/94, *Sample Storage, Preservation and Handling.*

4.0 INTERFERENCES AND POTENTIAL PROBLEMS

There are two primary potential problems associated with soil sampling - cross contamination of samples and improper sample collection. Cross contamination problems can be eliminated or minimized through the use of dedicated sampling equipment. If this is not possible or practical, then decontamination of sampling equipment is necessary. Improper sample collection can involve using contaminated equipment, disturbance of the matrix resulting in compaction of the sample, or inadequate homogenization of the samples where required, resulting in variable, non-representative results.

5.0 EQUIPMENT

Soil sampling equipment includes the following:

- Maps/plot plan
- Safety equipment, as specified in the site-specific Health and Safety Plan
- Survey equipment or global positioning system (GPS) to locate sampling points
- Tape measure
- Survey stakes or flags
- Camera and film
- Stainless steel, plastic, or other appropriate homogenization bucket, bowl or pan
- Appropriate size sample containers
- Ziplock plastic bags
- Logbook
- Labels
- Chain of Custody records and custody seals
- Field data sheets and sample labels
- Cooler(s)
- Ice
- Vermiculite
- Decontamination supplies/equipment
- Canvas or plastic sheet
- Spade or shovel
- Spatula
- Scoop
- Plastic or stainless steel spoons
- Trowel(s)
- Continuous flight (screw) auger
- Bucket auger
- Post hole auger
- Extension rods
- T-handle
- Sampling trier
- Thin wall tube sampler
- Split spoons
- Vehimeyer soil sampler outfit
  - Tubes
  - Points
  - Drive head
  - Drop hammer
  - Puller jack and grip
- Backhoe

6.0 REAGENTS

Reagents are not used for the preservation of soil samples. Decontamination solutions are specified in ERT/REAC SOP #2006 Rev. 0.0 08/11/94, *Sampling Equipment Decontamination*, and the site specific work plan.

7.0 PROCEDURES

7.1 Preparation

1. Determine the extent of the sampling effort, the sampling methods to be employed, and the types and amounts of equipment and supplies required.

2. Obtain necessary sampling and monitoring equipment.

3. Decontaminate or pre-clean equipment, and ensure that it is in working order.

4. Prepare schedules and coordinate with staff, client, and regulatory agencies, if appropriate.

5. Perform a general site survey prior to site entry in accordance with the site specific Health and Safety Plan.

6. Use stakes, flagging, or buoys to identify and mark all sampling locations. Specific site factors, including extent and nature of contaminant, should be considered when selecting sample location. If required, the proposed locations may be adjusted based on site access, property boundaries, and surface obstructions. All staked locations should be utility-cleared by the property owner or the On-Scene-Coordinator (OSC) prior to soil sampling; and utility clearance should always be confirmed before beginning work.

7.2 Sample Collection

7.2.1 Surface Soil Samples

Collection of samples from near-surface soil can be accomplished with tools such as spades, shovels, trowels, and scoops. Surface material is removed to the required depth and a stainless steel or plastic scoop is then used to collect the sample.

This method can be used in most soil types but is limited to sampling at or near the ground surface. Accurate, representative samples can be collected with this procedure depending on the care and precision demonstrated by the sample team member. A flat, pointed mason trowel to cut a block of the desired soil is helpful when undisturbed profiles are required. Tools plated with chrome or other materials should not be used. Plating is particularly common with garden implements such as potting trowels.

The following procedure is used to collect surface soil samples:

1. Carefully remove the top layer of soil or debris to the desired sample depth with a pre-cleaned spade.

2. Using a pre-cleaned, stainless steel scoop, plastic spoon, or trowel, remove and discard a thin layer of soil from the area which came in contact with the spade.

3. If volatile organic analysis is to be performed, transfer the sample directly into an appropriate, labeled sample container with a stainless steel lab spoon, or equivalent and secure the cap tightly. Place the remainder of the sample into a stainless steel, plastic, or other appropriate homogenization container, and mix thoroughly to obtain a homogenous sample representative of the entire sampling interval. Then, either place the sample into appropriate, labeled containers and secure the caps tightly; or, if composite samples are to be collected, place a sample from another sampling interval or location into the homogenization container and mix thoroughly. When compositing is complete, place the sample into appropriate, labeled containers and secure the caps tightly.

7.2.2 Sampling at Depth with Augers and Thin Wall Tube Samplers

This system consists of an auger, or a thin-wall tube sampler, a series of extensions, and a "T" handle (Figure 1, Appendix A). The auger is used to bore a hole to a desired sampling depth, and is then withdrawn. The sample may be collected directly from the auger. If a core sample is to be collected, the auger tip is then replaced with a thin wall tube sampler. The system is then lowered down the borehole, and driven into the soil to the completion depth. The system is withdrawn and the core is collected from the thin wall tube sampler.

Several types of augers are available; these include: bucket type, continuous flight (screw), and post-hole augers. Bucket type augers are better for direct sample recovery because they provide a large volume of sample in a short time. When continuous flight augers are used, the sample can be collected directly from the flights. The continuous flight augers are satisfactory when a composite of the complete soil column is desired. Post-hole augers have limited utility for sample collection as they are designed to cut through fibrous, rooted, swampy soil and cannot be used below a depth of approximately three feet.

The following procedure is used for collecting soil samples with the auger:

1. Attach the auger bit to a drill rod extension, and attach the "T" handle to the drill rod.

2. Clear the area to be sampled of any surface debris (e.g., twigs, rocks, litter). It may be advisable to remove the first three to six inches of surface soil for an area approximately six inches in radius around the drilling location.

3. Begin augering, periodically removing and depositing accumulated soils onto a plastic sheet spread near the hole. This prevents accidental brushing of loose material back down the borehole when removing the auger or adding drill rods. It also facilitates refilling the hole, and avoids possible contamination of the surrounding area.

4. After reaching the desired depth, slowly and carefully remove the auger from the hole. When sampling directly from the auger, collect the sample after the auger is removed from the hole and proceed to Step 10.

5. Remove auger tip from the extension rods and replace with a pre-cleaned thin wall tube sampler. Install the proper cutting tip.

6. Carefully lower the tube sampler down the borehole. Gradually force the tube sampler into the soil. Do not scrape the borehole sides. Avoid hammering the rods as the vibrations may cause the boring walls to collapse.

7. Remove the tube sampler, and unscrew the drill rods.

8. Remove the cutting tip and the core from the device.

9. Discard the top of the core (approximately 1 inch), as this possibly represents material collected before penetration of the layer of concern. Place the remaining core into the appropriate labeled sample container. Sample homogenization is not required.

10. If volatile organic analysis is to be performed, transfer the sample into an appropriate, labeled sample container with a stainless steel lab spoon, or equivalent and secure the cap tightly. Place the remainder of the sample into a stainless steel, plastic, or other appropriate homogenization container, and mix thoroughly to obtain a homogenous sample representative of the entire sampling interval. Then, either place the sample into appropriate, labeled containers and secure the caps tightly; or, if composite samples are to be collected, place a sample from another sampling interval into the homogenization container and mix thoroughly.

    When compositing is complete, place the sample into appropriate, labeled containers and secure the caps tightly.

11. If another sample is to be collected in the same hole, but at a greater depth, reattach the auger bit to the drill and assembly, and follow steps 3 through 11, making sure to decontaminate the auger and tube sampler between samples.

12. Abandon the hole according to applicable state regulations. Generally, shallow holes can simply be backfilled with the removed soil material.

7.2.3 Sampling with a Trier

The system consists of a trier, and a "T" handle. The auger is driven into the soil to be sampled and used to extract a core sample from the appropriate depth.

The following procedure is used to collect soil samples with a sampling trier:

1. Insert the trier (Figure 2, Appendix A) into the material to be sampled at a 0° to 45° angle from horizontal. This orientation minimizes the spillage of sample.

2. Rotate the trier once or twice to cut a core of material.

3. Slowly withdraw the trier, making sure that the slot is facing upward.

4. If volatile organic analyses are required, transfer the sample into an appropriate, labeled sample container with a stainless steel lab spoon, or equivalent and secure the cap tightly. Place the remainder of the sample into a stainless steel, plastic, or other appropriate homogenization container, and mix thoroughly to obtain a homogenous sample representative of the entire sampling interval. Then, either place the sample into appropriate, labeled containers and secure the caps tightly; or, if composite samples are to be collected, place a sample from another sampling interval into the homogenization container and mix thoroughly. When compositing is complete, place the sample into appropriate, labeled containers and secure the caps tightly.

7.2.4 Sampling at Depth with a Split Spoon (Barrel) Sampler

Split spoon sampling is generally used to collect undisturbed soil cores of 18 or 24 inches in length. A series of consecutive cores may be extracted with a split spoon sampler to give a complete soil column profile, or an auger may be used to drill down to the desired depth for sampling. The split spoon is then driven to its sampling depth through the bottom of the augured hole and the core extracted.

When split spoon sampling is performed to gain geologic information, all work should

be performed in accordance with ASTM D1586-98, "Standard Test Method for Penetration Test and Split-Barrel Sampling of Soils".

The following procedures are used for collecting soil samples with a split spoon:

1. Assemble the sampler by aligning both sides of barrel and then screwing the drive shoe on the bottom and the head piece on top.

2. Place the sampler in a perpendicular position on the sample material.

3. Using a well ring, drive the tube. Do not drive past the bottom of the head piece or compression of the sample will result.

4. Record in the site logbook or on field data sheets the length of the tube used to penetrate the material being sampled, and the number of blows required to obtain this depth.

5. Withdraw the sampler, and open by unscrewing the bit and head and splitting the barrel. The amount of recovery and soil type should be recorded on the boring log. If a split sample is desired, a cleaned, stainless steel knife should be used to divide the tube contents in half, longitudinally. This sampler is typically available in 2 and 3 1/2 inch diameters. A larger barrel may be necessary to obtain the required sample volume.

6. Without disturbing the core, transfer it to appropriate labeled sample container(s) and seal tightly.

7.2.5 Test Pit/Trench Excavation

A backhoe can be used to remove sections of soil, when detailed examination of soil characteristics are required. This is probably the most expensive sampling method because of the relatively high cost of backhoe operation.

The following procedures are used for collecting soil samples from test pits or trenches:

1. Prior to any excavation with a backhoe, it is important to ensure that all sampling locations are clear of overhead and buried utilities.

2. Review the site specific Health & Safety plan and ensure that all safety precautions including appropriate monitoring equipment are installed as required.

3. Using the backhoe, excavate a trench approximately three feet wide and approximately one foot deep below the cleared sampling location. Place excavated soils on plastic sheets. Trenches greater than five feet deep must be sloped or protected by a shoring system, as required by OSHA regulations.

4. A shovel is used to remove a one to two inch layer of soil from the vertical face of the pit where sampling is to be done.

5. Samples are taken using a trowel, scoop, or coring device at the desired intervals. Be sure to scrape the vertical face at the point of sampling to remove any soil that may have fallen from above, and to expose fresh soil for sampling. In many instances, samples can be collected directly from the backhoe bucket.

6. If volatile organic analyses are required, transfer the sample into an appropriate, labeled sample container with a stainless steel lab spoon, or equivalent and secure the cap tightly. Place the remainder of the sample into a stainless steel, plastic, or other appropriate homogenization container, and mix thoroughly to obtain a homogenous sample representative of the entire sampling interval. Then, either place the sample into appropriate, labeled containers and secure the caps tightly; or, if composite samples are to be collected, place a sample from another sampling interval into the homogenization container and mix thoroughly. When compositing is complete, place the sample into appropriate, labeled containers and secure the caps tightly.

7. Abandon the pit or excavation according to applicable state regulations. Generally, shallow excavations can simply be backfilled with the removed soil material.

8.0 CALCULATIONS

This section is not applicable to this SOP.

9.0 QUALITY ASSURANCE/QUALITY CONTROL

There are no specific quality assurance (QA) activities which apply to the implementation of these procedures. However, the following QA procedures apply:

1. All data must be documented on field data sheets or within site logbooks.

2. All instrumentation must be operated in accordance with operating instructions as supplied by the manufacturer, unless otherwise specified in the work plan. Equipment checkout and calibration

activities must occur prior to sampling/operation, and they must be documented.

10.0 DATA VALIDATION

This section is not applicable to this SOP.

11.0 HEALTH AND SAFETY

When working with potentially hazardous materials, follow U.S. EPA, OHSA and corporate health and safety procedures, in addition to the procedures specified in the site specific Health & Safety Plan..

12.0 REFERENCES

Mason, B.J. 1983. Preparation of Soil Sampling Protocol: Technique and Strategies. EPA-600/4-83-020.

Barth, D.S. and B.J. Mason. 1984. Soil Sampling Quality Assurance User's Guide. EPA-600/4-84-043.

U.S. Environmental Protection Agency. 1984 Characterization of Hazardous Waste Sites - A Methods Manual: Volume II. Available Sampling Methods, Second Edition. EPA-600/4-84-076.

de Vera, E.R., B.P. Simmons, R.D. Stephen, and D.L. Storm. 1980. Samplers and Sampling Procedures for Hazardous Waste Streams. EPA-600/2-80-018.

ASTM D 1586-98, ASTM Committee on Standards, Philadelphia, PA.

APPENDIX A
Figures
SOP #2012
February 2000

FIGURE 1. Sampling Augers

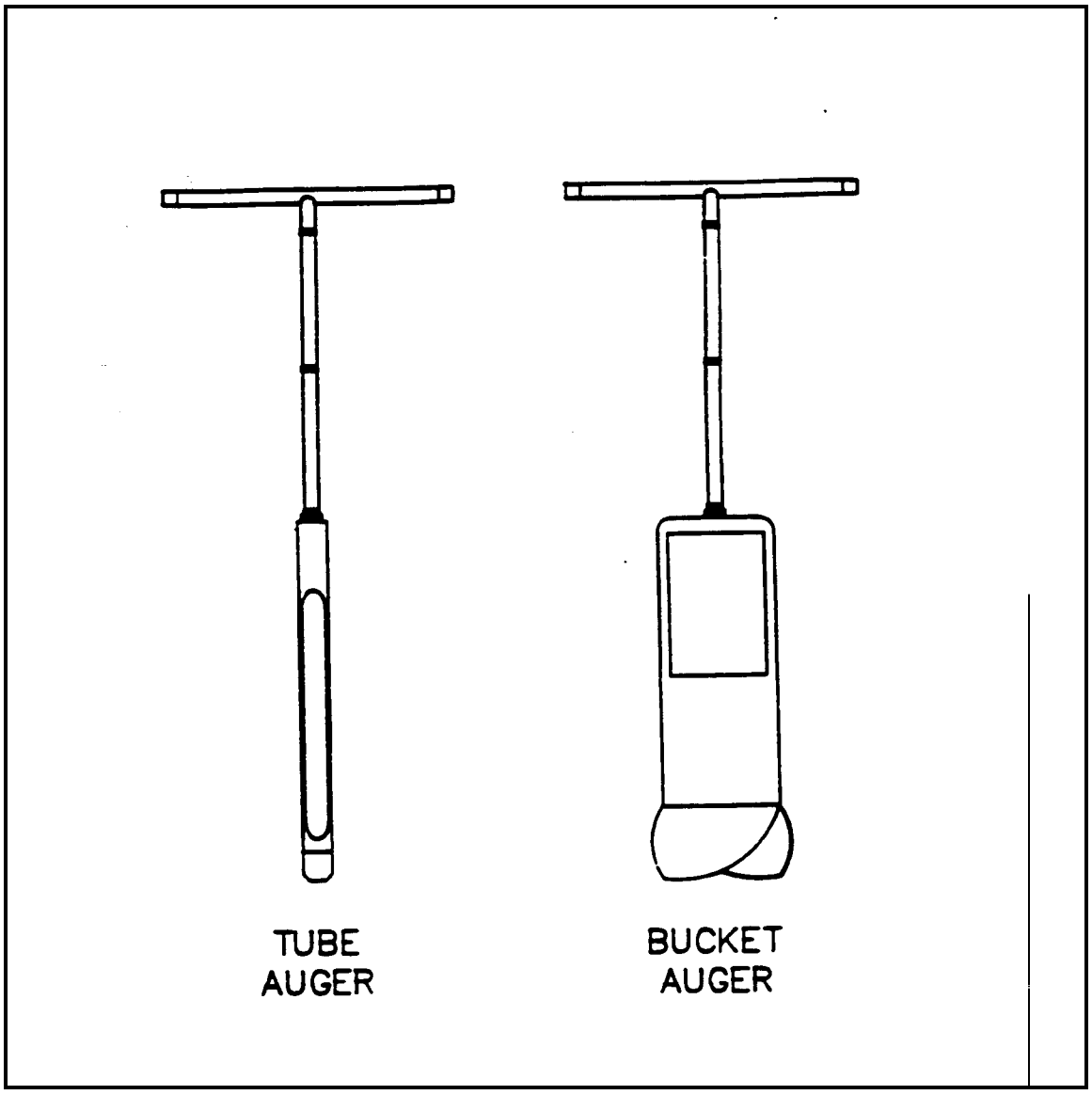
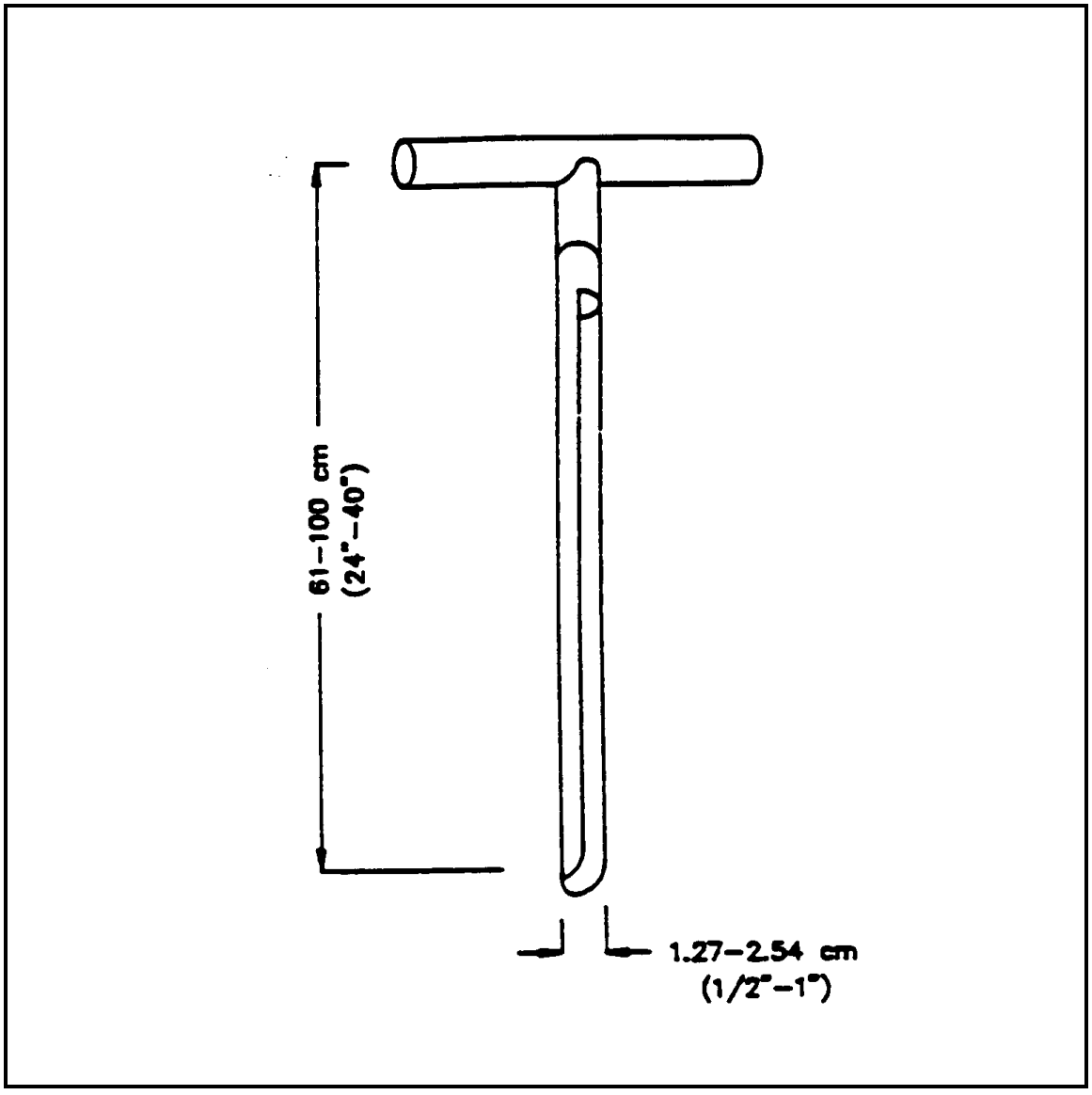


FIGURE 2. Sampling Trier



Appendix C

Chain of Custody Records

USEPA
DateShipped: 5/22/2016
CarrierName: Hand-Delivered
AirbillNo: NA

CHAIN OF CUSTODY RECORD
Baldwinsville Mercury ER/NY
Contact Name: Kathryn Donohue
Contact Phone: 732-570-4943

No: 2-052216-173612-0001
Cooler #: 1
Lab: EPA DESA Laboratory
Lab Phone: 732-906-6886

Lab #	Sample #	Location	Analyses	Matrix	Collected	Sample Time	Numb Cont	Container	Preservative	Lab QC
	P001-SS005-160520-01	P001-SS005	Mercury	Soil	5/20/2016	15:50	2	8 oz glass jar	None	Y
	P001-SS005-160520-02	P001-SS005	Mercury	Soil	5/20/2016	15:50	1	8 oz glass jar	None	N
	P001-SS006-160520-01	P001-SS006	Mercury	Soil	5/20/2016	15:53	1	8 oz glass jar	None	N
	P002-SS001-160520-01	P002-SS001	Mercury	Soil	5/20/2016	14:00	1	8 oz glass jar	None	N
	P002-SS002-160521-01	P002-SS002	Mercury	Soil	5/21/2016	15:55	1	8 oz glass jar	None	N
	P002-SS003-160522-01	P002-SS003	Mercury	Soil	5/22/2016	10:25	1	8 oz glass jar	None	N

5/22/16

Special Instructions: Please email results to S.Sumbaly@WestonSolutions.com, Kathryn.Donohue@WestonSolutions.com, and Michael.Beuthe@WestonSolutions.com

SAMPLES TRANSFERRED FROM
CHAIN OF CUSTODY #

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt
All samples All analyses	RST3	5/22/16 19:00			

Appendix D

Validated Analytical Data Package: ERT Clearance Air Samples

Lockheed Martin
Scientific Engineering Response and Analytical Services
2890 Woodbridge Avenue, Building 209 Annex
Edison, NJ 08837-3679
Telephone: 732-321-4200 Facsimile: 732-494-4021

LOCKHEED MARTIN

DATE: June 2, 2016

TO: Raj Singhvi, U.S. EPA/ERT Work Assignment Manager
Jeff Catanzarita, U.S. EPA/ERT

THROUGH: Kevin Taylor, SERAS Program Manager

FROM: Amy DuBois, SERAS Task Leader

SUBJECT: Upstate NY Mercury Response, Phoenix, NY
WA # 0-001 - Trip Report

This trip report contains confidential information as to locations and analytical results of private properties involved in the investigation, and therefore, specific information identifying property locations and results may need to be withheld or redacted prior to release to the public.

BACKGROUND

In early April 2016, a vial of mercury was found by children and contaminated three homes in Phoenix, New York (NY). The New York State Department of Environmental Conservation (NYSDEC) initiated the clean-up effort. On April 22, 2016, the Environmental Protection Agency (EPA) Region 2 assumed the clean-up. Air monitoring has been conducted during the clean-up activities until ambient readings were below 1 microgram per cubic meter ($\mu g/m^3$). EPA Region 2 has requested assistance from the EPA Environmental Response Team (ERT) and the Scientific, Engineering, Response and Analytical Services (SERAS) contract in providing air sampling to aid in making reoccupation decisions. Work was conducted under the Emergency Response Work Assignment #0-001.

Air samples were collected over an 8-hour period using Anasorb 300 (SKC 226-17-1A) sorbent tubes manufactured by SKC, Inc., which are equivalent to hopcalite, and personal sampling pumps. Samples were collected following SERAS standard operating procedure (SOP) #2107, *Mercury Air Sampling.* The samples were driven to the ERT/SERAS Laboratory for mercury analysis following SERAS SOP #1827, *Analysis of Mercury in Air using Cold Vapor Atomic Absorption (CVAA).* Preliminary results were provided within 24-hours of sample receipt by the laboratory.

OBSERVATIONS AND ACTIVITIES

SERAS sampling personnel mobilized to site May 5, 2016 to initiate clearance sampling in two of the three contaminated residences; at that time, clean-up activities were on-going in the third home. Prior to air sampling, the heat was elevated in the units using the home heating systems. Temperature measurements were made using a handheld infrared thermometer (provided by Removal Support Team [RST] personnel).

In Unit 3249, temperatures in the first and second floors ranged from 88 to 94 degrees Fahrenheit (F).

The basement temperature was 76℉ so a small space heater was added to help elevate the temperature. Samples were collected from the son's bedroom, the master bedroom, the living room, the doorway between the dining room and kitchen, the basement, and an ambient sample. A collocated sample was collected from the son's bedroom. Pumps were calibrated to collect approximately 0.25 liters per minute (L/min) and programmed to collect the sample over an 8-hour period for a target volume of 120 liters (L).

In Unit 3240, the temperature had not been elevated when SERAS personnel arrived to begin sampling. At 1415 hours ERT and SERAS personnel set the thermostat to 84℉. Pumps were calibrated and programmed as above, but a 2-hour delayed start was programmed to allow the temperature of the home to warm prior to collecting the samples. Samples were collected from the son's bedroom, a second bedroom, the living room, the doorway between the dining room and office, the basement, and an ambient sample. A collocated sample was collected from the son's bedroom. A space heater was placed in the basement to help warm the area. Prior to leaving the unit, after approximately 25 minutes of heating, temperatures on the first and second floors ranged from 77 to 81℉. The basement temperature was 72℉.

On May 6, 2016, SERAS personnel retrieved the samples from the two units. All samples collected for the full 8-hour period; however, one pump failed to shut off so 266.8 L of sample was collected from Unit 3249 living room. Samples were processed, properly documented, driven back to NJ, and delivered to the ERT/SERAS Lab under chain of custody for mercury analysis.

On May 11, 2016, SERAS personnel returned to NY to conduct clearance sampling at Unit 3244. SERAS personnel arrived at the house the morning of May 12, 2016 and confirmed the heat was elevated. The temperature of the living space was 85℉ according to the house thermostat. Samples were collected from the son's bedroom, the master bedroom, the living room, the hall near the garage entrance, the basement, and an ambient sample. A collocated sample was collected from the son's bedroom. Pumps were calibrated to collect approximately 0.25 L/min and programmed to collect the sample over an 8-hour period for a target volume of 120 L. No space heater was deployed in the basement of this unit. At the end of the 8-hour sample period, SERAS personnel returned to retrieve the samples. Samples were processed and properly documented. On May 13, 2016, the samples were delivered to the ERT/SERAS Laboratory for mercury analysis following SOP #1827.

RESULTS

Results of the clearance sampling are presented in Tables 1-A, 1-B and 1-C, one table per unit. None of the samples exceeded the action level of 1 $\mu g/m^3$. None of the Field Blanks or Ambient samples contained detectable mercury above the reporting limit (RL). Pictures of the sampling locations are provided in Appendix A. The Analytical Report is provided in Appendix B. Air sampling worksheets are provided in Appendix C. A CONFIDENTIAL Unit ID key is provided in Appendix D.

Future Activities

There are no additional activities scheduled at this time.

cc: Central File - WA #SERAS-001 (w/attachment)
Electronic File - I:\Archive\SERAS\001\D\TR\060216
SERAS Program Manager (cover page only)

TABLES
Upstate NY Mercury Response
Phoenix, NY
June 2016

TABLE 1-A
Clearance Sampling at Unit 3249 - May 5, 2016
Upstate NY Mercury Response
June 2016

Sample Number	Location	Description	Mercury Result	Units
75-001-0001	3249 A	Son's Bedroom	0.124	$\mu g/m^3$
75-001-0002	3249 A CO	Son's Bedroom Collocated	0.140	$\mu g/m^3$
75-001-0003	3249 B	Master Bedroom	0.129	$\mu g/m^3$
75-001-0004	3249 C	Living Room	0.126	$\mu g/m^3$
75-001-0005	3249 D	Doorway Dining room/Kitchen	0.129	$\mu g/m^3$
75-001-0006	3249 E	Basement	0.144	$\mu g/m^3$
75-001-0007	3249 F	Ambient	0.0833 U	$\mu g/m^3$

U - not detected above reporting limit

$\mu g/m^3$ - micrograms per cubic meter

TABLE 1-B
Clearance Sampling at Unit 3240 - May 5-6, 2016
Upstate NY Mercury Response
June 2016

Sample Number	Location	Description	Mercury Result	Units
75-001-0008	3240 A	Son's Bedroom	0.147	$\mu g/m^3$
75-001-0009	3240 A CO	Son's Bedroom Collocated	0.153	$\mu g/m^3$
75-001-0010	3240 B	Second Bedroom	0.154	$\mu g/m^3$
75-001-0011	3240 C	Living Room	0.180	$\mu g/m^3$
75-001-0012	3240 D	Dining Room/Office	0.166	$\mu g/m^3$
75-001-0013	3240 E	Basement	0.131	$\mu g/m^3$
75-001-0014	3240 F	Ambient	0.0811 U	$\mu g/m^3$
75-001-0015	Field Blank	Field Blank	0.0100 U	µg/tube

U - not detected above reporting limit

$\mu g/m^3$ - micrograms per cubic meter

µg/tube - micrograms per tube

TABLE 1-C
Clearance Sampling at Unit 3244 - May 12, 2016
Upstate NY Mercury Response
June 2016

Sample Number	Location	Description	Mercury Result	Units
75-001-0016	3244 A	Son's Bedroom	0.0769 U	µg/m^3
75-001-0017	3244 A CO	Son's Bedroom Collocated	0.0770 U	µg/m^3
75-001-0018	3244 B	Master Bedroom	0.0772 U	µg/m^3
75-001-0019	3244 C	Living Room	0.0769 U	µg/m^3
75-001-0020	3244 D	Hall from Garage	0.0770 U	µg/m^3
75-001-0021	3244 E	Basement	0.0798 U	µg/m^3
75-001-0022	3244 F	Ambient	0.0772 U	µg/m^3
75-001-0023	Field Blank	Field Blank	0.0100 U	µg/tube

U - not detected above reporting limit

µg/m^3 - micrograms per cubic meter

µg/tube - micrograms per tube

APPENDIX A
Sample Photo Documentation
Upstate NY Mercury Response
June 2016

3249-A: Boy's Bedroom and collocated sample

Sample # 75-001-0001 and 75-001-0002

3249-B: Master Bedroom

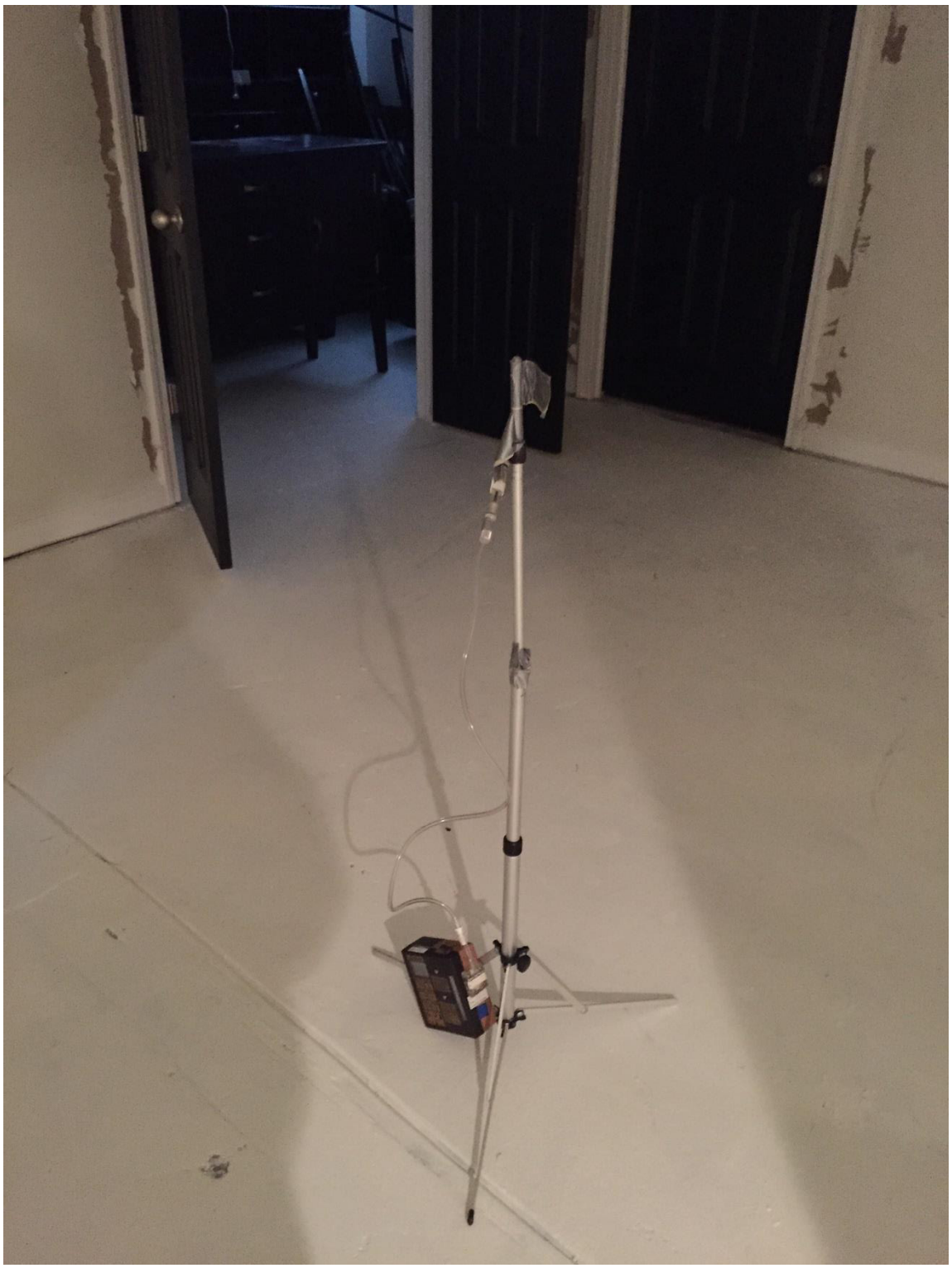
Sample #: 75-001-0003

3249-C: Living Room

Sample # 75-001-0004

3249-D: Doorway between Dining Room and Kitchen

Sample # 75-001-0005



3249-E: Basement

Sample # 75-001-0006

Heating basement Unit 3249

3249-F: Ambient

Sample # 75-001-0007

3240-A: Son’s bedroom and collocated

Sample # 75-001-0008 and 75-001-0009

Bagged items in son’s bedroom Unit 3240

3240-B: Second bedroom

Sample # 75-001-0010

3240-C: Living Room

Sample # 75-001-0011

3240-D: Dining Room/Office

Sample # 75-001-0012

3240-E: Basement

Sample # 75-001-0013

3240-F: Ambient

Sample # 75-001-0014

3244-A: Son’s bedroom and collocated

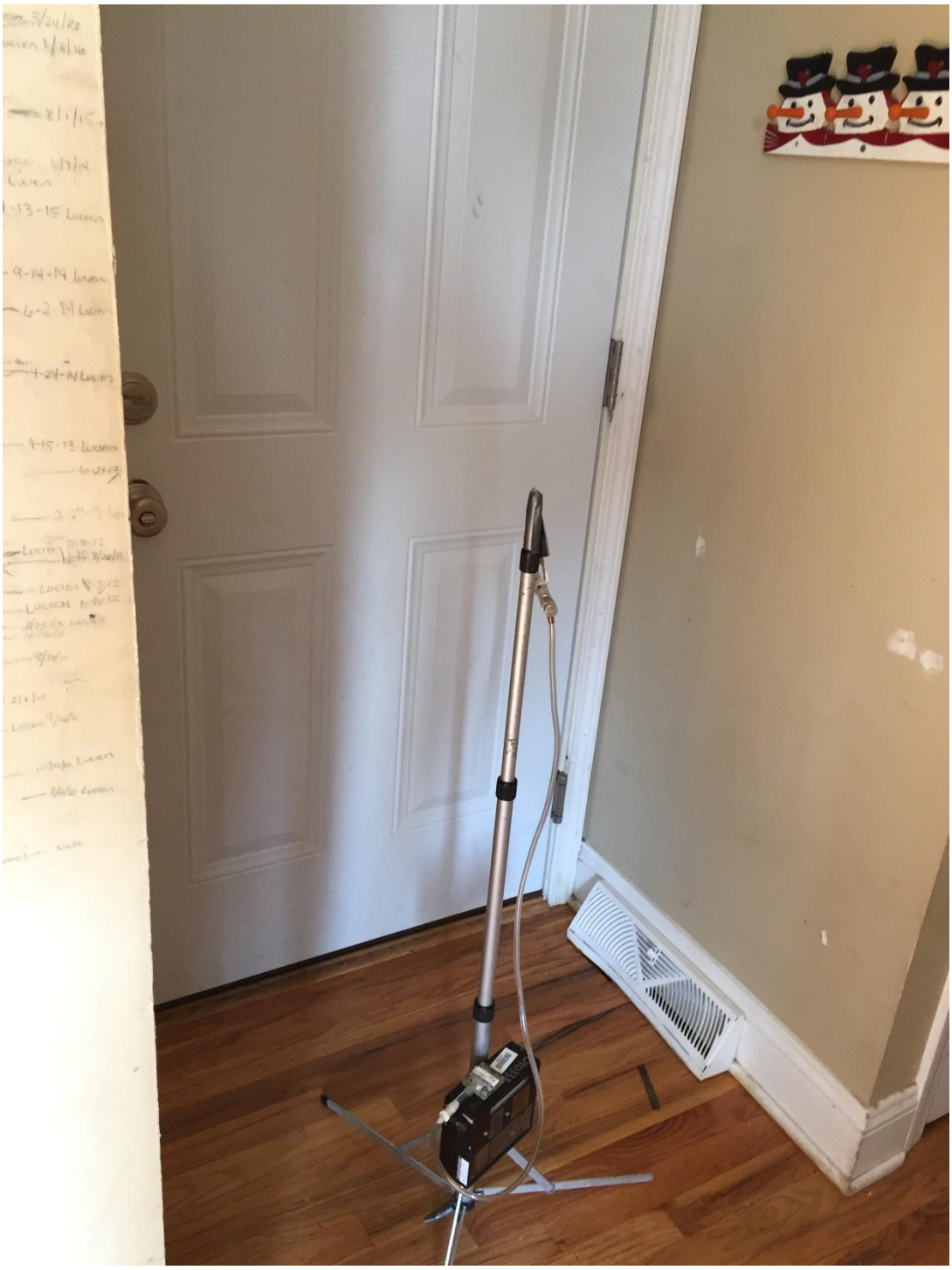
Sample # 75-001-0016 and 75-001-0017

3244-B: Master Bedroom

Sample # 75-001-0018

3244-C: Living Room

Sample # 75-001-0019

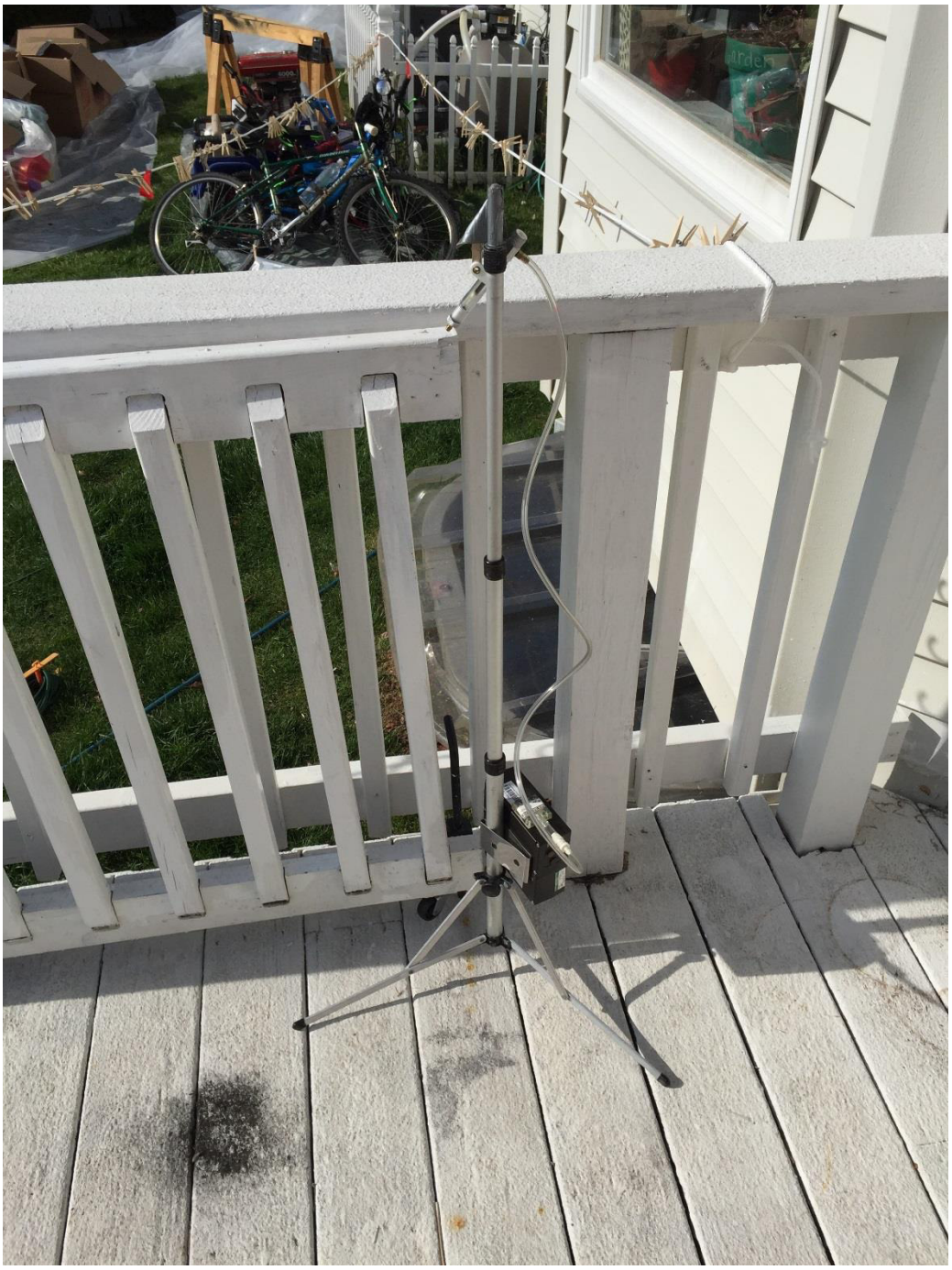


3244-D: Hall from Garage

Sample # 75-001-0020

3244-E: Basement

Sample # 75-001-0021



3244-F: Ambient

Sample # 75-001-0022

APPENDIX B
Analytical Report – May 16, 2016
Upstate NY Mercury Response
June 2016

ANALYTICAL REPORT

Prepared by
LOCKHEED MARTIN

Upstate NY Mercury Response - Analytical Report

May 2016

EPA Work Assignment No. SERAS-75001
LOCKHEED MARTIN Work Order No. SER75001
EPA Contract No. EP-W-09-031

Submitted to
R. Singhvi
EPA/ERT
2890 Woodbridge Avenue
Edison, NJ 08837

5/16/16

D. Killeen
QA/QC Officer

Date

Analysis by:
ERT/SERAS Lab

5/16/16

K. Taylor
Program Manager

Date

Prepared by:/Reviewed by:
S. Capil/R. Varsolona

REPORT OF LABORATORY ANALYSIS
This report shall not be reproduced, except in full,
without the written consent of the ERT/SERAS Laboratory

Table of Contents

Topic

Testing Laboratories Information
Detailed Sample Information
Introduction
Case Narrative
Summary of Abbreviations

Section I

Results of the Analysis for Mercury in Air Table 1.1

Section II

Results of the BS/BSD Analysis for Mercury in Air Table 2.1

Section III

Correspondence
Chains of Custody

Appendices

Appendix A Data for Mercury in Air AB 049
Appendix B Data for Mercury in Air AB 053

Appendices will be furnished on request.

This report shall not be reproduced, except in full,
without the written consent of the ERT/SERAS Laboratory

TESTING LABORATORIES INFORMATION

Analysis of Mercury in Air by SERAS SOP #1827, "*Analysis of Mercury in Air using Cold-Vapor Atomic Absorption (CVAA)*"

ERT/SERAS Laboratory
2890 Woodbridge Avenue
Edison, NJ 08837

All analyses were performed according to our NELAP-approved quality assurance program. The test results meet the requirements of the current NELAP standards, where applicable, except as noted in the laboratory case narrative provided. Results are intended to be considered in their entirety and apply only to those analyzed and reported herein.

ERT/SERAS Laboratory is certified by the New Jersey Department of Environmental Protection, NELAP Laboratory Certification ID #12023. Mercury in air is not a NELAP-certified parameter.

REPORT OF LABORATORY ANALYSIS
This report shall not be reproduced, except in full,
without the written consent of the ERT/SERAS Laboratory

Detailed Sample Information

SERAS Sample #	Field Sample #
R605002-01	75-001-0001
R605002-02	75-001-0002
R605002-03	75-001-0003
R605002-04	75-001-0004
R605002-05	75-001-0005
R605002-06	75-001-0006
R605002-07	75-001-0007
R605002-08	75-001-0008
R605002-09	75-001-0009
R605002-10	75-001-0010
R605002-11	75-001-0011
R605002-12	75-001-0012
R605002-13	75-001-0013
R605002-14	75-001-0014
R605002-15	75-001-0015
R605005-01	75-001-0016
R605005-02	75-001-0017
R605005-03	75-001-0018
R605005-04	75-001-0019
R605005-05	75-001-0020
R605005-06	75-001-0021
R605005-07	75-001-0022
R605005-08	75-001-0023

REPORT OF LABORATORY ANALYSIS
This report shall not be reproduced, except in full,
without the written consent of the ERT/SERAS Laboratory

Introduction

SERAS personnel, in response to WA# SERAS-75001, provided analytical support for environmental samples collected from the Upstate New York Mercury Response located in Baldwinsville, New York as described in the following table. The support also included QA/QC, data review and preparation of an analytical report containing analytical and QA/QC results.

The samples analyzed at SERAS were treated with procedures consistent with those specified in SERAS SOP #1008, *Sample Receiving, Handling and Storage* and SOP#1009, *Operation of Sample Refrigeration Units*.

Chain of Custody #	Number of Samples	Sampling Date	Date Received	Date Analyzed	Matrix	Analysis/ Method	Laboratory	Data Package
2-050616-082824-0001	7	05/05/16	05/06/16	05/07/16	Air	Hg/SERAS SOP #1827	ERT/SERAS Laboratory	AB049
	7	05/06/16						
	1				Field Blank			
2-051216-175525-0002	7	05/12/16	5/13/16	05/13/16	Air			AB053
	1				Field Blank			

Case Narrative

Sampling was conducted as per the site-specific Quality Assurance Project Plan (QAPP) and analyzed by the analytical methods as stated in the QAPP. The laboratory reported the data to three significant figures. Any other representation of the data is the responsibility of the user. Data were validated using a Stage 4 validation done manually (S4VM) in accordance with the "Guidance for Labeling Externally Validated Data for Superfund Use." All data validation flags have been inserted into the results tables.

Mercury in Air Package AB049

The data package was examined and found to be acceptable.

Mercury in Air Package AB053

The data package was examined and found to be acceptable.

The results presented in this report only relate to the samples analyzed. All results are intended to be considered in their entirety. The Environmental Response Team/Scientific, Engineering, Response and Analytical Services laboratory is not responsible for utilization of less than the complete report.

REPORT OF LABORATORY ANALYSIS
This report shall not be reproduced, except in full,
without the written consent of the ERT/SERAS Laboratory

Summary of Abbreviations

BFB	Bromofluorobenzene
C	Centigrade
CLP	Contract Laboratory Program
COC	Chain of Custody
conC	concentration
cont	continued
CRDL	Contract Required Detection Limit
CRQL	Contract Required Quantitation Limit
D	(Surrogate Table) value is from a diluted sample and was not calculated
Dioxin	Polychlorinated dibenzo-p-dioxins (PCDD) and Polychlorinated dibenzofurans (PCDF)
DFTPP	Decafluorotriphenylphosphine
EMPC	Estimated maximum possible concentration
GC/MS	Gas Chromatography/ Mass Spectrometry
IS	Internal Standard
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
MDA	Minimum Detectable Activity
MS (BS)	Matrix Spike (Blank Spike)
MSD (BSD)	Matrix Spike Duplicate (Blank Spike Duplicate)
MW	Molecular Weight
NA	Not Applicable or Not Available
NAD	Normalized Absolute Difference
NC	Not Calculated
NR	Not Requested/Not Reported
NS	Not Spiked
% D	Percent Difference
% REC	Percent Recovery
SOP	Standard Operating Procedure
ppbv	parts per billion by volume
ppm	parts per million
pptv	parts per trillion by volume
PQL	Practical Quantitation Limit
PAL	Performance Acceptance Limit
QA/QC	Quality Assurance/Quality Control
QL	Quantitation Limit
RL	Reporting Limit
RPD	Relative Percent Difference
RSD	Relative Standard Deviation
SERAS	Scientific, Engineering, Response and Analytical Services
SIM	Selected Ion Monitoring
Sur	Surrogate
TIC	Tentatively Identified Compound
TCLP	Toxicity Characteristic Leaching Procedure
VOC	Volatile Organic Compound
*	Value exceeds the acceptable QC limits

m^3	cubic meter	g	gram	kg	kilogram	L	liter
µg	microgram	µL	microliter	mg	milligram	mL	milliliter
ng	nanogram	pg	picogram	pCi	picocurie	s	sigma

Data Validation Flags

J	Value is estimated	R	Value is unusable
J+	Value is estimated high (metals only)	U	Not detected
J-	Value is estimated low (metals only)	UJ	Not detected and RL is estimated
N	Presumptively present (Aroclors only)		

Rev. 1/14/09

REPORT OF LABORATORY ANALYSIS
This report shall not be reproduced, except in full,
without the written consent of the ERT/SERAS Laboratory

Table 1.1 Results of the Analysis for Mercury in Air
WA# SERAS-75001 Upstate New York Mercury Response

Method SERAS SOP #1827

SERAS Sample Number	Method Blank 05072016		R605002-01		R605002-02		R605002-03	
Sample Number	Method Blank		75-001-0001		75-001-0002		75-001-0003	
Sample Location	5/7/2016		3249A-Boy's bedroom		3249A CO-Boys BR		3249B-Master bedroom	
Sample Volume (L)			112.32		110.88		112.8	
Analyte	Result µg/tube	RL µg/tube	Result ug/m3	RL ug/m3	Result ug/m3	RL ug/m3	Result ug/m3	RL ug/m3
Mercury	U	0.0100	0.124	0.089	0.140	0.0902	0.129	0.0887

Table 1.1 (cont) Results of the Analysis for Mercury in Air
WA# SERAS-75001 Upstate New York Mercury Response

Method SERAS SOP #1827

SERAS Sample Number	R605002-04		R605002-05		R605002-06		R605002-07	
Sample Number	75-001-0004		75-001-0005		75-001-0006		75-001-0007	
Sample Location	3249C-Living room		3249D-Doorway bet. DR & kitchen		3249E-Basement		3249F- Ambient	
Sample Volume (L)	266.75		116.64		114.24		120	
Analyte	Result ug/m3	RL ug/m3	Result ug/m3	RL ug/m3	Result ug/m3	RL ug/m3	Result ug/m3	RL ug/m3
Mercury	0.126	0.0375	0.129	0.0857	0.144	0.0875	U	0.0833

Table 1.1 (cont) Results of the Analysis for Mercury in Air
WA# SERAS-75001 Upstate New York Mercury Response

Method SERAS SOP #1827

SERAS Sample Number	R605002-08		R605002-09		R605002-10		R605002-11	
Sample Number	75-001-0008		75-001-0009		75-001-0010		75-001-0011	
Sample Location	3240A -Boy's bedroom		3240A CO-Boys BR		3240B -2nd BR (right rear)		3240C - Living room	
Sample Volume (L)	120.96		118.56		123.12		120	
Analyte	Result ug/m3	RL ug/m3	Result ug/m3	RL ug/m3	Result ug/m3	RL ug/m3	Result ug/m3	RL ug/m3
Mercury	0.147	0.0827	0.153	0.0843	0.154	0.0812	0.180	0.0833

Table 1.1 (cont) Results of the Analysis for Mercury in Air
WA# SERAS-75001 Upstate New York Mercury Response

Method SERAS SOP #1827

SERAS Sample Number	R605002-12		R605002-13		R605002-14		R605002-15	
Sample Number	75-001-0012		75-001-0013		75-001-0014		75-001-0015	
Sample Location	3240D-between dining room/office		3240E-Basement		3240F-Ambient		Field Blank	
Sample Volume (L)	133.92		120.96		123.36		0	
Analyte	Result ug/m3	RL ug/m3	Result ug/m3	RL ug/m3	Result ug/m3	RL ug/m3	Result µg/tube	RL µg/tube
Mercury	0.166	0.0747	0.131	0.0827	U	0.0811	U	0.010

REPORT OF LABORATORY ANALYSIS
This report shall not be reproduced, except in full,
without the written consent of the ERT/SERAS Laboratory

Table 1.1 (cont) Results of the Analysis for Mercury in Air
WA# SERAS-75001 Upstate New York Mercury Response

Method SERAS SOP #1827

SERAS Sample Number	Method Blank 05132016		R605005-01		R605005-02		R605005-03	
Sample Number	Method Blank		75-001-0016		75-001-0017		75-001-0018	
Sample Location	5/13/2016		3244A		3244A CO		3244B	
Sample Volume (L)			130.08		129.84		129.6	
Analyte	Result µg/tube	RL µg/tube	Result ug/m3	RL ug/m3	Result ug/m3	RL ug/m3	Result ug/m3	RL ug/m3
Mercury	U	0.0100	U	0.0769	U	0.0770	U	0.0772

Table 1.1 (cont) Results of the Analysis for Mercury in Air
WA# SERAS-75001 Upstate New York Mercury Response

Method SERAS SOP #1827

SERAS Sample Number	R605005-04		R605005-05		R605005-06		R605005-07	
Sample Number	75-001-0019		75-001-0020		75-001-0021		75-001-0022	
Sample Location	3244C		3244D		3244E		3244F	
Sample Volume (L)	130.08		129.84		125.28		129.6	
Analyte	Result ug/m3	RL ug/m3	Result ug/m3	RL ug/m3	Result ug/m3	RL ug/m3	Result ug/m3	RL ug/m3
Mercury	U	0.0769	U	0.0770	U	0.0798	U	0.0772

Table 1.1 (cont) Results of the Analysis for Mercury in Air
WA# SERAS-75001 Upstate New York Mercury Response

Method SERAS SOP #1827

SERAS Sample Number	R605005-08	
Sample Number	75-001-0023	
Sample Location	Field Blank	
Sample Volume (L)		
Analyte	Result µg/tube	RL µg/tube
Mercury	U	0.0100

This report shall not be reproduced, except in full,
without the written consent of the ERT/SERAS Laboratory

Table 2.1 Results of the BS/BSD Analysis for Mercury In Air
WA# SERAS-75001 Upstate New York Mercury Response

Sample ID : BS/BSD 05/07/16

	Sample Result µg/tube	BS/BSD Spike µg/tube	BS Recovered µg/tube	BS % Recovery	BSD Recovered µg/tube	BSD % Recovery	RPD	QC Limits RPD	QC Limits % Recovery
Mercury	U	0.100	0.0979	98	0.0998	100	2	20	80 - 120

Table 2.1 (cont) Results of the BS/BSD Analysis for Mercury In Air
WA# SERAS-75001 Upstate New York Mercury Response

Sample ID : BS/BSD 05/13/16

	Sample Result µg/tube	BS/BSD Spike µg/tube	BS Recovered µg/tube	BS % Recovery	BSD Recovered µg/tube	BSD % Recovery	RPD	QC Limits RPD	QC Limits % Recovery
Mercury	U	0.100	0.106	106	0.106	106	0	20	80 - 120

This report shall not be reproduced, except in full,
without the written consent of the ERT/SERAS Laboratory

SERAS-75001-DAR-051616

USEPA
DateShipped:
CarrierName:
AirbillNo:
WO# R605002

CHAIN OF CUSTODY RECORD
Baldwinsville Hg Response/NY
Contact Name: DUBOIS/SOLINSKI
Contact Phone:

No: 2-050616-082824-0001
Cooler #:
Lab: ERT/SERAS
Lab Phone: 732-321-4200

Lab #	Sample #	Location	Analyses	Matrix	Collected	Stop_Time	Numb Cont	Container	Preservative	Volume	Vol Units	Lab QC
01	75-001-0001	3249	Mercury	Air	5/5/2016	9:14:00 PM	1	tube	None	112.32	Liters	
02	75-001-0002	3249	Mercury	Air	5/5/2016	9:14:00 PM	1	tube	None	110.88	Liters	
03	75-001-0003	3249	Mercury	Air	5/5/2016	9:17:00 PM	1	tube	None	112.8	Liters	
04	75-001-0004	3249	Mercury	Air	5/5/2016	9:21:00 PM	1	tube	None	266.75	Liters	
05	75-001-0005	3249	Mercury	Air	5/5/2016	9:22:00 PM	1	tube	None	116.64	Liters	
06	75-001-0006	3249	Mercury	Air	5/5/2016	9:25:00 PM	1	tube	None	114.24	Liters	
07	75-001-0007	3249	Mercury	Air	5/5/2016	9:38:00 PM	1	tube	None	120	Liters	
08	75-001-0008	3240	Mercury	Air	5/6/2016	12:27:00 AM	1	tube	None	120.96	Liters	
09	75-001-0009	3240	Mercury	Air	5/6/2016	12:28:00 AM	1	tube	None	118.56	Liters	
10	75-001-0010	3240	Mercury	Air	5/6/2016	12:30:00 AM	1	tube	None	123.12	Liters	
11	75-001-0011	3240	Mercury	Air	5/6/2016	12:32:00 AM	1	tube	None	120	Liters	
12	75-001-0012	3240	Mercury	Air	5/6/2016	12:33:00 AM	1	tube	None	133.92	Liters	
13	75-001-0013	3240	Mercury	Air	5/6/2016	12:36:00 AM	1	tube	None	120.96	Liters	
14	75-001-0014	3240	Mercury	Air	5/6/2016	12:45:00 AM	1	tube	None	123.36	Liters	
15	75-001-0015	Field Blank	Mercury	Air	5/6/2016	8:00:00 AM	1	tube	None	0	Liters	
~~16~~	~~TM 5/16/16~~											

Special Instructions: Analyze for Mercury following SERAS SOP #1827
Extra tubes provided for Method Blank/BS/BSD

SAMPLES TRANSFERRED FROM
CHAIN OF CUSTODY #

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt
All/Analysis		5/6/16	/SERAS	5/6/16 14:00	Intact Room Temp.
All/Analysis	/SERAS	5/6/16 14:30	Jay Patel/SERAS	05/07/16 @ 7:10 am	↓

06

SERAS-75001-DAR-051616

USEPA
DateShipped:
CarrierName:
AirbillNo:

CHAIN OF CUSTODY RECORD
Baldwinsville Hg Response/NY
Contact Name: DUBOIS/SOLINSKI
Contact Phone:

No: 2-051216-175525-0002
Cooler #:
Lab: ERT/SERAS
Lab Phone: 732-321-4200

WO# R605005

Lab #	Sample #	Location	Sub Location	Analyses	Matrix	Collected	Stop_Time	Numb Cont	Container	Preservative	Volume	Vol Units	Lab QC
01	75-001-0016	3244	A	Mercury	Air	5/12/2016	4:41:00 PM	1	tube	None	130.08	Liters	
02	75-001-0017	3244	A CO	Mercury	Air	5/12/2016	4:41:00 PM	1	tube	None	129.84	Liters	
03	75-001-0018	3244	B	Mercury	Air	5/12/2016	4:41:00 PM	1	tube	None	129.6	Liters	
04	75-001-0019	3244	C	Mercury	Air	5/12/2016	4:43:00 PM	1	tube	None	130.08	Liters	
05	75-001-0020	3244	D	Mercury	Air	5/12/2016	4:48:00 PM	1	tube	None	129.84	Liters	
06	75-001-0021	3244	E	Mercury	Air	5/12/2016	4:50:00 PM	1	tube	None	125.28	Liters	
07	75-001-0022	3244	F	Mercury	Air	5/12/2016	4:53:00 PM	1	tube	None	129.6	Liters	
08	75-001-0023	Field Blank		Mercury	Air	5/12/2016	5:00:00 PM	1	tube	None	0	Liters	

LOT #8679
Extra tubes provided for Method Blank/BS/BSD

Special Instructions: Analyze for Mercury following SERAS SOP #1827

SAMPLES TRANSFERRED FROM CHAIN OF CUSTODY #

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt
All/Analysis	[signature]	5/12/16	[signature]/SERAS	5/13/16 10:20	Intact
All/Analysis	[signature]/SERAS	5/13/16 10:45	Jon Patel/SERAS	5/13/16 10:45	↓

07

APPENDIX C
Air Sampling Worksheets
Upstate NY Mercury Response
June 2016

EPA/Environmental Response Team
Scientific Engineering Response and Analytical Services
Air Sampling Work Sheet

Lockheed Martin Corp., Edison, NJ
EPA Contract No. EP-W-09-031

Site: Baldwinsville Hg ER
WA#: 0-001 (75-001)
Sampler: DuBois
EPA/ERT WAM: Singhvi / Catanzarite
Date: 5/5/16
SERAS Task Leader: Solinski (DuBois)

Sample #	75-001-0001	-0002	-0003	-0004	-0005
Location	3249-A	3249-A CO	3249-B	3249-C	3249-D
Pump #	530	346	357	394	110
Media	Carulite				
Analysis/Method	SOP 1087	(NIOSH 6009)			
Date/Time/Count (Start)	5/5/16 1314	1314	1317	1321	1322
Date/Time/Count (Stop)	480	480	480	1067	480
Total Time	480	480	480	1067	480
Flow Rate (Start)	253	251	245	250	253
Flow Rate (Stop)	215	211	222	250	233
Flow Rate (Average)	234	231		250	243
Sample Volume	112.3	110.9	112.8	266.8	110.6

MET Station on Site?: Y / N	Atmospheric Pressure (Local):	Ambient Sampling Temperature:

SKC 226-17-14
LOT 8679

Flowmeter 012745 - all samples

1 MASTER
2 - Boys
1 - BASE

Temp gun - 88-90°F (A) 94°F (B) 93°F (C+D)

A - Boys room
B - master
C - LR
D - Doorway DR/KIT

A - ACU-RITE = 88

EPA/Environmental Response Team
Scientific Engineering Response and Analytical Services
Air Sampling Work Sheet

Lockheed Martin Corp., Edison, NJ
EPA Contract No. EP-W-09-031

Site: Baldwinsville Hg ER
WA#: 0-001
Sampler: DuBois
EPA/ERT WAM: Singhvi / Catanzorita
Date: 5/5/16
SERAS Task Leader: Solinski (DuBois)

Sample #	75-001-0006	-0007			
Location	3249-E	3249-F			
Pump #	18	478			
Media					
Analysis/Method	SOP 1087	(NIOSH 6009)			
Date/Time/Count (Start)	5/5/16 1325	1335			
Date/Time/Count (Stop)					
Total Time	480	480			
Flow Rate (Start)	252	250			
Flow Rate (Stop)	224	250			
Flow Rate (Average)	238	250			
Sample Volume	114.2	120			

MET Station on Site?: Y / N	Atmospheric Pressure (Local):	Ambient Sampling Temperature:

E - 80°F
E BASEMENT

F - AMBIENT

1330 Temp dropped to 76°F brought in small heater will run until leave site

EPA/Environmental Response Team
Scientific Engineering Response and Analytical Services
Air Sampling Work Sheet

Lockheed Martin Corp., Edison, NJ
EPA Contract No. EP-W-09-031

Site: Baldwinsville Hg
WA#: 0-001
Sampler: DuBois
EPA/ERT WAM: SINGHVI/CATANZARITA
Date: 5/5/16 - 5/6/16
SERAS Task Leader: Solinski (DuBois)

Sample #	75-001-0008	-0009	-0010	-0011	-0012
Location	3240-A	3240-ACO	3240-B	3240-C	3240-D
Pump #	50	212	98	~~198~~ ~~500~~ stat	~~138~~ 148
Media					
Analysis/Method					
Date/Time/Count (Start)	1427 -2HR DELAY 1627	1427 1627	1430 +2 1630	1432 +2 1632	1433 +2HR 1633
Date/Time/Count (Stop)					
Total Time	480	480	480	480	480
Flow Rate (Start)	252	248	255	250	248
Flow Rate (Stop)	252	246	258	250	310
Flow Rate (Average)	252	247	256.5	250	279
Sample Volume	121	118.6	123.1	120	133.9

MET Station on Site?: Y / N	Atmospheric Pressure (Local):	Ambient Sampling Temperature:

A - SON'S BR
B - 2nd BR
C - LR
D - DR/OFFICE

1415 - Arrived at house, heat was not elevated. Set to 84°F

77°F - A @ 1439
77°F - B @ 1440
C - 81°F @ 1441
D - 80°F @ 1441
E - 72°F @ 1442

EPA/Environmental Response Team
Scientific Engineering Response and Analytical Services
Air Sampling Work Sheet

Lockheed Martin Corp., Edison, NJ
EPA Contract No. EP-W-09-031

Site: Baldwinsville Hg ER
WA#: 0-001
Sampler: DuBois
EPA/ERT WAM: SINGHVI / Calabrezanta
Date: 5/5/16 - 5/6/16
SERAS Task Leader: Salinski (DuBois)

Sample #	75-001 -0014	-0013	-0015		
Location	3240-F	3240-E	FIELD BLANK		
Pump #	~~515~~	~~506~~ ~~145~~ 138			
Media					
Analysis/Method					
Date/Time/Count (Start)	1445 / 2 1645	1436 / 2HR 1636			
Date/Time/Count (Stop)					
Total Time	480	480			
Flow Rate (Start)	256	250	—		
Flow Rate (Stop)	258	254			
Flow Rate (Average)	257	252			
Sample Volume	123.4	121	0		

MET Station on Site?: Y / N	Atmospheric Pressure (Local):	Ambient Sampling Temperature:

E - Basement
69°F added spaceheater

F - 53°F / 58°F
F - AMB

EPA/Environmental Response Team
Scientific Engineering Response and Analytical Services
Air Sampling Work Sheet

Lockheed Martin Corp., Edison, NJ
EPA Contract No. EP-W-09-031

Site: Baldwinsville Hg ER
WA#: 75-001
Sampler: Simonetti / DuBois
EPA/ERT WAM: SINGHUI
Date: 5/12/16
SERAS Task Leader: Solinski (DuBois)

Sample #	75-001-0016	-0017	-0018	-0019	-0020
Location	3244-A	3244-A CV	3244-B	-C	-D
Pump #	110	515	50	148	138
Media	Carulite	→	→	→	→
Analysis/Method	NIOSH 6009				
Date/Time/Count (Start)	0841	0841	0841	0843	0848
Date/Time/Count (Stop)					
Total Time	480	480	480	480	480
Rotameter/ Flow Meter	007962	→	→	→	→
Flow Rate (Start)	252	251	251	250	249
Flow Rate (Stop)	~~290~~ OK	290	289	292	292
Flow Rate (Average)					
Sample Volume					

MET Station on Site?: Y / (N)	Atmospheric Pressure (Local):	Ambient Sampling Temperature:

SKC 226-17-1A
LOT 8679
House temp 85°F

A- Kid's room
B- Master
C- LR
D- Hall from garage
E- Base

EPA/Environmental Response Team
Scientific Engineering Response and Analytical Services
Air Sampling Work Sheet

Lockheed Martin Corp., Edison, NJ
EPA Contract No. EP-W-09-031

Site: Baldwinsville Hg Response WA#: 75-001

Sampler: Simonetti / DuBois EPA/ERT WAM: SINGHVI

Date: 5/12/16 SERAS Task Leader: Solinski (DuBois)

Sample #	3244-E	-F	FIELD BLANK		
Location	75-001-0021	-0022	-0023		
Pump #	98	394	—		
Media	Carulite →				
Analysis/Method	NIOSH	6009 →			
Date/Time/Count (Start)	0850	0853	0900		
Date/Time/Count (Stop)			1700		
Total Time	480	480	—		
Rotameter/ Flow Meter	007962	007962	—		
Flow Rate (Start)	250	256	—		
Flow Rate (Stop)	272	290	—		
Flow Rate (Average)		270			
Sample Volume			0 (L)		

MET Station on Site?: Y / N	Atmospheric Pressure (Local):	Ambient Sampling Temperature:

APPENDIX D
Confidential Unit ID Key
Upstate NY Mercury Response
June 2016

Confidential Unit ID Key	
Unit Number	**Address**
Unit 3240	3240 Greenleafe
Unit 3244	3244 Greenleafe
Unit 3249	3249 Greenleafe

Appendix E

Validated Analytical Data Package: Post-Excavation Soil Samples

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region 2 Laboratory
2890 Woodbridge Avenue
Edison , New Jersey 08837
732-906-6886 Phone
732-906-6165 Fax

May 24, 2016

Smita Sumbaly
Weston Solutions Inc.
205 Campus Drive
Edison, NJ 08837

RE: Baldwinsville NY Res. HG RV - 1605047

Enclosed are the results of analyses for samples received by the laboratory on 05/23/2016. The signature below reflects the laboratory's approval of the reported results. If you have any questions concerning this report, please refer to Project Number 1605047 and contact the laboratory.

Sincerely,

John R. Bourbon
Chief, DESA/LB

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region 2 Laboratory

Final Report

Project: Baldwinsville NY Res. HG RV - 1605047

Project Number: 1605047

Project Narrative:

The National Environmental Laboratory Accreditation Conference Institute (TNI) is a voluntary environmental laboratory accreditation association of State and Federal agencies. TNI established and promoted a National Environmental Laboratory Accreditation Program (NELAP) that provides a uniform set of standards for the generation of environmental data that are of known and defensible quality. The EPA Region 2 Laboratory is NELAP accredited. The Laboratory tests that are accredited have met all the requirements established under the TNI Standards.

Condition Comments

None

Comment(s):

The "Sample Analysis Date and Time" is included in the results section for any analyte with a prescribed holding time of 72 hours or less.

Data Qualifier(s):

U- The analyte was not detected at or above the Reporting Limit.
J- The identification of the analyte is acceptable; the reported value is an estimate.
K- The identification of the analyte is acceptable; the reported value may be biased high.
L- The identification of the analyte is acceptable; the reported value may be biased low.
NJ- There is presumptive evidence that the analyte is present; the analyte is reported as a tentative identification. The reported value is an estimate.

Reporting Limit(s):

The Laboratory was able to achieve the appropriate limits for each analyte requested.

Final Report

Project: Baldwinsville NY Res. HG RV - 1605047

Project Number: 1605047

SUMMARY REPORT FOR SAMPLES

Field ID	Laboratory ID	Matrix	Date Sampled	Date Received
P001-SS005-160520-02	1605047-01	Solid	05/20/2016 15:50	05/23/2016 09:00
P001-SS005-160520-01	1605047-02	Solid	05/20/2016 15:50	05/23/2016 09:00
P001-SS006-160520-01	1605047-03	Solid	05/20/2016 15:53	05/23/2016 09:00
P002-SS001-160520-01	1605047-04	Solid	05/20/2016 14:00	05/23/2016 09:00
P002-SS002-160521-01	1605047-05	Solid	05/21/2016 15:55	05/23/2016 09:00
P002-SS003-160522-01	1605047-06	Solid	05/22/2016 10:25	05/23/2016 09:00

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region 2 Laboratory

Final Report

Project: Baldwinsville NY Res. HG RV - 1605047

Project Number: 1605047

SUMMARY REPORT FOR METHODS

Analysis	Method	Certification	Matrix
Mercury	EPA 245.1 SOP C-110 Rev2.4	NELAP	Solid

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region 2 Laboratory

Final Report

Project: Baldwinsville NY Res. HG RV - 1605047

Project Number: 1605047

Analyte	Result	Qualifier	Reporting Limit	Units	Date and Time of Analysis*
Field ID: P001-SS005-160520-02				Sample ID: 1605047-01	
Mercury CVAA					
Mercury	0.056		0.052	mg/kg dry	
Field ID: P001-SS005-160520-01				Sample ID: 1605047-02	
Mercury CVAA					
Mercury	0.064		0.052	mg/kg dry	
Field ID: P001-SS006-160520-01				Sample ID: 1605047-03	
Mercury CVAA					
Mercury	0.059		0.050	mg/kg dry	
Field ID: P002-SS001-160520-01				Sample ID: 1605047-04	
Mercury CVAA					
Mercury	0.074		0.049	mg/kg dry	
Field ID: P002-SS002-160521-01				Sample ID: 1605047-05	
Mercury CVAA					
Mercury	0.087		0.046	mg/kg dry	
Field ID: P002-SS003-160522-01				Sample ID: 1605047-06	
Mercury CVAA					
Mercury	---	U	0.050	mg/kg dry	

Appendix F

Waste Disposal Manifests

CERCLA OFF-SITE DISPOSAL REPORT

CONTRACT #: EP-S2-15-02

1. Superfund Site Name: Greenleafe Drive Mercury
   State: New York
   CERCLIS SSID Number: NYP000972729

2. Type of Action *(check two)*:
   ☒ Removal ☐ Fund-Financed
   ☐ Remedial ☐ PRP-Financed

3. Type *(check one)* and form *(check one)* of waste:
   *If more than one type attach separate sheets for this and remaining questions for each type.

Type:		**Form:**
☐ Solvents Dioxins / Furans	☐ Acids	☐ Wastewater Liquid Waste
☐ Cyanides Heavy Metals	☐ Metals *(Specify)*	☐ Organic Sludge *(greater than 1% solids)*
☐ Halogenated Organics	☐ PCBs	☐ Inorganic Sludge *(less than 1% total organic carbon)*
☐ Soil and Debris	☐ Waste *(Specify)*	☐ Contaminated Soil & Debris
☐ Other RCRA-Listed Hazardous Wastes		☒ Solid or Solidified Waste *(Specify)*
☒ Non-Hazardous or De-Listed Wastes		

4. Quantity of Waste:
   ☐ Cubic Yard (cy) ☒ Tons/Lbs ☐ Gallons (gal) ☐ Lab Packs ☐ Drums

5. Range, average, and/or representative concentrations of the contaminates of concern:

6. Pre-Treatment of waste before transportation:
   ☐ Precipitation ☐ Neutralization ☐ Solidification
   ☐ Fixation ☐ Stabilization ☐ Other *(Specify)*N/A

7. Receiving RCRA facility name: Senneca Meadows, Inc.
   Address: 1786 Salesman Road
   City, State Zip: Waterloo, NY 13165
   ID Number: 50508
   Units: 22.34 Tons

8. Receiving Region: 2

9. Receiving Region Off-Site Contact (RROC):
   Name: Beckett Grealish
   Date: 5/9/16

10. Date(s) of Shipments: 5/18/16
    Date Disposal Completed: 5/18/16
    Date facility signs manifest for receipt of final shipment: 6/13/16

11. Pre-Treatment of waste at site before final treatment or disposal:
    ☐ Precipitation ☐ Neutralization ☐ Solidification
    ☐ Fixation ☐ Stabilization ☐ Other *(Specify)*N/A

12. Final method of treatment or disposal:
    ☐ Precipitation ☐ Neutralization ☐ Incineration ☒ Landfill
    ☐ Land Treatment ☐ Injection ☐ Recovery/Re-Use ☐ Other *(Specify)*____

13. If waste was landfilled:
    What disposal cell number or location:
    Type of liner in cell: *(e.g. PVC, clay, hypalon)*

14. Cost of activities:
    Treatment/Disposal Cost Per Unit: $30.00 per Ton
    Treatment/Disposal Cost Per Unit:
    Total Cost Based on Treatment/Disposal Only *(no transportation cost)*: $670.20
    Transportation Cost Per Unit *(total cost for transportation only)*:

U.S. EPA Region 2 Off-Site Rule Request Form

Receiving Facility Information

Estimated Initial Shipping Date: 5-10-16
Estimated Shipping Completion Date: 6-30-16

Supporting Documentation Attached: ☐ Yes ☑ No

1.) Name of Facility Receiving CERCLA Waste
Seneca Meadows, Inc.

2.) Address of Facility
1786 Saleman Rd

3.) City
Waterloo

4.) County
Seneca

5.) State
New York

6.) Zip Code
13165

7.) EPA Facility I.D. (Hazardous Waste or Municipal Waste I.D.)
n/a

RCRA Info Webpage

Facility Type
Subtitle C ☐ Subtitle D ☑ Other ☐ _____

State Permit No.
NYS DEC Facility# 50508

8.) Any other pertinent I.D. numbers that may apply (License Numbers, etc.)

9.) Facility Phone Number
+1 (315) 539-5624

Contact Name

10.) Facility Fax Number (if available)

11.) Email Address

Generating Site Information

12.) Name of CERCLA Site
US EPA Region 2/ Greenleafe Drive Mercury Spill

13.) Address of CERCLA Site
3244 Greenleafe Drive

14.) City
Phoenix

15.) County
Onondaga

16.) State
New York

17.) Zip Code
01301

18.) CERCLA Site I.D.
n/a

19.) CERCLA Waste Median (e.g. Soil, Water, Air etc.)
Poly, PPE, debris/trash

Hazardous and/or Non-Hazardous (check all that apply)
RCRA Hazardous ☐ Non-Hazardous ☑

20.) CERCLA Waste Contaminates (e.g. tce, pcb, Mercury, Lead, etc.)
non-hazardous

21.) Amount of CERCLA Waste (e.g. Gallons, Pounds, Tons, etc.)
0-72 tons

22.) Person Making Request(s)/Affiliation & Phone Number
OSC--Cris D'Onofrio @ 908-420-4475
Amy Riggott
Environmental Restoration, LLC
860-778-4835

(Lotus Notes Users Select Submit via Desktop email Application)

776829

Seneca Meadows, Inc.
1786 Salcman Rd.
Waterloo, NY 13165
Ph: (315) 539-5624 Fax: (315) 539-3097

Ticket: 2823604
Date: 05/18/2016
Time: 11:14:04 - 12:01:26

Customer: 15CAP / CAPITOL ENVIROMEN
Carrier: 9999 / VARIOUS HAULERS
Profile: 2016-066-15CAP / 15CAP-2016-06
Cust Ref: 001
Gross: 74280LBS Manual
Tare: 48860LBS
Net: 25420LBS

Origin: 95 / OTSEGO
Truck: PAGE6655
Comment:

Wastes & Services	Quantity
SWCD1 / CONSTRUCT DEBRI	12.7100 Tons

Weighmaster: MARTI 450062

Driver:

776829

NON-HAZARDOUS WASTE MANIFEST	1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Waste Tracking Number
	NOT REQUIRED	1	888-814-7477	001

GENERATOR

5. Generator's Name and Mailing Address
US EPA Region 2- Greenleafe Dr. Mercury Site
2890 Woodbridge Ave., Edison, NJ 08837
Generator's Phone: (908) 4204475 Attn: Cris D'Onofrio

Generator's Site Address (if different than mailing address)
3244 Greenleafe Dr., Phoenix, NY 13135

6. Transporter 1 Company Name: Page ETC, Inc.
U.S. EPA ID Number: NYD 986 969 947

7. Transporter 2 Company Name
U.S. EPA ID Number

8. Designated Facility Name and Site Address
Seneca Meadows, Inc.
1786 Salcman Rd., Waterloo, NY 13165
Facility's Phone: (315)539-5624
U.S. EPA ID Number: NOT REQUIRED

	9. Waste Shipping Name and Description	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	
1.	Non DOT, Non RCRA Regulated Material (Asphalt Debris)	001	CM	20CY	T	
2.						
3.						
4.						

13. Special Handling Instructions and Additional Information

App# 16-066 Job# ROAN-SSCH

14. GENERATOR'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations.

Generator's/Offeror's Printed/Typed Name: Cris D'Onofrio (OSC R2) Signature: C. D'Onofrio Month 05 Day 18 Year 16

INT'L

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter Signature (for exports only): Date leaving U.S.:

TRANSPORTER

16. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: Jeff Williams Signature: Month 5 Day 18 Year 16

Transporter 2 Printed/Typed Name Signature Month Day Year

DESIGNATED FACILITY

17. Discrepancy

17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

17b. Alternate Facility (or Generator) U.S. EPA ID Number

Facility's Phone:

17c. Signature of Alternate Facility (or Generator) Month Day Year

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a

Printed/Typed Name Signature Month 5 Day 18 Year 16

169-BLC-O 6 10498 (Rev. 9/09)

DESIGNATED FACILITY TO GENERATOR

776830

Seneca Meadows, Inc.
1786 Salcman Rd.
Waterloo, NY 13165
Ph: (315) 539-5624 Fax: (315) 539-3097

Ticket: 2823858
Date: 05/18/2016
Time: 15:40:46 - 16:17:20

Customer: 15CAP / CAPITOL ENVIROMEN
Carrier: 9999 / VARIOUS HAULERS
Profile: 2016-066-15CAP / 15CAP-2016-06
Cust Ref: 002
Gross: 68060LBS
Tare: 48800LBS
Net: 19260LBS
Origin: 95 / OTSEGO
Truck: PAGE6655
Comment:

Wastes & Services	Quantity
SWCD1 / CONSTRUCT DEBRI	9.6300 Tons

Weighmaster: MORGAN 600822

Driver: _____

776830

NON-HAZARDOUS WASTE MANIFEST	1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Waste Tracking Number
	NOT REQUIRED	1	888-814-7477	002

GENERATOR

5. Generator's Name and Mailing Address
US EPA Region 2- Greenleafe Dr. Mercury Site
2890 Woodbridge Ave., Edison, NJ 08837
(908) 4204475 Attn: Cris D'Onofrio

Generator's Site Address (if different than mailing address)
3244 Greenleafe Dr., Phoenix, NY 13135

Generator's Phone:

6. Transporter 1 Company Name
Page ETC, Inc.

U.S. EPA ID Number
NYD 986 969 947

7. Transporter 2 Company Name

U.S. EPA ID Number

8. Designated Facility Name and Site Address
Seneca Meadows, Inc.
1786 Selcman Rd., Waterloo, NY 13165
(315)539-5624

U.S. EPA ID Number
NOT REQUIRED

Facility's Phone:

	9. Waste Shipping Name and Description	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	
1.	Non DOT, Non RCRA Regulated Material (Asphalt Debris)	001	CM	20CY	T	
2.						
3.						
4.						

13. Special Handling Instructions and Additional Information

App# 16-066 Job# ROAN-SSCH

14. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations.

Generator's/Offeror's Printed/Typed Name: Cris D'Onofrio (OSC) Signature: Month 05 Day 18 Year 16

INT'L

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter Signature (for exports only): Date leaving U.S.:

TRANSPORTER

16. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: Jeff Williams Signature: Month 5 Day 18 Year 16

Transporter 2 Printed/Typed Name: Signature: Month Day Year

DESIGNATED FACILITY

17. Discrepancy

17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

17b. Alternate Facility (or Generator) U.S. EPA ID Number

Facility's Phone:

17c. Signature of Alternate Facility (or Generator) Month Day Year

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a

Printed/Typed Name: Signature: Month 5 Day 18 Year 16

169-BLC-O 6 10498 (Rev. 9/09)

DESIGNATED FACILITY TO GENERATOR

CERTIFICATE OF RECEIPT FOR DISPOSAL

Generator Name: US EPA Reg.2–Greenleafe Drive Mercury Site
3244 Greenleafe Drive
Phoenix, NY 13135

This letter is a certificate acknowledging that the following material was received from the generator identified above:

Dates: **5/18/16**

Waste Material: **Asphalt Debris**

Quantity: **22.34 Tons**

This material was received and properly disposed of at the Seneca Meadows Landfill, 1786 Salcman Rd., Waterloo, NY 13165.

Signature of Authorized Representative

Date: 6/13/16

Printed Name of Authorized Representative

CERCLA OFF-SITE DISPOSAL REPORT

CONTRACT #: EP-S2-15-02

1. Superfund Site Name: Greenleafe Drive Mercury
   State: New York
   CERCLIS SSID Number: NYP000972729

2. Type of Action *(check two)*:
   ☒ Removal ☐ Fund-Financed
   ☐ Remedial ☐ PRP-Financed

3. Type *(check one)* and form *(check one)* of waste:
   *If more than one type attach separate sheets for this and remaining questions for each type.

Type:		**Form:**
☐ Solvents Dioxins / Furans	☐ Acids	☐ Wastewater Liquid Waste
☐ Cyanides Heavy Metals	☐ Metals *(Specify)*	☐ Organic Sludge *(greater than 1% solids)*
☐ Halogenated Organics	☐ PCBs	☐ Inorganic Sludge *(less than 1% total organic carbon)*
☐ Soil and Debris	☐ Waste *(Specify)*	☒ Contaminated Soil & Debris
☐ Other RCRA-Listed Hazardous Wastes		☐ Solid or Solidified Waste *(Specify)*
☒ Non-Hazardous or De-Listed Wastes		

4. Quantity of Waste:
   ☐ Cubic Yard (cy) ☒ Tons/Lbs ☐ Gallons (gal) ☐ Lab Packs ☐ Drums

5. Range, average, and/or representative concentrations of the contaminates of concern:

6. Pre-Treatment of waste before transportation:
   ☐ Precipitation ☐ Neutralization ☐ Solidification
   ☐ Fixation ☐ Stabilization ☐ Other *(Specify)*N/A

7. Receiving RCRA facility name: Senneca Meadows, Inc.
   Address: 1786 Salesman Road
   City, State Zip: Waterloo, NY 13165
   ID Number: 50508
   Units: 7.53

8. Receiving Region: 2

9. Receiving Region Off-Site Contact (RROC):
   Name: Beckett Grealish
   Date: 5/9/16

10. Date(s) of Shipments: 5/25/16, 5/26/16
    Date Disposal Completed: 5/26/16
    Date facility signs manifest for receipt of final shipment: 6/13/16

11. Pre-Treatment of waste at site before final treatment or disposal:
    ☐ Precipitation ☐ Neutralization ☐ Solidification
    ☐ Fixation ☐ Stabilization ☐ Other *(Specify)*N/A

12. Final method of treatment or disposal:
    ☐ Precipitation ☐ Neutralization ☐ Incineration ☒ Landfill
    ☐ Land Treatment ☐ Injection ☐ Recovery/Re-Use ☐ Other *(Specify)*

13. If waste was landfilled:
    What disposal cell number or location:
    Type of liner in cell: *(e.g. PVC, clay, hypalon)*

14. Cost of activities:
    Treatment/Disposal Cost Per Unit: $30.00 per ton
    Treatment/Disposal Cost Per Unit:
    Total Cost Based on Treatment/Disposal Only *(no transportation cost)*: $225.90
    Transportation Cost Per Unit *(total cost for transportation only)*:

U.S. EPA Region 2 Off-Site Rule Request Form

Receiving Facility Information

Estimated Initial Shipping Date: 5-10-16
Estimated Shipping Completion Date: 6-30-16

Supporting Documentation Attached: ☐ Yes ☑ No

1.) Name of Facility Receiving CERCLA Waste
Seneca Meadows, Inc.

2.) Address of Facility
1786 Saleman Rd

3.) City
Waterloo

4.) County
Seneca

5.) State
New York

6.) Zip Code
13165

7.) EPA Facility I.D. (Hazardous Waste or Municipal Waste I.D.)
n/a

RCRA Info Webpage

Facility Type
Subtitle C ☐ Subtitle D ☑ Other ☐ _____

State Permit No.
NYS DEC Facility# 50508

8.) Any other pertinent I.D. numbers that may apply (License Numbers, etc.)

9.) Facility Phone Number
+1 (315) 539-5624

Contact Name

10.) Facility Fax Number (if available)

11.) Email Address

Generating Site Information

12.) Name of CERCLA Site
US EPA Region 2/ Greenleafe Drive Mercury Spill

13.) Address of CERCLA Site
3244 Greenleafe Drive

14.) City
Phoenix

15.) County
Onondaga

16.) State
New York

17.) Zip Code
01301

18.) CERCLA Site I.D.
n/a

19.) CERCLA Waste Median (e.g. Soil, Water, Air etc.)
Poly, PPE, debris/trash

Hazardous and/or Non-Hazardous (check all that apply)
RCRA Hazardous ☐ Non-Hazardous ☑

20.) CERCLA Waste Contaminates (e.g. tce, pcb, Mercury, Lead, etc.)
non-hazardous

21.) Amount of CERCLA Waste (e.g. Gallons, Pounds, Tons, etc.)
0-72 tons

22.) Person Making Request(s)/Affiliation & Phone Number
OSC--Cris D'Onofrio @ 908-420-4475
Amy Riggott
Environmental Restoration, LLC
860-778-4835

(Lotus Notes Users Select Submit via Desktop email Application)

CAP#21

NON-HAZARDOUS WASTE MANIFEST	1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Waste Tracking Number
	NOT REQUIRED	1	888-814-7477	002

5. Generator's Name and Mailing Address
US EPA Region 2- Greenleafe Dr. Mercury Site
2890 Woodbridge Ave., Edison, NJ 08837
(908) 4204475 Attn: Cris D'Onofrio
Generator's Phone:

Generator's Site Address (if different than mailing address)
3244 Greenleafe Dr., Phoenix, NY 13135

6. Transporter 1 Company Name
Riccelli Trucking
U.S. EPA ID Number
NOT REQUIRED

7. Transporter 2 Company Name
U.S. EPA ID Number

8. Designated Facility Name and Site Address
Seneca Meadows, Inc.
1786 Salcman Rd., Waterloo, NY 13165
(315)539-5624
Facility's Phone:
U.S. EPA ID Number
NOT REQUIRED

	9. Waste Shipping Name and Description	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.
1.	Non DOT, Non RCRA Regulated Material ([redacted])	001	CM	15CY	T
2.	C&D Per Driver				
3.					
4.					

13. Special Handling Instructions and Additional Information

~~App# 18-000~~ Job# ROAN-SSCH

14. GENERATOR'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations.

Generator's/Offeror's Printed/Typed Name: Cris D'Onofrio OSC Region 2 | Signature: Cris [signature] | Month 5 Day 26 Year 16

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter Signature (for exports only): Date leaving U.S.:

16. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: Tim Sheard | Signature: Tim Sheard | Month 5 Day 26 Year 16

Transporter 2 Printed/Typed Name: Randy Flucker | Signature: Randy Flucker | Month 5 Day 27 Year 16

17. Discrepancy

17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

17b. Alternate Facility (or Generator) U.S. EPA ID Number

Facility's Phone:

17c. Signature of Alternate Facility (or Generator) Month Day Year

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a

Printed/Typed Name: [signature] | Signature: [signature] | Month Day Year

GENERATOR / INT'L / TRANSPORTER / DESIGNATED FACILITY

169-BLC-O 6 10498 (Rev. 9/09) DESIGNATED FACILITY TO GENERATOR

Seneca Meadows, Inc.
1786 Saleman Rd.
Waterloo, NY 13165
Ph: (315) 539-5624 Fax: (315) 539-3097

Ticket: 2827186
Date: 05/25/2016
Time: 08:10:02 - 08:43:55

Customer: 15CAP / CAPITOL ENVIROMEN
Carrier: 7318 / RICCELLI TRUCKING,
Profile: 2016-068-15CAP / 15CAP-2016-06
Cust Ref: BOX 3108

Origin: 92 / OSWEGO
Truck: RT18
Comment:

Gross: 40900LBS
Tare: 37700LBS
Net: 3200LBS

Wastes & Services	Quantity
ICS01 / CONTAMINAT SOIL	1.6000 Tons

Weighmaster: MORGAN 600822

Driver: _____

CERTIFICATE OF RECEIPT FOR DISPOSAL

Generator Name: US EPA Reg.2–Greenleafe Drive Mercury Site
3244 Greenleafe Drive
Phoenix, NY 13135

This letter is a certificate acknowledging that the following material was received from the generator identified above:

Date: **5/25/16**

Waste Material: **Soil**

Quantity: **5.93 Tons**

This material was received and properly disposed of at the Seneca Meadows Landfill, 1786 Salcman Rd., Waterloo, NY 13165.

Signature of Authorized Representative

Date: 6/13/16

Printed Name of Authorized Representative

Seneca Meadows, Inc.
1786 Salcman Rd.
Waterloo, NY 13165
Ph: (315) 539-5624 Fax: (315) 539-3097

Ticket: 2027580
Date: 05/25/2016
Time: 13:45:48 - 14:13:14

Customer: 15CAP / CAPITOL ENVIROMEN
Carrier: 7318 / RICCELLI TRUCKING,
Profile: 2016-060-15CAP / 15CAP-2016-06
Cust Ref: 001

Origin: 92 / OSWEGO
Truck: RT18
Comment: BOX 2036

Gross: 40160LBS
Tare: 36300LBS
Net: 11860LBS

Wastes & Services	Quantity
IC601 / CONTAMINAT SOIL	5.9300 Tons

Weighmaster: MORGAN 600822

Driver: 2

NON-HAZARDOUS WASTE MANIFEST	1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Waste Tracking Number
	NOT REQUIRED	1	888-814-7477	001

5. Generator's Name and Mailing Address
US EPA Region 2- Greenleafe Dr. Mercury Site
2890 Woodbridge Ave., Edison, NJ 08837
(908) 4204475 Attn: Cris D'Onofrio
Generator's Phone:

Generator's Site Address (if different than mailing address)
3244 Greenleafe Dr., Phoenix, NY 13135

6. Transporter 1 Company Name
Riccelli Trucking
U.S. EPA ID Number
NOT REQUIRED

7. Transporter 2 Company Name
U.S. EPA ID Number

8. Designated Facility Name and Site Address
Seneca Meadows, Inc.
1786 Salcman Rd., Waterloo, NY 13165
Facility's Phone: (315)539-5624
U.S. EPA ID Number
NOT REQUIRED

	9. Waste Shipping Name and Description	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	
1.	Non DOT, Non RCRA Regulated Material (Contaminated Soil)	001	CM	15CY	T	
2.						
3.						
4.						

13. Special Handling Instructions and Additional Information
App# 16-068
Job# ROAN-SSCH

14. GENERATOR'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations.

Generator's/Offeror's Printed/Typed Name: Cris D'Onofrio OSC Region 2 | Signature | Month 5 | Day 25 | Year 2016

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter Signature (for exports only): Date leaving U.S.:

16. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: JOE WELLS | Signature | Month 5 | Day 25 | Year 2016

Transporter 2 Printed/Typed Name | Signature | Month | Day | Year

17. Discrepancy

17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

17b. Alternate Facility (or Generator)
U.S. EPA ID Number
Facility's Phone:

17c. Signature of Alternate Facility (or Generator) | Month | Day | Year

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a

Printed/Typed Name | Signature | Month | Day | Year

GENERATOR — INT'L — TRANSPORTER — DESIGNATED FACILITY

CERCLA OFF-SITE DISPOSAL REPORT

CONTRACT #: EP-S2-15-02

1. Superfund Site Name: Greenleafe Drive Mercury
   State: New York
   CERCLIS SSID Number: NYP000972729

2. Type of Action *(check two)*:
   ☒ Removal ☐ Fund-Financed
   ☐ Remedial ☐ PRP-Financed

3. Type *(check one)* and form *(check one)* of waste:
   *If more than one type attach separate sheets for this and remaining questions for each type.

   Type:
   ☐ Solvents Dioxins / Furans
   ☐ Cyanides Heavy Metals
   ☐ Halogenated Organics
   ☐ Soil and Debris
   ☐ Other RCRA-Listed Hazardous Wastes
   ☒ Non-Hazardous or De-Listed Wastes
   ☐ Acids
   ☐ Metals *(Specify)*
   ☐ PCBs
   ☐ Waste *(Specify)*

   Form:
   ☐ Wastewater Liquid Waste
   ☐ Organic Sludge *(greater than 1% solids)*
   ☐ Inorganic Sludge *(less than 1% total organic carbon)*
   ☒ Contaminated Soil & Debris
   ☐ Solid or Solidified Waste *(Specify)*

4. Quantity of Waste:
   ☐ Cubic Yard (cy) ☒ Tons/Lbs ☐ Gallons (gal) ☐ Lab Packs ☐ Drums

5. Range, average, and/or representative concentrations of the contaminates of concern:

6. Pre-Treatment of waste before transportation:
   ☐ Precipitation ☐ Neutralization ☐ Solidification
   ☐ Fixation ☐ Stabilization ☐ Other *(Specify)*N/A

7. Receiving RCRA facility name: Senneca Meadows, Inc.
   Address: 1786 Salesman Road
   City, State Zip: Waterloo, NY 13165
   ID Number: 50508
   Units: 15.89 Tons

8. Receiving Region: 2

9. Receiving Region Off-Site Contact (RROC):
   Name: Beckett Grealish
   Date: 5/9/16

10. Date(s) of Shipments: 5/18/16, 5/19, 2-5/25/16,
    Date Disposal Completed: 5/25/16
    Date facility signs manifest for receipt of final shipment: 6/13/16

11. Pre-Treatment of waste at site before final treatment or disposal:
    ☐ Precipitation ☐ Neutralization ☐ Solidification
    ☐ Fixation ☐ Stabilization ☐ Other *(Specify)*N/A

12. Final method of treatment or disposal:
    ☐ Precipitation ☐ Neutralization ☐ Incineration ☒ Landfill
    ☐ Land Treatment ☐ Injection ☐ Recovery/Re-Use ☐ Other *(Specify)*

13. If waste was landfilled:
    What disposal cell number or location:
    Type of liner in cell: *(e.g. PVC, clay, hypalon)*

14. Cost of activities:
    Treatment/Disposal Cost Per Unit: $30.00 per ton
    Treatment/Disposal Cost Per Unit:
    Total Cost Based on Treatment/Disposal Only *(no transportation cost)*: $476.70
    Transportation Cost Per Unit *(total cost for transportation only)*:

U.S. EPA Region 2 Off-Site Rule Request Form

Receiving Facility Information

Estimated Initial Shipping Date: 5-10-16
Estimated Shipping Completion Date: 6-30-16

Supporting Documentation Attached: ☐ Yes ☑ No

1.) Name of Facility Receiving CERCLA Waste
Seneca Meadows, Inc.

2.) Address of Facility
1786 Saleman Rd

3.) City
Waterloo

4.) County
Seneca

5.) State
New York

6.) Zip Code
13165

7.) EPA Facility I.D. (Hazardous Waste or Municipal Waste I.D.)
n/a

RCRA Info Webpage

Facility Type
Subtitle C ☐ Subtitle D ☑ Other ☐ _____

State Permit No.
NYS DEC Facility# 50508

8.) Any other pertinent I.D. numbers that may apply (License Numbers, etc.)

9.) Facility Phone Number
+1 (315) 539-5624

Contact Name

10.) Facility Fax Number (if available)

11.) Email Address

Generating Site Information

12.) Name of CERCLA Site
US EPA Region 2/ Greenleafe Drive Mercury Spill

13.) Address of CERCLA Site
3244 Greenleafe Drive

14.) City
Phoenix

15.) County
Onondaga

16.) State
New York

17.) Zip Code
01301

18.) CERCLA Site I.D.
n/a

19.) CERCLA Waste Median (e.g. Soil, Water, Air etc.)
Poly, PPE, debris/trash

Hazardous and/or Non-Hazardous (check all that apply)
RCRA Hazardous ☐ Non-Hazardous ☑

20.) CERCLA Waste Contaminates (e.g. tce, pcb, Mercury, Lead, etc.)
non-hazardous

21.) Amount of CERCLA Waste (e.g. Gallons, Pounds, Tons, etc.)
0-72 tons

22.) Person Making Request(s)/Affiliation & Phone Number
OSC--Cris D'Onofrio @ 908-420-4475
Amy Riggott
Environmental Restoration, LLC
860-778-4835

(Lotus Notes Users Select Submit via Desktop email Application)

CERTIFICATE OF RECEIPT FOR DISPOSAL

Generator Name: US EPA Reg.2–Greenleafe Drive Mercury Site
3244 Greenleafe Drive
Phoenix, NY 13135

This letter is a certificate acknowledging that the following material was received from the generator identified above:

Dates: **5/18 & 5/19/16**

Waste Material: **Household Debris**

Quantity: **5.75 Tons**

This material was received and properly disposed of at the Seneca Meadows Landfill, 1786 Salcman Rd., Waterloo, NY 13165.

R. LaRocca
Signature of Authorized Representative

Date: 6/13/16

R. LaRocca
Printed Name of Authorized Representative

Seneca Meadows, Inc.
1786 Salcman Rd.
Waterloo, NY 13165
Ph: (315) 539-5624 Fax: (315) 539-3097

Ticket: 2823036
Date: 05/18/2016
Time: 15:29:26 - 15:48:23

Customer: 15CAP / CAPITOL ENVIROMEN
Carrier: 9999 / VARIOUS HAULERS
Profile: 2016-065-15CAP / 15CAP-2016-06
Cust Ref: 001

Origin: 92 / OSWEGO
Truck: RT18
Comment: BOX 3277

Gross: 43000LBS
Tare: 37880LBS
Net: 5120LBS

Wastes & Services	Quantity
SWCD1 / CONSTRUCT DEBRI	2.5600 Tons

Weighmaster: MORGAN 600822

Driver: _____

NON-HAZARDOUS WASTE MANIFEST

1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Waste Tracking Number
NOT REQUIRED	1	888-814-7477	001

GENERATOR

5. Generator's Name and Mailing Address
US EPA Region 2- Greenleafe Dr. Mercury Site
2890 Woodbridge Ave., Edison, NJ 08837
(908) 4204475 Attn: Cris D'Onofrio
Generator's Phone:

Generator's Site Address (if different than mailing address)
3244 Greenleafe Dr., Phoenix, NY 13135

6. Transporter 1 Company Name
Riccelli Trucking
U.S. EPA ID Number: NOT REQUIRED

7. Transporter 2 Company Name
U.S. EPA ID Number:

8. Designated Facility Name and Site Address
Seneca Meadows, Inc.
1786 Salcman Rd., Waterloo, NY 13165
(315)539-5624
Facility's Phone:
U.S. EPA ID Number: NOT REQUIRED

	9. Waste Shipping Name and Description	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	
1.	Non DOT, Non RCRA Regulated Material (Household Debris)	001	CM	30YDS	T	
2.						
3.						
4.						

13. Special Handling Instructions and Additional Information
App# 16-065
Job# ROAN-SSCH

14. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations.

Generator's/Offeror's Printed/Typed Name: Cris D'Onofrio, DSC
Signature:
Month: 05 Day: 18 Year: 16

INT'L

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter Signature (for exports only): Date leaving U.S.:

TRANSPORTER

16. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: JOE WELLS
Signature: Joe Wells
Month: 5 Day: 18 Year: 16

Transporter 2 Printed/Typed Name:
Signature:
Month: Day: Year:

DESIGNATED FACILITY

17. Discrepancy

17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

17b. Alternate Facility (or Generator)
U.S. EPA ID Number:
Facility's Phone:

17c. Signature of Alternate Facility (or Generator)
Month: Day: Year:

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a

Printed/Typed Name:
Signature:
Month: 5 Day: 18 Year: 16

Seneca Meadows, Inc.
1786 Salcman Rd.
Waterloo, NY 13165
Ph: (315) 539-5624 Fax: (315) 539-3097

Ticket: 2824137
Date: 05/19/2016
Time: 08:56:08 - 09:33:04

Customer: 15CAP / CAPITOL ENVIROMEN

Carrier: 9999 / VARIOUS HAULERS
Profile: 2016-065-15CAP / 15CAP-2016-06
Cust Ref: 002

Origin: 92 / OSWEGO
Truck: RT18
Comment: TRL 3282

Gross: 43720LBS
Tare: 37340LBS
Net: 6380LBS

Wastes & Services	Quantity
SWCD1 / CONSTRUCT DEBRI	3.1900 Tons

Weighmaster: MORGAN 000622

Driver:

NON-HAZARDOUS WASTE MANIFEST

1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Waste Tracking Number
NOT REQUIRED	1	888-814-7477	002

GENERATOR

5. Generator's Name and Mailing Address
US EPA Region 2- Greenleafe Dr. Mercury Site
2890 Woodbridge Ave., Edison, NJ 08837
(908) 4204475 Attn: Cris D'Onofrio
Generator's Phone:

Generator's Site Address (if different than mailing address)
3244 Greenleafe Dr., Phoenix, NY 13135

6. Transporter 1 Company Name
Riccelli Trucking
U.S. EPA ID Number: NOT REQUIRED

7. Transporter 2 Company Name
U.S. EPA ID Number:

8. Designated Facility Name and Site Address
Seneca Meadows, Inc.
1786 Salcman Rd., Waterloo, NY 13165
Facility's Phone: (315)539-5624
U.S. EPA ID Number: NOT REQUIRED

	9. Waste Shipping Name and Description	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	
1.	Non DOT, Non RCRA Regulated Material (Household Debris)	001	CM	30CY	T	
2.						
3.						
4.						

13. Special Handling Instructions and Additional Information

App# 16-085 Job# ROAN-SSCH

14. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations.

Generator's/Offeror's Printed/Typed Name: Cris D'Onofrio, OSC
Signature:
Month: 5 Day: 15 Year: 16

INT'L

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter Signature (for exports only): Date leaving U.S.:

TRANSPORTER

16. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: Joe Wells
Signature:
Month: 5 Day: 19 Year: 16
Transporter 2 Printed/Typed Name:
Signature:
Month: Day: Year:

DESIGNATED FACILITY

17. Discrepancy
17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
17b. Alternate Facility (or Generator)
U.S. EPA ID Number:
Facility's Phone:
17c. Signature of Alternate Facility (or Generator)
Month: Day: Year:

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a
Printed/Typed Name:
Signature:
Month: Day: Year: 5 19 16

169-BLC-O 6 10498 (Rev. 9/09)

DESIGNATED FACILITY TO GENERATOR

CERTIFICATE OF RECEIPT FOR DISPOSAL

Generator Name: US EPA Reg.2–Greenleafe Drive Mercury Site
3244 Greenleafe Drive
Phoenix, NY 13135

This letter is a certificate acknowledging that the following material was received from the generator identified above:

Date: **5/25/16**

Waste Material: **Household Debris**

Quantity: **2.36 Tons**

This material was received and properly disposed of at the Seneca Meadows Landfill, 1786 Salcman Rd., Waterloo, NY 13165.

Signature of Authorized Representative

Date: 6/13/16

Printed Name of Authorized Representative

Seneca Meadows, Inc.
1786 Salcman Rd.
Waterloo, NY 13165
Ph: (315) 539-5624 Fax: (315) 539-3097

******* Reprint Ticket *******

Ticket: 2827468
Date: 05/25/2016
Time: 12:06:54 - 12:26:11

Customer: 15CAP / CAPITOL ENVIROMEN
Carrier: 7318 / RICCELLI TRUCKING,
Profile: 2016-065-15CAP / 15CAP-2016-06
Cust Ref: 003
Gross: 39580LBS
Tare: 38060LBS
Net: 1520LBS

Origin: 92 / OSWEGO
Truck: RT19
Comment: BOX 3038

Wastes & Services	Quantity
SWCD1 / CONSTRUCT DEBRI	0.7600 Tons

Weighmaster: KRISTY

Driver: _____

NON-HAZARDOUS WASTE MANIFEST	1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Waste Tracking Number
	NOT REQUIRED	1	866-814-7477	004 003 CC

5. Generator's Name and Mailing Address
US EPA Region 2- Greenleafe Dr. Mercury Site
2890 Woodbridge Ave., Edison, NJ 08837
(908) 4204475 Attn: Cris D'Onofrio
Generator's Phone:

Generator's Site Address (if different than mailing address)
3244 Greenleafe Dr., Phoenix, NY 13135

6. Transporter 1 Company Name
Riccelli Trucking
U.S. EPA ID Number
NOT REQUIRED

7. Transporter 2 Company Name
U.S. EPA ID Number

8. Designated Facility Name and Site Address
Seneca Meadows, Inc.
1786 Salcman Rd., Waterloo, NY 13165
(315)539-5624
Facility's Phone:
U.S. EPA ID Number
NOT REQUIRED

	9. Waste Shipping Name and Description	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	
1.	Non DOT, Non RCRA Regulated Material (Household Debris)	001	CM	30CY	T	
2.						
3.						
4.						

13. Special Handling Instructions and Additional Information
App# 16-065
Job# ROAN-SSCH

14. GENERATOR'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations.
Generator's/Offeror's Printed/Typed Name: Cris D'Onofrio OSC Region 2
Signature:
Month: 05 Day: 25 Year: 16

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter Signature (for exports only): Date leaving U.S.:

16. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: Tom Sheward
Signature:
Month: 05 Day: 25 Year: 16
Transporter 2 Printed/Typed Name
Signature
Month: Day: Year:

17. Discrepancy
17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
17b. Alternate Facility (or Generator)
U.S. EPA ID Number
Facility's Phone:
17c. Signature of Alternate Facility (or Generator)
Month: Day: Year:

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a
Printed/Typed Name
Signature
Month: Day: Year: 5/26/16

GENERATOR — INT'L — TRANSPORTER — DESIGNATED FACILITY

NON-HAZARDOUS WASTE MANIFEST	1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Waste Tracking Number
	NOT REQUIRED	1	888-814-7477	

GENERATOR

5. Generator's Name and Mailing Address
US EPA Region 2- Greenleafe Dr. Mercury Site
2890 Woodbridge Ave., Edison, NJ 08837
Generator's Phone: (908) 4204475 Attn: Cris D'Onofrio

Generator's Site Address (if different than mailing address)
3244 Greenleafe Dr., Phoenix, NY 13135

6. Transporter 1 Company Name
Riccelli Trucking
U.S. EPA ID Number: NOT REQUIRED

7. Transporter 2 Company Name
U.S. EPA ID Number:

8. Designated Facility Name and Site Address
Seneca Meadows, Inc.
1786 Salcman Rd., Waterloo, NY 13165
Facility's Phone: (315)539-5624
U.S. EPA ID Number: NOT REQUIRED

	9. Waste Shipping Name and Description	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	
1.	Non DOT, Non RCRA Regulated Material (Household Debris)	001	CM	30CY	T	
2.						
3.						
4.						

13. Special Handling Instructions and Additional Information
App# 16-085
Job# ROAN-SSCH

14. GENERATOR'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations.
Generator's/Offeror's Printed/Typed Name: Cris D'Onofrio OSC Region 2 Signature: Month 05 Day 25 Year 16

INT'L

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter Signature (for exports only): Date leaving U.S.:

TRANSPORTER

16. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: JOSEPH WELLS Signature: Joe Wells Month 5 Day 25 Year 16
Transporter 2 Printed/Typed Name: Signature: Month Day Year

DESIGNATED FACILITY

17. Discrepancy
17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
17b. Alternate Facility (or Generator) U.S. EPA ID Number
Facility's Phone:
17c. Signature of Alternate Facility (or Generator) Month Day Year

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a
Printed/Typed Name: Signature: Month 5 Day 26 Year 16

169-BLC-O 6 10498 (Rev. 9/09)

DESIGNATED FACILITY TO GENERATOR

CERTIFICATE OF RECEIPT FOR DISPOSAL

Generator Name: US EPA Reg.2–Greenleafe Drive Mercury Site
3244 Greenleafe Drive
Phoenix, NY 13135

This letter is a certificate acknowledging that the following material was received from the generator identified above:

Date: **5/27/16**

Waste Material: **Household Debris**

Quantity: **3.70 Tons**

This material was received and properly disposed of at the Seneca Meadows Landfill, 1786 Salcman Rd., Waterloo, NY 13165.

Signature of Authorized Representative

Date: 6/24/16

R. LaRocca

Printed Name of Authorized Representative

Seneca Meadows, Inc.
1786 Salcman Rd.
Waterloo, NY 13165
Ph: (315) 539-5624 Fax: (315) 539-3097

Ticket: 2820677
Date: 05/27/2016
Time: 09:53:15 - 10:14:46

Customer: 15CAP / CAPITOL ENVIROMEN
Carrier: 9999 / VARIOUS HAULERS
Profile: 2016-065-15CAP / 15CAP-2016-06
Cust Ref: 002

Origin: 92 / OSWEGO
Truck: RT28
Comment:

Gross: 40900LBS
Tare: 33500LBS
Net: 7400LBS

Wastes & Services	Quantity
SWCD1 / CONSTRUCT DEBRI	3.7000 Tons

Weighmasters: MORGAN 600022

Driver:

233164

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Manifest Tracking Number
NYP000972729	1	800-535-5053	010911372 JJK

GENERATOR

5. Generator's Name and Mailing Address

US EPA REGION 2 - GREENLEAFE DR MERCURY SPILL
3244 GREENLEAFE DR.
PHOENIX NY 13135 USA

Generator's Phone: 908-420-4476

Generator's Site Address (if different than mailing address)

6. Transporter 1 Company Name: AERC.COM, INC.

U.S. EPA ID Number: PAD987367216

7. Transporter 2 Company Name

U.S. EPA ID Number

8. Designated Facility Name and Site Address

AERC.COM, INC.
2691 MITCHELL AVE
ALLENTOWN, PA 18103 USA

U.S. EPA ID Number: PAD987367216

Facility's Phone: 610-797-7608

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes
X	1. NA3077, HAZARDOUS WASTE SOLID, NOS (MERCURY) 9, PGIII (ERG#171)	1	DF	5	P	D009
	2.					
	3.					
	4.					

14. Special Handling Instructions and Additional Information

9b1. MERCURY DEBRIS (DEBRIS FROM MERCURY SPILL CLEAN UP KIT)

AERC PT# 233164

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: X Chris D'Onofrio OSC Region 2 | Signature | Month: 5 | Day: 26 | Year: 16

INT'L

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:

Transporter signature (for exports only): Date leaving U.S.:

TRANSPORTER

17. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: X Raunwood | Signature | Month: 5 | Day: 26 | Year: 16

Transporter 2 Printed/Typed Name | Signature | Month | Day | Year

DESIGNATED FACILITY

18. Discrepancy

18a. Discrepancy Indication Space ☒ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

ACTUAL WEIGHT FOR LINE ITEM 1 IS 15 POUNDS

Manifest Reference Number:

18b. Alternate Facility (or Generator) | U.S. EPA ID Number

Facility's Phone:

18c. Signature of Alternate Facility (or Generator) | Month | Day | Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)

1.	2.	3.	4.
H010			

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a

Printed/Typed Name: Joshua Casado | Signature | Month: 5 | Day: 31 | Year: 16

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

D21965

DESIGNATED FACILITY TO GENERATOR

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number: NYP000972729
2. Page 1 of 1
3. Emergency Response Phone: 800-535-6053
4. Manifest Tracking Number: 010911407 JJK

5. Generator's Name and Mailing Address
US EPA REGION 2 - GREENLEAFE DR MERCURY SPILL
3244 GREENLEAFE DR
PHOENIX, NY 13135 USA
Generator's Phone: 908-420-4475

Generator's Site Address (if different than mailing address)

6. Transporter 1 Company Name: AERC COM, INC
U.S. EPA ID Number: PAD987367216

7. Transporter 2 Company Name:
U.S. EPA ID Number:

8. Designated Facility Name and Site Address
AERC COM, INC
2591 MITCHELL AVE
ALLENTOWN, PA 18103 USA
Facility's Phone: 610-797-7608
U.S. EPA ID Number: PAD987367216

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes
X	1. NA3082, HAZARDOUS WASTE LIQUID, NOS, (MERCURY), 9, PGII, ERG#171	1	DF	2	P	D009
	2.					
	3.					
	4.					

14. Special Handling Instructions and Additional Information
9b1 LIQUID (ELEMENTAL) MERCURY - FOR RECYCLING
AERC PT# 235421

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: X Cris ONOFRIO (OSC - USEPA R2)
Signature: [signature]
Month 8 Day 29 Year 16

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

17. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: X Raun Wood
Signature: Raun Wood
Month 8 Day 29 Year 16

Transporter 2 Printed/Typed Name:
Signature:
Month Day Year

18. Discrepancy
18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:

18b. Alternate Facility (or Generator)
U.S. EPA ID Number
Facility's Phone:

18c. Signature of Alternate Facility (or Generator)
Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)
1. 2. 3. 4.

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a
Printed/Typed Name
Signature
Month Day Year

GENERATOR | INT'L | TRANSPORTER | DESIGNATED FACILITY

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

GENERATOR'S INITIAL COPY

Appendix G

Lumex Screening Results Summary Table

Appendix G: Lumex Screening Results Summary Table
Greenleafe Drive Mercury Response Site
Baldwinsville, Onondaga County, New York

Serial Number	Property Number	Land Use	Date	Time	Screeining-1	Screeining-2	Screeining-3	Average Screening Result	R	Minimum	Maximum	Units	Location	Floor	Floor Cover	Height	Item Type	Description	Temperature (˚F)
616	Property 4	Residential	4/9/2016	19:38	6	8	7	<10	NR	NR	NR	ng/m3	Stairwell-Downstairs	NR	NR	NR	NR	Stairs, ground level, floor	NR
616	Property 4	Residential	4/9/2016	19:48	9	10	9	<10	NR	NR	NR	ng/m3	Living Room	NR	NR	NR	NR	TV room, floor	NR
616	Property 3	Residential	4/9/2016	18:08	3279	3423	4080	3594	22	NR	NR	ng/m3	Stairwell-Downstairs	NR	NR	NR	NR	Ground level, stairs, floor (repeat)	NR
616	Property 3	Residential	4/9/2016	17:30	5399	2326	2089	3271	101	NR	NR	ng/m3	Kitchen	NR	NR	NR	NR	Kitchen, floor (repeat)	NR
616	Property 3	Residential	4/9/2016	18:07	3003	2589	3552	3048	31	NR	NR	ng/m3	Stairwell-Downstairs	NR	NR	NR	NR	Ground level, stairs, floor	NR
616	Property 3	Residential	4/9/2016	17:29	2832	3968	2186	2995	59	NR	NR	ng/m3	Kitchen	NR	NR	NR	NR	Kitchen, floor	NR
616	Property 3	Residential	4/9/2016	18:11	2903	2944	2983	2943	2	NR	NR	ng/m3	Bedroom-Son (12)	NR	NR	NR	NR	Bedroom, son (12), hamper	NR
616	Property 1	Residential	4/9/2016	15:46	1777	4169	2812	2919	81	NR	NR	ng/m3	Garage	1	NR	NR	NR	Garage, middle area, floor	NR
616	Property 3	Residential	4/9/2016	17:42	2358	2516	2622	2499	10	NR	NR	ng/m3	Bathroom-Downstairs	NR	NR	NR	NR	Ground level bathroom, floor (repeat)	NR
616	Property 3	Residential	4/9/2016	17:32	2431	2800	2162	2464	25	NR	NR	ng/m3	Kitchen	NR	NR	NR	NR	Kitchen, floor (repeat)	NR
616	Property 3	Residential	4/9/2016	17:49	2403	2482	2392	2426	6	NR	NR	ng/m3	Bedroom-Son (12)	NR	NR	NR	NR	Bedroom, son (12), floor	NR
616	Property 1	Residential	4/9/2016	13:59	2009	1903	3090	2334	50	NR	NR	ng/m3	Stairwell-Upstairs	2	NR	NR	NR	Upstairs stairwell, floor	NR
616	Property 3	Residential	4/9/2016	18:09	2306	2309	2365	2327	2	NR	NR	ng/m3	Stairwell-Downstairs	NR	NR	NR	NR	Ground level, stairs, ceiling	NR
616	Property 3	Residential	4/9/2016	17:41	1889	2462	2580	2310	29	NR	NR	ng/m3	Bathroom-Downstairs	NR	NR	NR	NR	Ground level bathroom, floor	NR
616	Property 1	Residential	4/9/2016	14:41	2282	2262	2264	2270	0	NR	NR	ng/m3	Hallway-Upstairs	2	NR	NR	NR	Upstairs hall closet, closet	NR
616	Property 3	Residential	4/9/2016	17:35	1816	3179	1808	2268	60	NR	NR	ng/m3	Office	NR	NR	NR	NR	Office floor	NR
616	Property 1	Residential	4/9/2016	13:56	2200	2274	2297	2257	4	NR	NR	ng/m3	Bathroom-Upstairs	2	NR	NR	NR	Upstairs bathroom, ceiling	NR
616	Property 1	Residential	4/9/2016	14:32	2243	2192	2253	2229	2	NR	NR	ng/m3	Bedroom-Master	2	NR	NR	NR	Bedroom, master, bathroom, floor	NR
616	Property 3	Residential	4/9/2016	17:49	2231	2235	2209	2225	1	NR	NR	ng/m3	Bedroom-Son (12)	NR	NR	NR	NR	Bedroom, son (12), ceiling	NR
616	Property 1	Residential	4/9/2016	13:55	1944	2201	2323	2156	17	NR	NR	ng/m3	Bathroom-Upstairs	2	NR	NR	NR	Upstairs bathroom, floor	NR
616	Property 1	Residential	4/9/2016	14:37	2108	2111	2097	2105	0	NR	NR	ng/m3	Bedroom-Master	2	NR	NR	NR	Bedroom, master, bathroom, ceiling	NR
616	Property 1	Residential	4/9/2016	14:38	2094	2091	2074	2086	0	NR	NR	ng/m3	Bedroom-Master	2	NR	NR	NR	Bedroom, master, bathroom, ceiling (repeat)	NR
616	Property 3	Residential	4/9/2016	17:43	2065	2102	2087	2085	1	NR	NR	ng/m3	Bathroom-Downstairs	NR	NR	NR	NR	Ground level bathroom, ceiling	NR
616	Property 1	Residential	4/9/2016	19:05	2135	1936	2096	2056	9	NR	NR	ng/m3	Stairwell-Upstairs	2	NR	NR	NR	Top of stairs, floor	NR
616	Property 1	Residential	4/9/2016	13:59	2168	1869	2079	2038	14	NR	NR	ng/m3	Stairwell-Upstairs	2	NR	NR	NR	Upstairs stairwell, floor (repeat)	NR
616	Property 3	Residential	4/9/2016	17:33	2058	2021	2009	2029	2	NR	NR	ng/m3	Kitchen	NR	NR	NR	NR	Kitchen, ceiling	NR
616	Property 1	Residential	4/9/2016	19:12	1981	2016	2050	2016	3	NR	NR	ng/m3	Bathroom-Upstairs	2	NR	NR	NR	Upstairs hall bathroom, ceiling	NR
616	Property 3	Residential	4/9/2016	18:04	1983	2013	2027	2008	2	NR	NR	ng/m3	Hallway-Upstairs	NR	NR	NR	NR	Upstairs hall closet, ceiling	NR
616	Property 3	Residential	4/9/2016	17:50	1976	2076	1964	2005	5	NR	NR	ng/m3	Bathroom-Upstairs	NR	NR	NR	NR	Upstairs bathroom, floor	NR
616	Property 1	Residential	4/9/2016	19:12	1954	2033	2027	2005	3	NR	NR	ng/m3	Bathroom-Upstairs	2	NR	NR	NR	Upstairs hall bathroom, floor	NR
616	Property 3	Residential	4/9/2016	17:37	2327	1953	1711	1997	30	NR	NR	ng/m3	Office	NR	NR	NR	NR	Office floor (repeat)	NR
616	Property 3	Residential	4/9/2016	17:56	1973	1981	2007	1987	1	NR	NR	ng/m3	Stairwell-Upstairs	NR	NR	NR	NR	Upstairs stairs, ceiling	NR
616	Property 3	Residential	4/9/2016	17:26	1947	1985	1965	1965	1	NR	NR	ng/m3	Living Room	NR	NR	NR	NR	TV room, floor	NR
616	Property 1	Residential	4/9/2016	14:16	1975	1934	1982	1964	2	NR	NR	ng/m3	Bedroom-Master	2	NR	NR	NR	Bedroom, master, floor	NR
616	Property 1	Residential	4/9/2016	14:19	1964	1951	1950	1955	0	NR	NR	ng/m3	Bedroom-Master	2	NR	NR	NR	Bedroom, master, ceiling (repeat)	NR
616	Property 1	Residential	4/9/2016	14:17	1946	1954	1955	1951	0	NR	NR	ng/m3	Bedroom-Master	2	NR	NR	NR	Bedroom, master, ceiling	NR
616	Property 1	Residential	4/9/2016	14:00	1909	1974	1855	1912	6	NR	NR	ng/m3	Stairwell-Upstairs	2	NR	NR	NR	Upstairs stairwell, ceiling	NR
616	Property 1	Residential	4/9/2016	14:03	1791	1915	1981	1896	10	NR	NR	ng/m3	Bedroom-Son	2	NR	NR	NR	Bedroom, son, entrance to room, ceiling	NR
616	Property 1	Residential	4/9/2016	14:06	1818	1946	1907	1890	6	NR	NR	ng/m3	Bedroom-Son	2	NR	NR	NR	Bedroom, son, floor, clothes pile, floor	NR
616	Property 3	Residential	4/9/2016	17:58	1827	1900	1939	1889	5	NR	NR	ng/m3	Bedroom-Spare	NR	NR	NR	NR	Bedroom, spare, floor	NR
616	Property 1	Residential	4/9/2016	14:22	1895	1896	1869	1886	1	NR	NR	ng/m3	Bedroom-Master	2	NR	NR	NR	Bedroom, master, closet, ceiling	NR
616	Property 3	Residential	4/9/2016	17:27	1880	1877	1900	1885	1	NR	NR	ng/m3	Living Room	NR	NR	NR	NR	TV room, ceiling	NR
616	Property 3	Residential	4/9/2016	17:59	1878	1874	1904	1885	1	NR	NR	ng/m3	Bedroom-Spare	NR	NR	NR	NR	Bedroom, spare, ceiling	NR
616	Property 1	Residential	4/9/2016	14:11	1913	1869	1870	1884	2	NR	NR	ng/m3	Bedroom-Son	2	NR	NR	NR	Bedroom, son, ceiling, back corner (repeat)	NR
616	Property 1	Residential	4/9/2016	14:21	1971	1843	1805	1873	8	NR	NR	ng/m3	Bedroom-Master	2	NR	NR	NR	Bedroom, master, closet, floor	NR
616	Property 3	Residential	4/9/2016	17:40	1898	1869	1851	1873	2	NR	NR	ng/m3	Bathroom-Downstairs	NR	NR	NR	NR	Dining room, ceiling	NR
616	Property 1	Residential	4/9/2016	14:08	1825	1881	1881	1862	3	NR	NR	ng/m3	Bedroom-Son	2	NR	NR	NR	Bedroom, son, floor, clothes pile, ceilng	NR
616	Property 3	Residential	4/9/2016	17:53	1825	1865	1876	1855	2	NR	NR	ng/m3	Bedroom-Son (17)	NR	NR	NR	NR	Bedroom, son (17), floor	NR
616	Property 1	Residential	4/9/2016	14:14	1787	1893	1883	1854	5	NR	NR	ng/m3	Bedroom-Son	2	NR	NR	NR	Bedroom, son, closet, ceiling	NR
616	Property 1	Residential	4/9/2016	14:10	1854	1849	1854	1852	0	NR	NR	ng/m3	Bedroom-Son	2	NR	NR	NR	Bedroom, son, ceiling, back corner	NR
616	Property 1	Residential	4/9/2016	14:09	1851	1823	1838	1837	1	NR	NR	ng/m3	Bedroom-Son	2	NR	NR	NR	Bedroom, son, floor, back corner	NR
616	Property 3	Residential	4/9/2016	17:52	1843	1813	1805	1820	2	NR	NR	ng/m3	Bathroom-Upstairs	NR	NR	NR	NR	Upstairs bathroom, ceiling	NR
616	Property 1	Residential	4/9/2016	19:19	1807	1810	1834	1817	1	NR	NR	ng/m3	Bedroom-Son	2	NR	NR	NR	Bedroom, son, floor	NR
616	Property 3	Residential	4/9/2016	17:54	1793	1790	1814	1799	1	NR	NR	ng/m3	Bedroom-Son (17)	NR	NR	NR	NR	Bedroom, son (17), ceiling	NR
616	Property 1	Residential	4/9/2016	14:40	1755	1784	1837	1792	4	NR	NR	ng/m3	Hallway-Upstairs	2	NR	NR	NR	Upstairs hall closet, floor	NR
616	Property 1	Residential	4/9/2016	14:02	1808	1791	1752	1784	3	NR	NR	ng/m3	Bedroom-Son	2	NR	NR	NR	Bedroom, son, entrance to room	NR
616	Property 3	Residential	4/9/2016	18:01	1752	1779	1802	1778	2	NR	NR	ng/m3	Bedroom-Master	NR	NR	NR	NR	Bedroom, master, ceiling	NR
616	Property 1	Residential	4/9/2016	19:20	1767	1779	1775	1774	0	NR	NR	ng/m3	Bedroom-Son	2	NR	NR	NR	Bedroom, son, ceiling	NR
616	Property 3	Residential	4/9/2016	17:39	1782	1770	1763	1772	1	NR	NR	ng/m3	Office	NR	NR	NR	NR	Office ceiling	NR
616	Property 3	Residential	4/9/2016	17:34	1969	1657	1675	1767	17	NR	NR	ng/m3	Dining Room	NR	NR	NR	NR	Dining room, floor	NR
616	Property 1	Residential	4/9/2016	19:15	1723	1834	1745	1767	6	NR	NR	ng/m3	Bathroom-Master	2	NR	NR	NR	Master bathroom, floor	NR
616	Property 3	Residential	4/9/2016	17:38	1710	1782	1782	1758	4	NR	NR	ng/m3	Office	NR	NR	NR	NR	Office floor (repeat)	NR
616	Property 3	Residential	4/9/2016	17:55	1819	1706	1683	1736	7	NR	NR	ng/m3	Stairwell-Upstairs	NR	NR	NR	NR	Upstairs stairs, floor	NR
616	Property 3	Residential	4/9/2016	18:02	1683	1720	1772	1725	5	NR	NR	ng/m3	Bathroom-Master	NR	NR	NR	NR	Master bathroom, floor	NR
616	Property 1	Residential	4/9/2016	19:15	1716	1728	1731	1725	0	NR	NR	ng/m3	Bathroom-Master	2	NR	NR	NR	Master bathroom, ceiling	NR
616	Property 1	Residential	4/9/2016	19:17	1720	1697	1721	1712	1	NR	NR	ng/m3	Bedroom-Master	2	NR	NR	NR	Master bedroom, floor	NR
616	Property 1	Residential	4/9/2016	14:12	1774	1691	1659	1708	6	NR	NR	ng/m3	Bedroom-Son	2	NR	NR	NR	Bedroom, son, closet, floor	NR
616	Property 3	Residential	4/9/2016	18:03	1704	1700	1711	1705	0	NR	NR	ng/m3	Bathroom-Master	NR	NR	NR	NR	Master bathroom, ceiling	NR
616	Property 1	Residential	4/9/2016	19:18	1700	1697	1693	1697	0	NR	NR	ng/m3	Bedroom-Master	2	NR	NR	NR	Master bedroom, ceiling	NR
616	Property 1	Residential	4/9/2016	13:44	1663	1693	1643	1666	2	NR	NR	ng/m3	Stairwell-Downstairs	1	NR	NR	NR	Stairs, ground level, floor	NR
616	Property 1	Residential	4/9/2016	19:10	1688	1648	1655	1664	2	NR	NR	ng/m3	Stairwell-Upstairs	2	NR	NR	NR	Top of stairs, ceiling	NR
616	Property 3	Residential	4/9/2016	18:00	1648	1643	1692	1661	2	NR	NR	ng/m3	Bedroom-Master	NR	NR	NR	NR	Bedroom, master, floor	NR
616	Property 1	Residential	4/9/2016	13:48	1727	1655	1564	1648	9	NR	NR	ng/m3	Bedroom-Daughter	2	NR	NR	NR	Bedroom, daughter (17), floor carpet	NR
616	Property 3	Residential	4/9/2016	18:04	1591	1643	1638	1624	3	NR	NR	ng/m3	Hallyway-Upstairs	NR	NR	NR	NR	Upstairs hall closet, floor	NR
616	Property 1	Residential	4/9/2016	13:52	1627	1559	1536	1574	5	NR	NR	ng/m3	Bedroom-Baby	2	NR	NR	NR	Bedroom, baby, carpet	NR
616	Property 1	Residential	4/9/2016	15:00	1476	1724	1517	1572	15	NR	NR	ng/m3	Kitchen	1	NR	NR	NR	Kitchen, dining, floor	NR
616	Property 3	Residential	4/9/2016	17:23	1568	1603	1539	1570	4	NR	NR	ng/m3	Hallway-Downstairs	NR	NR	NR	NR	Front entrance, floor	NR
616	Property 1	Residential	4/9/2016	13:42	1571	1553	1560	1561	1	NR	NR	ng/m3	Stairwell-Downstairs	1	NR	NR	NR	Stairs, ground level, breathing zone	NR
616	Property 1	Residential	4/9/2016	13:50	1541	1535	1543	1539	0	NR	NR	ng/m3	Bedroom-Daughter	2	NR	NR	NR	Bedroom, daughter (17), floor ceiling	NR
616	Property 3	Residential	4/9/2016	17:25	1508	1534	1528	1523	1	NR	NR	ng/m3	Hallway-Downstairs	NR	NR	NR	NR	Front entrance, ceiling	NR
616	Property 1	Residential	4/9/2016	13:53	1506	1509	1507	1507	0	NR	NR	ng/m3	Bedroom-Baby	2	NR	NR	NR	Bedroom, baby, ceiling	NR
616	Property 3	Residential	4/9/2016	18:13	1052	1258	1859	1390	58	NR	NR	ng/m3	Garage	NR	NR	NR	NR	Garage, floor	NR
616	Property 1	Residential	4/9/2016	15:48	1239	1240	1373	1284	1	NR	NR	ng/m3	Garage	1	NR	NR	NR	Garage, middle, floor (repeat)	NR
616	Property 1	Residential	4/9/2016	15:07	1289	1269	1281	1280	1	NR	NR	ng/m3	Hallway-Downstairs	1	NR	NR	NR	Hall near garage door, ceiling	NR
616	Property 1	Residential	4/9/2016	15:09	1237	1253	1289	1260	4	NR	NR	ng/m3	Basement	BA	NR	NR	NR	Basement, bottom stairs, ceiling	NR

NA- Not Applicable
NR- Not Recorded
R - Standard Deviation

Appendix G: Lumex Screening Results Summary Table
Greenleafe Drive Mercury Response Site
Baldwinsville, Onondaga County, New York

Serial Number	Property Number	Land Use	Date	Time	Screeining-1	Screeining-2	Screeining-3	Average Screening Result	R	Minimum	Maximum	Units	Location	Floor	Floor Cover	Height	Item Type	Description	Temperature (˚F)
616	Property 1	Residential	4/9/2016	15:05	1217	1232	1256	1235	3	NR	NR	ng/m3	Hallway-Downstairs	1	NR	NR	NR	Hall near garage door, floor	NR
616	Property 1	Residential	4/9/2016	15:03	1235	1177	1156	1189	6	NR	NR	ng/m3	Living Room	1	NR	NR	NR	Living, ceiling	NR
616	Property 1	Residential	4/9/2016	15:16	1169	1120	1138	1143	4	NR	NR	ng/m3	Basement	BA	NR	NR	NR	Basement, stairs closet, floor	NR
616	Property 3	Residential	4/9/2016	18:14	1213	1125	1078	1139	11	NR	NR	ng/m3	Garage	NR	NR	NR	NR	Garage, floor (repeat)	NR
616	Property 1	Residential	4/9/2016	15:02	1115	1154	1135	1135	3	NR	NR	ng/m3	Living Room	1	NR	NR	NR	Living, floor	NR
616	Property 1	Residential	4/9/2016	14:46	1175	1123	1091	1130	7	NR	NR	ng/m3	Bathroom-Downstairs	1	NR	NR	NR	Bathroom, downstairs, ceiling	NR
616	Property 1	Residential	4/9/2016	15:01	1097	1126	1131	1118	3	NR	NR	ng/m3	Kitchen	1	NR	NR	NR	Kitchen, dining, ceiling	NR
616	Property 3	Residential	4/9/2016	17:47	1082	1143	1106	1110	5	NR	NR	ng/m3	Basement	BA	NR	NR	NR	Basement, ceiling	NR
616	Property 1	Residential	4/9/2016	15:11	1081	1111	1125	1106	3	NR	NR	ng/m3	Basement	BA	NR	NR	NR	Basement, couches, ceiling	NR
616	Property 1	Residential	4/9/2016	15:14	1096	1106	1107	1103	1	NR	NR	ng/m3	Basement	BA	NR	NR	NR	Basement, back hoops room, ceiling	NR
616	Property 1	Residential	4/9/2016	15:12	1086	1149	1072	1102	6	NR	NR	ng/m3	Basement	BA	NR	NR	NR	Basement, back hoops room, floor	NR
616	Property 1	Residential	4/9/2016	14:53	993	1105	1190	1096	17	NR	NR	ng/m3	Kitchen	1	NR	NR	NR	Kitchen, island, floor	NR
616	Property 1	Residential	4/9/2016	15:08	1156	1064	1045	1088	10	NR	NR	ng/m3	Basement	BA	NR	NR	NR	Basement, bottom stairs, floor	NR
616	Property 1	Residential	4/9/2016	15:10	1094	1097	1056	1082	3	NR	NR	ng/m3	Basement	BA	NR	NR	NR	Basement, couches, floor	NR
616	Property 3	Residential	4/9/2016	17:45	1133	1050	1010	1064	11	NR	NR	ng/m3	Basement	BA	NR	NR	NR	Basement, floor	NR
616	Property 1	Residential	4/9/2016	14:44	1020	1013	1052	1028	3	NR	NR	ng/m3	Bathroom-Downstairs	1	NR	NR	NR	Bathroom, downstairs, floor	NR
616	Property 1	Residential	4/9/2016	14:46	1038	1021	995	1018	4	NR	NR	ng/m3	Office	1	NR	NR	NR	Office, dog feeding, floor	NR
616	Property 1	Residential	4/9/2016	15:45	1664	672	684	1007	98	NR	NR	ng/m3	Garage	1	NR	NR	NR	Garage, tool space, floor (repeat)	NR
616	Property 1	Residential	4/9/2016	14:51	994	1008	1012	1005	1	NR	NR	ng/m3	Kitchen	1	NR	NR	NR	Kitchen, stove, floor	NR
616	Property 1	Residential	4/9/2016	14:48	994	994	981	990	4	NR	NR	ng/m3	Office	1	NR	NR	NR	Office, dog feeding, ceiling	NR
616	Property 1	Residential	4/9/2016	15:44	992	979	982	984	1	NR	NR	ng/m3	Garage	1	NR	NR	NR	Garage, tool space, ceiling	NR
616	Property 1	Residential	4/9/2016	14:55	1044	955	942	980	10	NR	NR	ng/m3	Kitchen	1	NR	NR	NR	Kitchen, island, ceiling	NR
616	Property 1	Residential	4/9/2016	14:52	1009	924	917	950	9	NR	NR	ng/m3	Kitchen	1	NR	NR	NR	Kitchen, stove, ceiling	NR
616	Property 1	Residential	4/9/2016	15:15	1047	877	857	927	20	NR	NR	ng/m3	Basement	1	NR	NR	NR	Basement, stairs closet, floor	NR
616	Property 1	Residential	4/9/2016	15:32	855	962	936	918	11	NR	NR	ng/m3	Laundry Room	1	NR	NR	NR	Laundry, ceiling	NR
616	Property 1	Residential	4/9/2016	15:37	897	862	876	878	4	NR	NR	ng/m3	Garage	1	NR	NR	NR	Garage, door to home, ceiling	NR
616	Property 3	Residential	4/9/2016	18:15	823	846	888	852	7	NR	NR	ng/m3	Garage	NR	NR	NR	NR	Garage, ceiling	NR
616	Property 1	Residential	4/9/2016	15:39	984	640	704	776	44	NR	NR	ng/m3	Garage	1	NR	NR	NR	Garage, tool space, floor	NR
616	Property 1	Residential	4/9/2016	15:30	709	655	682	682	7	NR	NR	ng/m3	Laundry Room	1	NR	NR	NR	Laundry, floor	NR
616	Property 1	Residential	4/9/2016	15:34	519	511	550	527	7	NR	NR	ng/m3	Garage	1	NR	NR	NR	Garage, door to home, floor	NR
616	Property 1	Residential	4/9/2016	15:47	267	495	563	442	66	NR	NR	ng/m3	Garage	1	NR	NR	NR	Garage, middle, ceiling	NR
616	Property 1	Residential	4/9/2016	16:37	235	386	512	378	73	NR	NR	ng/m3	Front Yard	NR	NR	NR	NR	Soil, 4 feet north of basketball hoop	NR
616	Property 1	Residential	4/9/2016	15:50	336	325	452	371	34	NR	NR	ng/m3	Garage	1	NR	NR	NR	Garage, middle, ceiling (repeat)	NR
616	Property 1	Residential	4/9/2016	16:39	243	282	492	339	73	NR	NR	ng/m3	Front Yard	NR	NR	NR	NR	Soil, 4 feet north of basketball hoop	NR
616	Property 1	Residential	4/9/2016	16:38	172	275	213	220	46	NR	NR	ng/m3	Front Yard	NR	NR	NR	NR	Soil, 4 feet north of basketball hoop	NR
616	Property 1	Residential	4/9/2016	16:30	154	246	221	207	44	NR	NR	ng/m3	Front Yard	NR	NR	NR	NR	Soil, 4 feet south of basketball hoop	NR
616	Property 1	Residential	4/9/2016	16:32	166	193	262	207	45	NR	NR	ng/m3	Front Yard	NR	NR	NR	NR	Soil, 4 feet south of basketball hoop	NR
616	Property 1	Residential	4/9/2016	16:33	213	169	62	148	101	NR	NR	ng/m3	Front Yard	NR	NR	NR	NR	Soil, under basketball hoop	NR
616	Property 1	Residential	4/9/2016	16:30	58	90	198	116	119	NR	NR	ng/m3	Front Yard	NR	NR	NR	NR	Soil, 4 feet south of basketball hoop	NR
616	Property 1	Residential	4/9/2016	16:35	82	122	105	103	38	NR	NR	ng/m3	Front Yard	NR	NR	NR	NR	Soil, under basketball hoop	NR
616	Property 1	Residential	4/9/2016	16:35	70	65	82	72	24	NR	NR	ng/m3	Front Yard	NR	NR	NR	NR	Soil, under basketball hoop	NR
616	Property 4	Residential	4/9/2016	19:50	21	42	46	36	66	NR	NR	ng/m3	Living Room	NR	NR	NR	NR	TV room, ceiling (repeat)	NR
616	Property 1	Residential	4/9/2016	15:25	39	31	28	33	34	NR	NR	ng/m3	Outdoor	NR	NR	NR	NR	Outdoor, end of driveway	NR
616	Property 4	Residential	4/9/2016	19:46	23	27	41	30	60	NR	NR	ng/m3	Stairwell-Downstairs	NR	NR	NR	NR	Stairs, ground level, ceiling	NR
616	Property 1	Residential	4/9/2016	15:26	23	28	27	26	16	NR	NR	ng/m3	Outdoor	NR	NR	NR	NR	Outdoor, end of driveway (repeat)	NR
616	Property 4	Residential	4/9/2016	19:49	20	32	27	26	41	NR	NR	ng/m3	Living Room	NR	NR	NR	NR	TV room, ceiling	NR
616	Property 4	Residential	4/9/2016	19:51	15	27	36	26	78	NR	NR	ng/m3	Living Room	NR	NR	NR	NR	TV room, ceiling (repeat)	NR
616	Property 4	Residential	4/9/2016	19:41	22	24	27	24	20	NR	NR	ng/m3	Stairwell-Downstairs	NR	NR	NR	NR	Stairs, ground level, ceiling	NR
616	Property 4	Residential	4/9/2016	19:47	15	26	18	20	55	NR	NR	ng/m3	Stairwell-Downstairs	NR	NR	NR	NR	Stairs, ground level, ceiling (repeat)	NR
616	Property 4	Residential	4/9/2016	19:42	18	13	11	14	45	NR	NR	ng/m3	Stairwell-Upstairs	NR	NR	NR	NR	Stairs, upstairs, floor	NR
616	Property 4	Residential	4/9/2016	19:44	14	13	13	13	3	NR	NR	ng/m3	Stairwell-Upstairs	NR	NR	NR	NR	Stairs, upstairs, floor (repeat)	NR
616	Property 3	Residential	4/9/2016	18:18	13	12	8	10	NR	NR	NR	ng/m3	Outdoor	NR	NR	NR	NR	End of driveway	NR
616	Property 3	Residential	4/10/2016	14:47	3145	3267	3389	3267	7	NR	NR	ng/m3	Basement	BA	NR	NR	NR	Basement, floor	NR
616	Property 1	Residential	4/10/2016	14:26	4690	2529	1594	2938	3240	NR	NR	ng/m3	Bedroom-Son	1	NR	NR	NR	Bags from Residience	NR
616	Property 3	Residential	4/10/2016	14:44	1120	56	2531	1198	215	NR	NR	ng/m3	Basement	BA	NR	NR	NR	Basement, floor	NR
616	Property 3	Residential	4/10/2016	14:46	591	1507	1310	1136	80	NR	NR	ng/m3	Basement	BA	NR	NR	NR	Basement, floor	NR
616	Property 3	Residential	4/10/2016	14:32	1772	524	1080	1125	110	NR	NR	ng/m3	Hallway-Downstairs	NR	NR	NR	NR	Front entrance, floor	NR
616	Property 3	Residential	4/10/2016	14:45	825	749	1674	1082	85	NR	NR	ng/m3	Basement	NR	NR	NR	NR	Basement, floor	NR
616	Property 3	Residential	4/10/2016	14:34	1167	1308	231	902	119	NR	NR	ng/m3	Hallway-Downstairs	NR	NR	NR	NR	Front entrance, ceiling	NR
616	Property 1	Residential	4/10/2016	14:25	830	752	1104	895	39	NR	NR	ng/m3	Bedroom-Son	1	NR	NR	NR	Bags from Residience	NR
616	Property 3	Residential	4/10/2016	14:39	436	943	1217	865	90	NR	NR	ng/m3	Bathroom-Downstairs	NR	NR	NR	NR	Ground level bathroom, floor (repeat)	NR
616	Property 3	Residential	4/10/2016	14:33	811	733	994	846	30	NR	NR	ng/m3	Hallway-Downstairs	NR	NR	NR	NR	Front entrance, floor (repeat)	NR
616	Property 3	Residential	4/10/2016	14:42	763	1509	227	833	153	NR	NR	ng/m3	Stairwell-Downstairs	NR	NR	NR	NR	Ground level, stairs, floor (repeat)	NR
616	Property 3	Residential	4/10/2016	14:38	577	184	1441	734	171	NR	NR	ng/m3	Bathroom-Downstairs	NR	NR	NR	NR	Ground level bathroom, floor	NR
616	Property 3	Residential	4/10/2016	14:41	1308	163	137	444	69	NR	NR	ng/m3	Stairwell-Downstairs	NR	NR	NR	NR	Ground level, stairs, floor	NR
1210	Property 1	Residential	4/11/2016	19:08	1517	1543	1517	1525	1	NR	NR	ng/m3	Stairwell-Upstairs	2	NR	NR	NR	Top of stairs	NR
1210	Property 1	Residential	4/11/2016	19:01	3499	3968	4727	4065	30	NR	NR	ng/m3	Bedroom-Master	2	NR	NR	NR	Entrance	NR
1210	Property 1	Residential	4/11/2016	19:01	1466	1511	1459	1479	3	NR	NR	ng/m3	Bedroom-Son	2	NR	NR	NR	Adjacent to dresser	NR
1210	Property 1	Residential	4/11/2016	19:00	1936	1845	2173	1985	16	NR	NR	ng/m3	Stairwell-Upstairs	2	NR	NR	NR	Entrance to bathroom	NR
1210	Property 1	Residential	4/11/2016	18:57	1540	1680	2110	1777	32	NR	NR	ng/m3	Stairwell-Upstairs	2	NR	NR	NR	Top of stairs	NR
1210	457 Main Street	Residential	4/11/2016	18:05	158	160	159	159	1	NR	NR	ng/m3	Garage	1	NR	NR	NR	SCBA back pack	NR
1210	457 Main Street	Residential	4/11/2016	18:01	1405	1386	1245	1345	11	NR	NR	ng/m3	Garage	1	NR	NR	NR	Gear in poly bag underneath boots	NR
1210	457 Main Street	Residential	4/11/2016	17:52	540	208	331	360	92	NR	NR	ng/m3	Cubby	NR	NR	NR	NR	Cubby (J. Wood) peaked at 1200 ng/m3	NR
1210	457 Main Street	Residential	4/11/2016	17:43	1499	1641	1547	1562	9	NR	NR	ng/m3	Truck	NR	NR	NR	NR	R1	NR
1210	457 Main Street	Residential	4/11/2016	17:40	674	806	595	692	30	NR	NR	ng/m3	Washer	NR	NR	NR	NR	NR	NR
1210	457 Main Street	Residential	4/11/2016	17:38	501	444	398	448	22	NR	NR	ng/m3	Garage	NR	NR	NR	NR	Used Gear in poly bag	NR
1210	lementary Schoo	Residential	4/11/2016	17:11	8	7	7	10	<10	NR	NR	ng/m3	Room 146	NR	NR	NR	NR	Carpet by book shelves	NR
1210	lementary Schoo	Residential	4/11/2016	17:08	29	30	38	32	6	NR	NR	ng/m3	Room 146	NR	NR	NR	NR	Inside desk of son of 3244 Greenleafe Drive	NR
1210	Property 3	Residential	4/11/2016	16:24	1344	1327	1565	1412	16	NR	NR	ng/m3	Garage	1	NR	NR	NR	Steps leading into house	NR
1210	Property 3	Residential	4/11/2016	16:18	3014	3292	3483	3263	14	NR	NR	ng/m3	Kitchen	1	NR	NR	NR	Throw rug adjacent to stove	NR
1210	Property 3	Residential	4/11/2016	16:14	1935	1905	1910	1917	1	NR	NR	ng/m3	Dining Room	1	NR	NR	NR	Door way between dining room and kitchen	NR
1210	Property 3	Residential	4/11/2016	16:12	1011	1022	1011	1015	1	NR	NR	ng/m3	Basement	BA	NR	NR	NR	At landing (breathing zone)	NR
1210	Property 3	Residential	4/11/2016	16:10	1123	1622	1280	1342	37	NR	NR	ng/m3	Basement	BA	NR	NR	NR	Floor rug at landing	NR
1210	Property 3	Residential	4/11/2016	16:07	3836	3588	3665	3696	6	NR	NR	ng/m3	Living Room	1	NR	NR	NR	Boundary of living room and kitchen	NR
1210	Property 3	Residential	4/11/2016	16:06	12420	7732	9668	9941	47	NR	NR	ng/m3	Kitchen	1	NR	NR	NR	Floor rug at basement entrance	NR

NA- Not Applicable
NR- Not Recorded
R - Standard Deviation

Appendix G: Lumex Screening Results Summary Table
Greenleafe Drive Mercury Response Site
Baldwinsville, Onondaga County, New York

Serial Number	Property Number	Land Use	Date	Time	Screeining-1	Screeining-2	Screeining-3	Average Screening Result	R	Minimum	Maximum	Units	Location	Floor	Floor Cover	Height	Item Type	Description	Temperature (°F)
1210	Property 3	Residential	4/11/2016	16:01	2673	5162	5138	4324	57	NR	NR	ng/m3	Kitchen	1	NR	NR	NR	One foot off sliding glass door (floor rug)	NR
1210	Property 3	Residential	4/11/2016	16:00	1963	1950	1950	1954	0	NR	NR	ng/m3	Kitchen	1	NR	NR	NR	One foot off stove (breathing zone)	NR
1210	Property 3	Residential	4/11/2016	15:59	2157	2181	2303	2213	6	NR	NR	ng/m3	Kitchen	1	NR	NR	NR	One foot off stove	NR
1210	Property 3	Residential	4/11/2016	15:57	1857	1773	1858	1830	4	NR	NR	ng/m3	Kitchen	1	NR	NR	NR	One foot off refrigerator	NR
1210	Property 3	Residential	4/11/2016	15:53	1560	1544	1536	1547	1	NR	NR	ng/m3	Spare Room	2	NR	NR	NR	Behind door	NR
1210	Property 3	Residential	4/11/2016	15:50	1653	1643	1644	1647	0	NR	NR	ng/m3	Bedroom-Son (12)	2	NR	NR	NR	Center of room (breathing zone)	NR
1210	Property 3	Residential	4/11/2016	15:46	2143	1960	1993	2032	9	NR	NR	ng/m3	Bedroom-Son (12)	2	NR	NR	NR	Center of room	NR
1210	Property 3	Residential	4/11/2016	15:45	1765	1775	1814	1785	2	NR	NR	ng/m3	Bedroom-Son (12)	2	NR	NR	NR	Entrance	NR
1210	Property 3	Residential	4/11/2016	15:43	1700	1729	1764	1731	3	NR	NR	ng/m3	Stairwell-Upstairs	2	NR	NR	NR	Top of stairs	NR
1210	Property 3	Residential	4/11/2016	15:41	1707	1721	1722	1717	0	NR	NR	ng/m3	Stairwell-Downstairs	1	NR	NR	NR	Landing at bottom of stairs	NR
1210	Property 1	Residential	4/11/2016	14:40	162	144	146	151	11	NR	NR	ng/m3	Bedroom-Master	2	NR	NR	NR	Behind front door	NR
1210	Property 1	Residential	4/11/2016	14:38	5072	6653	6491	6072	26	NR	NR	ng/m3	Bedroom-Master	2	NR	NR	NR	Entrance	NR
1210	Property 1	Residential	4/11/2016	14:34	559	484	425	489	27	NR	NR	ng/m3	Bathroom-Master	2	NR	NR	NR	Bathroom rug by entrance	NR
1210	Property 1	Residential	4/11/2016	14:30	533	1081	590	735	74	NR	NR	ng/m3	Bedroom-Master	2	NR	NR	NR	Entrance	NR
1210	Property 1	Residential	4/11/2016	14:25	2021	1932	837	1597	74	NR	NR	ng/m3	Stairwell-Upstairs	2	NR	NR	NR	Bathroom entrance	NR
1210	Property 1	Residential	4/11/2016	14:20	747	1064	784	865	36	NR	NR	ng/m3	Stairwell-Upstairs	2	NR	NR	NR	1 inch off floor, top of stairs	NR
1210	Property 1	Residential	4/11/2016	14:12	306	523	454	428	50	NR	NR	ng/m3	Bedroom-Son	2	NR	NR	NR	One inch off floor	NR
1210	Property 1	Residential	4/11/2016	19:20	1786	1605	1578	1655	12	NR	NR	ng/m3	Hallway-Downstairs	2	NR	NR	NR	Throw rug at entrance	NR
1210	Property 1	Residential	4/11/2016	19:22	1621	1637	1694	1651	4	NR	NR	ng/m3	Hallway-Downstairs	2	NR	NR	NR	Front entrance (breathing zone)	NR
1210	Property 1	Residential	4/11/2016	19:23	1869	2095	2486	2150	28	NR	NR	ng/m3	Office	1	NR	NR	NR	Rug in office	NR
1210	Property 1	Residential	4/11/2016	19:25	1878	1868	1870	1872	0	NR	NR	ng/m3	Office	1	NR	NR	NR	Office (breathing zone)	NR
1210	Property 1	Residential	4/11/2016	19:26	1796	1827	1850	1823	2	NR	NR	ng/m3	Kitchen	1	NR	NR	NR	Adjacent to stove	NR
1210	Property 1	Residential	4/11/2016	19:27	1804	1808	1850	1809	0	NR	NR	ng/m3	Kitchen	1	NR	NR	NR	Breathing zone	NR
1210	Property 1	Residential	4/11/2016	19:29	1757	1743	1753	1751	0	NR	NR	ng/m3	Dining Room	1	NR	NR	NR	Throw rug by back door	NR
1210	Property 1	Residential	4/11/2016	19:30	1802	1814	1813	1810	0	NR	NR	ng/m3	Dining Room	1	NR	NR	NR	Breathing zone	NR
1210	Property 1	Residential	4/11/2016	19:32	2655	3072	2638	2788	15	NR	NR	ng/m3	Living Room	1	NR	NR	NR	Rug	NR
1210	Property 1	Residential	4/11/2016	19:34	2027	2004	1991	2007	1	NR	NR	ng/m3	Living Room	1	NR	NR	NR	Breathing zone	NR
1210	Property 1	Residential	4/11/2016	19:35	1977	1917	2003	1966	4	NR	NR	ng/m3	Hallway-Downstairs	1	NR	NR	NR	Adjacent to closet	NR
1210	Property 1	Residential	4/11/2016	19:37	2065	2131	2100	2099	3	NR	NR	ng/m3	Bathroom-Downstairs	1	NR	NR	NR	Floor	NR
1210	Property 1	Residential	4/11/2016	19:38	1987	1989	1988	1988	0	NR	NR	ng/m3	Bathroom-Downstairs	1	NR	NR	NR	Breathing Zone	NR
1210	Property 1	Residential	4/11/2016	19:42	1994	1913	1912	1939	4	NR	NR	ng/m3	Bedroom-Baby	2	NR	NR	NR	Floor	NR
1210	Property 1	Residential	4/11/2016	19:42	1932	1914	2069	1972	7	NR	NR	ng/m3	Bedroom-Baby	2	NR	NR	NR	Breathing zone	NR
1210	Property 1	Residential	4/12/2016	9:06	176	231	231	213	25	NR	NR	ng/m3	Stairwell-Upstairs	2	NR	NR	NR	Top of stairs	NR
1210	Property 1	Residential	4/12/2016	9:07	1486	1754	1752	1664	16	NR	NR	ng/m3	Stairwell-Upstairs	2	NR	NR	NR	Top of stairs	NR
1210	Property 1	Residential	4/12/2016	9:09	141	182	178	167	24	NR	NR	ng/m3	Stairwell-Upstairs	2	NR	NR	NR	Top of Stairs	NR
1210	Property 1	Residential	4/12/2016	9:11	520	554	609	561	15	NR	NR	ng/m3	Bedroom-Master	2	NR	NR	NR	Entrance	NR
1210	Property 1	Residential	4/12/2016	9:13	148	157	159	155	6	NR	NR	ng/m3	Bedroom-Master	2	NR	NR	NR	Entrance (breathing zone)	NR
1210	Property 1	Residential	4/12/2016	9:15	143	135	125	134	12	NR	NR	ng/m3	Bathroom-Master	2	NR	NR	NR	Over throw rug adjacent to sink	NR
1210	Property 1	Residential	4/12/2016	9:18	150	152	149	150	1	NR	NR	ng/m3	Bathroom-Master	2	NR	NR	NR	Over throw rug (breathing zone)	NR
1210	Property 1	Residential	4/12/2016	9:20	172	176	158	169	10	NR	NR	ng/m3	Bedroom-Master	2	NR	NR	NR	One foot off closet	NR
1210	Property 1	Residential	4/12/2016	9:22	221	217	239	226	9	NR	NR	ng/m3	Bedroom-Daughter (17)	2	NR	NR	NR	Center of room	NR
1210	Property 1	Residential	4/12/2016	9:24	240	231	222	231	7	NR	NR	ng/m3	Bedroom-Daughter (17)	2	NR	NR	NR	Center of room (breathing zone)	NR
1210	Property 1	Residential	4/12/2016	9:26	732	2403	2593	1909	97	NR	NR	ng/m3	Stairwell-Upstairs	2	NR	NR	NR	Bathroom entrance	NR
1210	Property 1	Residential	4/12/2016	9:27	3040	4394	4207	3880	34	NR	NR	ng/m3	Stairwell-Upstairs	2	NR	NR	NR	Bathroom entrance	NR
1210	Property 1	Residential	4/12/2016	9:28	183	206	220	203	18	NR	NR	ng/m3	Stairwell-Upstairs	2	NR	NR	NR	Bathroom entrance (breathing zone)	NR
1210	Property 1	Residential	4/12/2016	9:30	290	267	288	282	7	NR	NR	ng/m3	Bathroom-Upstairs	2	NR	NR	NR	Under towel rack	NR
1210	Property 1	Residential	4/12/2016	9:34	83	81	80	81	2	NR	NR	ng/m3	Baby's Room	2	NR	NR	NR	Over throw rug (window open)	NR
1210	Property 1	Residential	4/12/2016	9:35	150	173	175	166	15	NR	NR	ng/m3	Baby's Room	2	NR	NR	NR	Entrance (breathing zone)	NR
1210	Property 1	Residential	4/12/2016	9:37	195	244	235	225	21	NR	NR	ng/m3	Bedroom-Son	2	NR	NR	NR	Entrance	NR
1210	Property 1	Residential	4/12/2016	9:38	139	151	125	138	18	NR	NR	ng/m3	Bedroom-Son	2	NR	NR	NR	Between front door and dresser	NR
1210	Property 1	Residential	4/12/2016	9:40	155	164	167	162	7	NR	NR	ng/m3	Bedroom-Son	2	NR	NR	NR	Inside closet	NR
1210	Property 1	Residential	4/12/2016	9:41	364	493	418	425	30	NR	NR	ng/m3	Stairwell	2	NR	NR	NR	10th step from the bottom	NR
1210	Property 1	Residential	4/12/2016	9:41	173	184	183	180	6	NR	NR	ng/m3	Bedroom-Son	2	NR	NR	NR	Center of room (breathing zone)	NR
1210	Property 1	Residential	4/12/2016	9:45	197	205	269	224	32	NR	NR	ng/m3	Hallway-Downstairs	1	NR	NR	NR	Front door entrance	NR
1210	Property 1	Residential	4/12/2016	9:46	114	111	95	107	18	NR	NR	ng/m3	Hallway-Downstairs	1	NR	NR	NR	2 feet from downstairs bathroom (breathing zone)	NR
1210	Property 1	Residential	4/12/2016	9:48	134	130	111	125	18	NR	NR	ng/m3	Bathroom-Downstairs	1	NR	NR	NR	Center of room	NR
1210	Property 1	Residential	4/12/2016	9:51	153	101	84	113	60	NR	NR	ng/m3	Hallway-Downstairs	1	NR	NR	NR	Inside of downstairs closet next to bathroom	NR
1210	Property 1	Residential	4/12/2016	9:54	391	579	906	625	82	NR	NR	ng/m3	Living room	1	NR	NR	NR	Over rug	NR
1210	Property 1	Residential	4/12/2016	9:54	57	55	58	57	5	NR	NR	ng/m3	Kitchen	1	NR	NR	NR	Boundary of kitchen and living room	NR
1210	Property 1	Residential	4/12/2016	9:56	117	109	102	110	13	NR	NR	ng/m3	Living room	1	NR	NR	NR	Over rug one foot off coffee table	NR
1210	Property 1	Residential	4/12/2016	9:57	116	114	111	113	3	NR	NR	ng/m3	Living room	1	NR	NR	NR	Center of room (breathing zone)	NR
1210	Property 1	Residential	4/12/2016	9:58	57	37	36	44	49	NR	NR	ng/m3	Dining room	1	NR	NR	NR	Over rug	NR
1210	Property 1	Residential	4/12/2016	9:59	91	96	96	94	5	NR	NR	ng/m3	Dining Room	1	NR	NR	NR	(breathing zone)	NR
1210	Property 1	Residential	4/12/2016	10:01	75	77	76	76	2	NR	NR	ng/m3	Kitchen	1	NR	NR	NR	Over rug under sink	NR
1210	Property 1	Residential	4/12/2016	10:09	307	300	301	303	2	NR	NR	ng/m3	Office	1	NR	NR	NR	Over rug	NR
1210	Property 1	Residential	4/12/2016	10:11	327	330	328	328	1	NR	NR	ng/m3	Office	1	NR	NR	NR	Center of room (breathing zone)	NR
1210	Property 1	Residential	4/12/2016	10:13	741	942	964	882	25	NR	NR	ng/m3	Stairwell-Basement	BA	NR	NR	NR	Third step down	NR
1210	Property 1	Residential	4/12/2016	10:15	573	572	697	614	20	NR	NR	ng/m3	Basement	BA	NR	NR	NR	Basement entrance are (breathing zone)	NR
1210	Property 1	Residential	4/12/2016	10:15	483	508	537	509	10	NR	NR	ng/m3	Basement	BA	NR	NR	NR	Bottom of stairwell	NR
1210	Property 1	Residential	4/12/2016	10:22	595	480	517	531	21	NR	NR	ng/m3	Basement	BA	NR	NR	NR	Large area rug behind couch	NR
1210	Property 1	Residential	4/12/2016	10:23	659	597	597	618	10	NR	NR	ng/m3	Basement	BA	NR	NR	NR	Large area rug behind couch (breathing zone)	NR
1210	Property 1	Residential	4/12/2016	10:27	510	498	495	501	3	NR	NR	ng/m3	Basement	BA	NR	NR	NR	Center of playroom	NR
1210	Property 1	Residential	4/12/2016	10:28	554	558	560	557	0	NR	NR	ng/m3	Basement	BA	NR	NR	NR	Center of playroom (breathing zone)	NR
1210	Property 1	Residential	4/12/2016	10:35	1022	929	941	964	9	NR	NR	ng/m3	Garage	1	NR	NR	NR	Poly bag with backpack	NR
1210	Property 1	Residential	4/12/2016	10:37	655	715	705	692	8	NR	NR	ng/m3	Garage	1	NR	NR	NR	Poly bag with HW	NR
1210	Property 1	Residential	4/12/2016	10:39	348	442	475	422	30	NR	NR	ng/m3	Garage	1	NR	NR	NR	Poly bag with compressor	NR
1210	Property 1	Residential	4/12/2016	10:42	218	341	387	315	53	NR	NR	ng/m3	Garage	1	NR	NR	NR	Poly bag with lacrosse equipment	NR
1210	Property 1	Residential	4/12/2016	10:44	2003	2006	1895	1968	5	NR	NR	ng/m3	Garage	1	NR	NR	NR	Poly bag with Christmas decorations	NR
1210	Property 1	Residential	4/12/2016	10:46	411	453	414	426	9	NR	NR	ng/m3	Garage	1	NR	NR	NR	Poly bag with radio	NR
1210	Property 1	Residential	4/12/2016	10:48	4830	4849	4529	4736	6	NR	NR	ng/m3	Garage	1	NR	NR	NR	Poly bag with stuffed snowman	NR
1210	Property 1	Residential	4/12/2016	10:50	287	303	340	310	17	NR	NR	ng/m3	Garage	1	NR	NR	NR	Poly bag with homework	NR
1210	Property 1	Residential	4/12/2016	11:02	1452	1134	1337	1300	24	NR	NR	ng/m3	Laundry Room	1	NR	NR	NR	In front of washer	NR
1210	Property 1	Residential	4/12/2016	11:03	855	1062	1062	993	20	NR	NR	ng/m3	Laundry Room	1	NR	NR	NR	Inside washer	NR
1210	Property 1	Residential	4/12/2016	11:08	2516	2045	1987	2183	24	NR	NR	ng/m3	Laundry Room	1	NR	NR	NR	Inside washer hose	NR
1210	Property 1	Residential	4/12/2016	11:10	949	703	396	683	80	NR	NR	ng/m3	Laundry Room	1	NR	NR	NR	Inside dryer	NR

NA- Not Applicable
NR- Not Recorded
R - Standard Deviation

Appendix G: Lumex Screening Results Summary Table
Greenleafe Drive Mercury Response Site
Baldwinsville, Onondaga County, New York

Serial Number	Property Number	Land Use	Date	Time	Screeining-1	Screeining-2	Screeining-3	Average Screening Result	R	Minimum	Maximum	Units	Location	Floor	Floor Cover	Height	Item Type	Description	Temperature (˚F)
1210	Property 1	Residential	4/12/2016	11:14	1069	1161	1056	1095	9	NR	NR	ng/m3	Laundry Room	1	NR	NR	NR	Breathing zone	NR
1210	Property 3	Residential	4/12/2016	12:16	2172	2342	2288	2267	7	NR	NR	ng/m3	Stairwell-Downstairs	1	NR	NR	NR	Landing	NR
1210	Property 3	Residential	4/12/2016	12:17	1929	1934	1943	1935	0	NR	NR	ng/m3	Stairwell-Downstairs	1	NR	NR	NR	Landing	NR
1210	Property 3	Residential	4/12/2016	12:18	1971	2172	2197	2114	10	NR	NR	ng/m3	Stairwell-Upstairs	2	NR	NR	NR	Upstairs Landing	NR
1210	Property 3	Residential	4/12/2016	12:21	1830	1816	1798	1815	1	NR	NR	ng/m3	Stairwell-Upstairs	2	NR	NR	NR	Upstairs Landind (breathing zone)	NR
1210	Property 3	Residential	4/12/2016	12:22	1834	1820	1732	1795	5	NR	NR	ng/m3	Bedroom-Master	2	NR	NR	NR	Center of room	NR
1210	Property 3	Residential	4/12/2016	12:24	1710	1736	1772	1739	3	NR	NR	ng/m3	Bathroom-Master	2	NR	NR	NR	Over throw rug outside shower	NR
1210	Property 3	Residential	4/12/2016	12:24	1715	1646	1657	1672	4	NR	NR	ng/m3	Bedroom-Master	2	NR	NR	NR	Center of room (Breathing zone)	NR
1210	Property 3	Residential	4/12/2016	12:26	1702	1710	1689	1700	1	NR	NR	ng/m3	Bathroom-Master	2	NR	NR	NR	Center of room	NR
1210	Property 3	Residential	4/12/2016	12:28	1942	1968	1986	1966	2	NR	NR	ng/m3	Spare Room	2	NR	NR	NR	Center of room	NR
1210	Property 3	Residential	4/12/2016	12:31	1817	1789	1790	1798	1	NR	NR	ng/m3	Spare Room	2	NR	NR	NR	Center of room (breathing zone)	NR
1210	Property 3	Residential	4/12/2016	12:32	1833	1912	1930	1892	5	NR	NR	ng/m3	Bathroom-Upstairs	2	NR	NR	NR	Over throw rug by tub	NR
1210	Property 3	Residential	4/12/2016	12:34	1763	1794	1744	1749	1	NR	NR	ng/m3	Bathroom-Upstairs	2	NR	NR	NR	Breathing zone	NR
1210	Property 3	Residential	4/12/2016	12:36	1800	1811	1813	1808	0	NR	NR	ng/m3	Bedroom-Son (middle)	2	NR	NR	NR	Center of room	NR
1210	Property 3	Residential	4/12/2016	12:38	1841	1811	1793	1815	2	NR	NR	ng/m3	Bedroom-Son (middle)	2	NR	NR	NR	Breathing zone	NR
1210	Property 3	Residential	4/12/2016	12:39	1966	2074	2019	2020	5	NR	NR	ng/m3	Hallway-Upstairs	2	NR	NR	NR	Next to oldest sons bedroom	NR
1210	Property 3	Residential	4/12/2016	12:42	1697	1683	1610	1663	5	NR	NR	ng/m3	Bedroom-Son (17)	2	NR	NR	NR	Foot of bed	NR
1210	Property 3	Residential	4/12/2016	12:42	1602	1569	1600	1590	2	NR	NR	ng/m3	Bedroom-Son (17)	2	NR	NR	NR	Breathing zone	NR
1210	Property 3	Residential	4/12/2016	12:44	2117	2202	2178	2166	3	NR	NR	ng/m3	Bedroom-Son (12)	2	NR	NR	NR	Center of room	NR
1210	Property 3	Residential	4/12/2016	12:45	1883	1892	1873	1882	1	NR	NR	ng/m3	Bedroom-Son (12)	2	NR	NR	NR	Center of room breathing zone	NR
1210	Property 3	Residential	4/12/2016	12:48	1938	1950	1989	1959	2	NR	NR	ng/m3	Hallway-Downstairs	1	NR	NR	NR	Front entrance (breathing zone)	NR
1210	Property 3	Residential	4/12/2016	12:48	1833	1888	1914	1879	4	NR	NR	ng/m3	Hallway-Downstairs	1	NR	NR	NR	Front entrance	NR
1210	Property 3	Residential	4/12/2016	12:50	1865	1850	1838	1851	1	NR	NR	ng/m3	Bathroom-Downstairs	1	NR	NR	NR	Center of room	NR
1210	Property 3	Residential	4/12/2016	12:51	2056	1949	1875	1960	9	NR	NR	ng/m3	Kitchen	1	NR	NR	NR	Adjacent to basement entrance	NR
1210	Property 3	Residential	4/12/2016	12:53	1959	1960	1957	1959	0	NR	NR	ng/m3	Kitchen	1	NR	NR	NR	Adjacent to basement entrance (breathing zone)	NR
1210	Property 3	Residential	4/12/2016	12:54	2518	4159	4225	3634	46	NR	NR	ng/m3	Living room	1	NR	NR	NR	Boundary of kitchen and living room	NR
1210	Property 3	Residential	4/12/2016	12:56	2076	2015	1990	2027	4	NR	NR	ng/m3	Living Room	1	NR	NR	NR	Boundary of kitchen and living room (breathing	NR
1210	Property 3	Residential	4/12/2016	12:57	2308	2379	2411	2366	4	NR	NR	ng/m3	Kitchen	1	NR	NR	NR	Next to dishwasher	NR
1210	Property 3	Residential	4/12/2016	12:58	2177	2136	2128	2147	2	NR	NR	ng/m3	Kitchen	1	NR	NR	NR	Next to dishwasher (breathing zone)	NR
1210	Property 3	Residential	4/12/2016	13:00	1925	1979	1930	1945	2	NR	NR	ng/m3	Dining Room	1	NR	NR	NR	Adjacent to table	NR
1210	Property 3	Residential	4/12/2016	13:01	1879	1893	1884	1885	0	NR	NR	ng/m3	Dining Room	1	NR	NR	NR	Adjacent to dog crate (breathing zone)	NR
1210	Property 3	Residential	4/12/2016	13:03	1900	1916	1931	1916	1	NR	NR	ng/m3	Dining Room	1	NR	NR	NR	Dog crate	NR
1210	Property 3	Residential	4/12/2016	13:05	1167	1186	1006	1119	16	NR	NR	ng/m3	Basement	BA	NR	NR	NR	Stair landing	NR
1210	Property 3	Residential	4/12/2016	13:07	1028	1087	1104	1073	7	NR	NR	ng/m3	Basement	BA	NR	NR	NR	Adjacent to freezer (breathing zone)	NR
1210	Property 3	Residential	4/12/2016	13:07	1012	1018	1015	1015	0	NR	NR	ng/m3	Basement	BA	NR	NR	NR	Rug adjacent to dryer	NR
1210	Property 3	Residential	4/12/2016	13:09	962	1011	949	974	6	NR	NR	ng/m3	Basement	BA	NR	NR	NR	Adjacent to washer and dryer (breathing zone)	NR
1210	Property 1	Residential	4/12/2016	13:26	1212	1416	1439	1356	16	NR	NR	ng/m3	Stairwell-Upstairs	2	NR	NR	NR	Top of stairwell	NR
1210	Property 1	Residential	4/12/2016	13:28	2343	1766	1350	1820	54	NR	NR	ng/m3	Hallway-Upstairs	2	NR	NR	NR	Adjacent to master bedroom entrance	NR
1210	Property 1	Residential	4/12/2016	13:29	2884	2546	2454	2628	16	NR	NR	ng/m3	Hallway-Upstairs	2	NR	NR	NR	In front of bathroom entrance	NR
1210	Property 1	Residential	4/12/2016	13:31	3495	1732	2124	2450	71	NR	NR	ng/m3	Hallway-Upstairs	2	NR	NR	NR	In front of bathroom entrance	NR
1210	Property 1	Residential	4/12/2016	13:38	1112	1072	1073	1086	3	NR	NR	ng/m3	Bedroom-Son	2	NR	NR	NR	Between front door and dresser	NR
1210	Property 1	Residential	4/12/2016	13:39	1049	980	1053	1027	14	NR	NR	ng/m3	Bedroom-Son	2	NR	NR	NR	6" in front of dresser	NR
1210	Property 1	Residential	4/12/2016	13:40	1458	1286	1414	1386	12	NR	NR	ng/m3	Bedroom-Son	2	NR	NR	NR	6" in front of dresser	NR
1210	Property 1	Residential	4/12/2016	13:44	741	735	731	736	1	NR	NR	ng/m3	Bedroom-Baby	2	NR	NR	NR	Throw rug	NR
1210	Property 1	Residential	4/12/2016	13:45	743	743	745	744	0	NR	NR	ng/m3	Bedroom-Baby	2	NR	NR	NR	Breathing zone	NR
1210	Property 1	Residential	4/12/2016	13:46	756	747	747	750	1	NR	NR	ng/m3	Bathroom-Upstairs	2	NR	NR	NR	Floor	NR
1210	Property 1	Residential	4/12/2016	13:48	753	748	751	751	0	NR	NR	ng/m3	Bathroom-Upstairs	2	NR	NR	NR	Breathing zone	NR
1210	Property 1	Residential	4/12/2016	13:50	1201	1085	1067	1118	11	NR	NR	ng/m3	Bedroom-Master	2	NR	NR	NR	Just inside doorway	NR
1210	Property 1	Residential	4/12/2016	13:52	889	879	900	889	2	NR	NR	ng/m3	Bedroom-Master	2	NR	NR	NR	Just inside doorway (Breathing zone)	NR
1210	Property 1	Residential	4/12/2016	13:53	692	670	658	673	5	NR	NR	ng/m3	Bedroom-Daughter (17)	2	NR	NR	NR	Center of room	NR
1210	Property 1	Residential	4/12/2016	13:55	659	665	657	660	1	NR	NR	ng/m3	Bedroom-Daughter (17)	2	NR	NR	NR	Center of room breathing zone	NR
1210	Property 1	Residential	4/12/2016	13:56	809	824	809	813	1	NR	NR	ng/m3	Hallway-Upstairs	2	NR	NR	NR	Breathing zone	NR
1210	Property 1	Residential	4/12/2016	13:57	796	794	794	795	0	NR	NR	ng/m3	Bedroom-Son	2	NR	NR	NR	Breathing zone	NR
1210	Property 1	Residential	4/12/2016	14:00	1035	864	1112	1003	24	NR	NR	ng/m3	Stairwell	2	NR	NR	NR	3rd step from the top	NR
1210	Property 1	Residential	4/12/2016	14:02	1024	1039	1063	1042	3	NR	NR	ng/m3	Stairwell	2	NR	NR	NR	8th step from the top	NR
1210	Property 1	Residential	4/12/2016	14:04	813	804	809	809	1	NR	NR	ng/m3	Stairwell	2	NR	NR	NR	Breathing zone	NR
1210	Property 1	Residential	4/12/2016	14:06	811	804	767	794	5	NR	NR	ng/m3	Hallway-Downstairs	1	NR	NR	NR	Between closet and stairwell	NR
1210	Property 1	Residential	4/12/2016	14:08	834	820	817	824	2	NR	NR	ng/m3	Hallway-Downstairs	1	NR	NR	NR	Breathing zone	NR
1210	Property 1	Residential	4/12/2016	14:09	789	796	797	794	1	NR	NR	ng/m3	Living Room	1	NR	NR	NR	Behind couch	NR
1210	Property 1	Residential	4/12/2016	14:10	774	776	773	774	0	NR	NR	ng/m3	Living Room	1	NR	NR	NR	Behind couch breathing zone	NR
1210	Property 1	Residential	4/12/2016	14:11	3169	3728	4210	3703	28	NR	NR	ng/m3	Living Room	1	NR	NR	NR	Throw rug	NR
1210	Property 1	Residential	4/12/2016	14:12	974	973	991	979	1	NR	NR	ng/m3	Living Room	1	NR	NR	NR	Throw rug breathing zone	NR
1210	Property 1	Residential	4/12/2016	14:14	762	780	774	772	2	NR	NR	ng/m3	Kitchen	1	NR	NR	NR	Breathing zone	NR
1210	Property 1	Residential	4/12/2016	14:14	706	698	700	701	1	NR	NR	ng/m3	Kitchen	1	NR	NR	NR	Adjacent to dishwasher	NR
1210	Property 1	Residential	4/12/2016	14:17	1707	1507	1655	1623	12	NR	NR	ng/m3	Dining Room	1	NR	NR	NR	Black and white throw rug	NR
1210	Property 1	Residential	4/12/2016	14:18	868	783	786	812	10	NR	NR	ng/m3	Dining Room	1	NR	NR	NR	Gray and white throw rug	NR
1210	Property 1	Residential	4/12/2016	14:20	1362	1206	1232	1267	12	NR	NR	ng/m3	Dining Room	1	NR	NR	NR	Beige throw rug	NR
1210	Property 1	Residential	4/12/2016	14:21	1460	1083	962	1168	42	NR	NR	ng/m3	Dining Room	1	NR	NR	NR	Turkish rugs	NR
1210	Property 1	Residential	4/12/2016	14:22	1057	856	854	922	21	NR	NR	ng/m3	Dining Room	1	NR	NR	NR	Breathing zone by back door	NR
1210	Property 1	Residential	4/12/2016	14:25	798	781	779	786	2	NR	NR	ng/m3	Dining Room	1	NR	NR	NR	Wood floor	NR
1210	Property 1	Residential	4/12/2016	14:28	963	893	867	908	10	NR	NR	ng/m3	Office	1	NR	NR	NR	Area rug	NR
1210	Property 1	Residential	4/12/2016	14:29	819	826	837	827	2	NR	NR	ng/m3	Office	1	NR	NR	NR	Breathing zone	NR
1210	Property 1	Residential	4/12/2016	14:30	866	915	926	902	6	NR	NR	ng/m3	Office	1	NR	NR	NR	Hardwood floor	NR
1210	Property 1	Residential	4/12/2016	14:32	3152	2400	1575	2376	66	NR	NR	ng/m3	Stairwell-Basement	BA	NR	NR	NR	4th step from top	NR
1210	Property 1	Residential	4/12/2016	14:35	1696	2815	3278	2596	60	NR	NR	ng/m3	Stairwell-Basement	BA	NR	NR	NR	8th step from top	NR
1210	Property 1	Residential	4/12/2016	14:37	2750	2849	4804	3468	59	NR	NR	ng/m3	Stairwell-Basement	BA	NR	NR	NR	3rd step from bottom	NR
1210	Property 1	Residential	4/12/2016	14:38	1276	1262	1181	1239	7	NR	NR	ng/m3	Stairwell-Basement	BA	NR	NR	NR	Breathing zone	NR
1210	Property 1	Residential	4/12/2016	14:40	1338	1775	1764	1609	26	NR	NR	ng/m3	Basement	BA	NR	NR	NR	Landing	NR
1210	Property 1	Residential	4/12/2016	14:42	2387	2475	3482	2781	39	NR	NR	ng/m3	Basement	BA	NR	NR	NR	Landing	NR
1210	Property 1	Residential	4/12/2016	14:43	1176	1251	1289	1238	9	NR	NR	ng/m3	Basement	BA	NR	NR	NR	Landing	NR
1210	Property 1	Residential	4/12/2016	14:47	756	755	806	772	6	NR	NR	ng/m3	Basement	BA	NR	NR	NR	Area rug	NR
1210	Property 1	Residential	4/12/2016	14:49	1239	1302	1078	1206	18	NR	NR	ng/m3	Basement	BA	NR	NR	NR	4 feet off table	NR
1210	Property 1	Residential	4/12/2016	14:52	805	802	808	805	0	NR	NR	ng/m3	Basement	BA	NR	NR	NR	Playroom	NR
1210	Property 1	Residential	4/12/2016	14:54	864	866	867	865	0	NR	NR	ng/m3	Basement	BA	NR	NR	NR	Playroom breathing zone	NR
1210	Property 1	Residential	4/12/2016	14:55	943	966	1188	1033	23	NR	NR	ng/m3	Basement	BA	NR	NR	NR	Adjacent to TV	NR

NA- Not Applicable
NR- Not Recorded
R - Standard Deviation

Appendix G: Lumex Screening Results Summary Table
Greenleafe Drive Mercury Response Site
Baldwinsville, Onondaga County, New York

Serial Number	Property Number	Land Use	Date	Time	Screeining-1	Screeining-2	Screeining-3	Average Screening Result	R	Minimum	Maximum	Units	Location	Floor	Floor Cover	Height	Item Type	Description	Temperature (˚F)
1210	Property 1	Residential	4/12/2016	14:56	929	953	953	945	2	NR	NR	ng/m3	Basement	BA	NR	NR	NR	Center of room breathing zone	NR
616	Property 4	Residential	4/9/2016	19:38	6	8	7	<10	NR	NR	NR	ng/m3	Stairwell-Downstairs	1	NR	NR	NR	Stairs, ground level, floor	NR
616	Property 4	Residential	4/9/2016	19:48	9	10	9	<10	NR	NR	NR	ng/m3	Living Room	1	NR	NR	NR	TV room, floor	NR
616	Property 3	Residential	4/9/2016	18:08	3279	3423	4080	3594	22	NR	NR	ng/m3	Stairwell-Downstairs	1	NR	NR	NR	Ground level, stairs, floor (repeat)	NR
616	Property 3	Residential	4/9/2016	17:30	5399	2326	2089	3271	101	NR	NR	ng/m3	Kitchen	1	NR	NR	NR	Kitchen, floor (repeat)	NR
616	Property 3	Residential	4/9/2016	18:07	3003	2589	3552	3048	31	NR	NR	ng/m3	Stairwell-Downstairs	1	NR	NR	NR	Ground level, stairs, floor	NR
616	Property 3	Residential	4/9/2016	17:29	2832	3968	2186	2995	59	NR	NR	ng/m3	Kitchen	1	NR	NR	NR	Kitchen, floor	NR
616	Property 3	Residential	4/9/2016	18:11	2903	2944	2983	2943	2	NR	NR	ng/m3	Bedroom-Son (12)	2	NR	NR	NR	Bedroom, son (12), hamper	NR
616	Property 1	Residential	4/9/2016	15:46	1777	4169	2812	2919	81	NR	NR	ng/m3	Garage	1	NR	NR	NR	Garage, middle area, floor	NR
616	Property 3	Residential	4/9/2016	17:42	2358	2516	2622	2499	10	NR	NR	ng/m3	Bathroom-Downstairs	1	NR	NR	NR	Ground level bathroom, floor (repeat)	NR
616	Property 3	Residential	4/9/2016	17:32	2431	2800	2162	2464	25	NR	NR	ng/m3	Kitchen	1	NR	NR	NR	Kitchen, floor (repeat)	NR
616	Property 3	Residential	4/9/2016	17:49	2403	2482	2392	2426	6	NR	NR	ng/m3	Bedroom-Son (12)	2	NR	NR	NR	Bedroom, son (12), floor	NR
616	Property 1	Residential	4/9/2016	13:44	1663	1693	1643	1666	2	NR	NR	ng/m3	Stairwell-Downstairs	1	NR	NR	NR	Stairs, ground level, floor	NR
616	Property 3	Residential	4/9/2016	18:09	2306	2309	2365	2327	2	NR	NR	ng/m3	Stairwell-Downstairs	1	NR	NR	NR	Ground level, stairs, ceiling	NR
616	Property 3	Residential	4/9/2016	17:41	1889	2462	2580	2310	29	NR	NR	ng/m3	Bathroom-Downstairs	1	NR	NR	NR	Ground level bathroom, floor	NR
616	Property 1	Residential	4/9/2016	15:00	1476	1724	1517	1572	15	NR	NR	ng/m3	Kitchen	1	NR	NR	NR	Kitchen, dining, floor	NR
616	Property 3	Residential	4/9/2016	17:35	1816	3179	1808	2268	60	NR	NR	ng/m3	Office	1	NR	NR	NR	Office floor	NR
616	Property 1	Residential	4/9/2016	13:42	1571	1553	1560	1561	1	NR	NR	ng/m3	Stairwell-Downstairs	1	NR	NR	NR	Stairs, ground level, breathing zone	NR
616	Property 1	Residential	4/9/2016	15:48	1239	1240	1373	1284	1	NR	NR	ng/m3	Garage	1	NR	NR	NR	Garage, middle, floor (repeat)	NR
616	Property 3	Residential	4/9/2016	17:49	2231	2235	2209	2225	1	NR	NR	ng/m3	Bedroom-Son (12)	2	NR	NR	NR	Bedroom, son (12), ceiling	NR
616	Property 1	Residential	4/9/2016	15:07	1289	1269	1281	1280	1	NR	NR	ng/m3	Hallway-Downstairs	1	NR	NR	NR	Hall near garage door, ceiling	NR
616	Property 1	Residential	4/9/2016	15:05	1217	1232	1256	1235	3	NR	NR	ng/m3	Hallway-Downstairs	1	NR	NR	NR	Hall near garage door, floor	NR
616	Property 1	Residential	4/9/2016	15:03	1235	1177	1156	1189	6	NR	NR	ng/m3	Living Room	1	NR	NR	NR	Living, ceiling	NR
616	Property 3	Residential	4/9/2016	17:43	2065	2102	2087	2085	1	NR	NR	ng/m3	Bathroom-Downstairs	1	NR	NR	NR	Ground level bathroom, ceiling	NR
616	Property 1	Residential	4/9/2016	15:02	1115	1154	1135	1135	3	NR	NR	ng/m3	Living Room	1	NR	NR	NR	Living, floor	NR
616	Property 1	Residential	4/9/2016	14:46	1175	1123	1091	1130	7	NR	NR	ng/m3	Bathroom-Downstairs	1	NR	NR	NR	Bathroom, downstairs, ceiling	NR
616	Property 3	Residential	4/9/2016	17:33	2058	2021	2009	2029	2	NR	NR	ng/m3	Kitchen	1	NR	NR	NR	Kitchen, ceiling	NR
616	Property 1	Residential	4/9/2016	15:01	1097	1126	1131	1118	3	NR	NR	ng/m3	Kitchen	1	NR	NR	NR	Kitchen, dining, ceiling	NR
616	Property 3	Residential	4/9/2016	18:04	1983	2013	2027	2008	2	NR	NR	ng/m3	Hallyway-Upstairs	2	NR	NR	NR	Upstairs hall closet, ceiling	NR
616	Property 3	Residential	4/9/2016	17:50	1976	2076	1964	2005	5	NR	NR	ng/m3	Bathroom-Upstairs	2	NR	NR	NR	Upstairs bathroom, floor	NR
616	Property 1	Residential	4/9/2016	14:53	993	1105	1190	1096	17	NR	NR	ng/m3	Kitchen	1	NR	NR	NR	Kitchen, island, floor	NR
616	Property 3	Residential	4/9/2016	17:37	2327	1953	1711	1997	30	NR	NR	ng/m3	Office	1	NR	NR	NR	Office floor (repeat)	NR
616	Property 3	Residential	4/9/2016	17:56	1973	1981	2007	1987	1	NR	NR	ng/m3	Stairwell-Upstairs	2	NR	NR	NR	Upstairs stairs, ceiling	NR
616	Property 3	Residential	4/9/2016	17:26	1947	1985	1965	1965	1	NR	NR	ng/m3	Living Room	1	NR	NR	NR	TV room, floor	NR
616	Property 1	Residential	4/9/2016	14:44	1020	1013	1052	1028	3	NR	NR	ng/m3	Bathroom-Downstairs	1	NR	NR	NR	Bathroom, downstairs, floor	NR
616	Property 1	Residential	4/9/2016	14:46	1038	1021	995	1018	4	NR	NR	ng/m3	Office	1	NR	NR	NR	Office, dog feeding, floor	NR
616	Property 1	Residential	4/9/2016	15:45	1664	672	684	1007	98	NR	NR	ng/m3	Garage	1	NR	NR	NR	Garage, tool space, floor (repeat)	NR
616	Property 1	Residential	4/9/2016	14:51	994	1008	1012	1005	1	NR	NR	ng/m3	Kitchen	1	NR	NR	NR	Kitchen, stove, floor	NR
616	Property 1	Residential	4/9/2016	14:48	994	994	981	990	4	NR	NR	ng/m3	Office	1	NR	NR	NR	Office, dog feeding, ceiling	NR
616	Property 1	Residential	4/9/2016	15:44	992	979	982	984	1	NR	NR	ng/m3	Garage	1	NR	NR	NR	Garage, tool space, ceiling	NR
616	Property 3	Residential	4/9/2016	17:58	1827	1900	1939	1889	5	NR	NR	ng/m3	Bedroom-Spare	2	NR	NR	NR	Bedroom, spare, floor	NR
616	Property 1	Residential	4/9/2016	14:55	1044	955	942	980	10	NR	NR	ng/m3	Kitchen	1	NR	NR	NR	Kitchen, island, ceiling	NR
616	Property 3	Residential	4/9/2016	17:27	1880	1877	1900	1885	1	NR	NR	ng/m3	Living Room	1	NR	NR	NR	TV room, ceiling	NR
616	Property 3	Residential	4/9/2016	17:59	1878	1874	1904	1885	1	NR	NR	ng/m3	Bedroom-Spare	2	NR	NR	NR	Bedroom, spare, ceiling	NR
616	Property 1	Residential	4/9/2016	14:52	1009	924	917	950	9	NR	NR	ng/m3	Kitchen	1	NR	NR	NR	Kitchen, stove, ceiling	NR
616	Property 1	Residential	4/9/2016	15:15	1047	877	857	927	20	NR	NR	ng/m3	Basement	1	NR	NR	NR	Basement, stairs closet, floor	NR
616	Property 3	Residential	4/9/2016	17:40	1898	1869	1851	1873	2	NR	NR	ng/m3	Bathroom-Downstairs	1	NR	NR	NR	Dining room, ceiling	NR
616	Property 1	Residential	4/9/2016	15:32	855	962	936	918	11	NR	NR	ng/m3	Laundry Room	1	NR	NR	NR	Laundry, ceiling	NR
616	Property 3	Residential	4/9/2016	17:53	1825	1865	1876	1855	2	NR	NR	ng/m3	Bedroom-Son (17)	2	NR	NR	NR	Bedroom, son (17), floor	NR
616	Property 1	Residential	4/9/2016	15:37	897	862	876	878	4	NR	NR	ng/m3	Garage	1	NR	NR	NR	Garage, door to home, ceiling	NR
616	Property 1	Residential	4/9/2016	15:39	984	640	704	776	44	NR	NR	ng/m3	Garage	1	NR	NR	NR	Garage, tool space, floor	NR
616	Property 1	Residential	4/9/2016	15:30	709	655	682	682	7	NR	NR	ng/m3	Laundry Room	1	NR	NR	NR	Laundry, floor	NR
616	Property 3	Residential	4/9/2016	17:52	1843	1813	1805	1820	2	NR	NR	ng/m3	Bathroom-Upstairs	2	NR	NR	NR	Upstairs bathroom, ceiling	NR
616	Property 1	Residential	4/9/2016	15:34	519	511	550	527	7	NR	NR	ng/m3	Garage	1	NR	NR	NR	Garage, door to home, floor	NR
616	Property 3	Residential	4/9/2016	17:54	1793	1790	1814	1799	1	NR	NR	ng/m3	Bedroom-Son (17)	2	NR	NR	NR	Bedroom, son (17), ceiling	NR
616	Property 1	Residential	4/9/2016	15:47	267	495	563	442	66	NR	NR	ng/m3	Garage	1	NR	NR	NR	Garage, middle, ceiling	NR
616	Property 1	Residential	4/9/2016	15:50	336	325	452	371	34	NR	NR	ng/m3	Garage	1	NR	NR	NR	Garage, middle, ceiling (repeat)	NR
616	Property 3	Residential	4/9/2016	18:01	1752	1779	1802	1778	2	NR	NR	ng/m3	Bedroom-Master	2	NR	NR	NR	Bedroom, master, ceiling	NR
616	Property 1	Residential	4/9/2016	13:59	2009	1903	3090	2334	50	NR	NR	ng/m3	Stairwell-Upstairs	2	NR	NR	NR	Upstairs stairwell, floor	NR
616	Property 3	Residential	4/9/2016	17:39	1782	1770	1763	1772	1	NR	NR	ng/m3	Office	1	NR	NR	NR	Office ceiling	NR
616	Property 3	Residential	4/9/2016	17:34	1969	1657	1675	1767	17	NR	NR	ng/m3	Dining Room	1	NR	NR	NR	Dining room, floor	NR
616	Property 1	Residential	4/9/2016	14:41	2282	2262	2264	2270	0	NR	NR	ng/m3	Hallway-Upstairs	2	NR	NR	NR	Upstairs hall closet, closet	NR
616	Property 3	Residential	4/9/2016	17:38	1710	1782	1782	1758	4	NR	NR	ng/m3	Office	1	NR	NR	NR	Office floor (repeat)	NR
616	Property 3	Residential	4/9/2016	17:55	1819	1706	1683	1736	7	NR	NR	ng/m3	Stairwell-Upstairs	2	NR	NR	NR	Upstairs stairs, floor	NR
616	Property 3	Residential	4/9/2016	18:02	1683	1720	1772	1725	5	NR	NR	ng/m3	Bathroom-Master	2	NR	NR	NR	Master bathroom, floor	NR
616	Property 1	Residential	4/9/2016	13:56	2200	2274	2297	2257	4	NR	NR	ng/m3	Bathroom-Upstairs	2	NR	NR	NR	Upstairs bathroom, ceiling	NR
616	Property 1	Residential	4/9/2016	14:32	2243	2192	2253	2229	2	NR	NR	ng/m3	Bedroom-Master	2	NR	NR	NR	Bedroom, master, bathroom, floor	NR
616	Property 1	Residential	4/9/2016	13:55	1944	2201	2323	2156	17	NR	NR	ng/m3	Bathroom-Upstairs	2	NR	NR	NR	Upstairs bathroom, floor	NR
616	Property 3	Residential	4/9/2016	18:03	1704	1700	1711	1705	0	NR	NR	ng/m3	Bathroom-Master	2	NR	NR	NR	Master bathroom, ceiling	NR
616	Property 1	Residential	4/9/2016	14:37	2108	2111	2097	2105	0	NR	NR	ng/m3	Bedroom-Master	2	NR	NR	NR	Bedroom, master, bathroom, ceiling	NR
616	Property 1	Residential	4/9/2016	14:38	2094	2091	2074	2086	0	NR	NR	ng/m3	Bedroom-Master	2	NR	NR	NR	Bedroom, master, bathroom, ceiling (repeat)	NR
616	Property 1	Residential	4/9/2016	19:05	2135	1936	2096	2056	9	NR	NR	ng/m3	Stairwell-Upstairs	2	NR	NR	NR	Top of stairs, floor	NR
616	Property 3	Residential	4/9/2016	18:00	1648	1643	1692	1661	2	NR	NR	ng/m3	Bedroom-Master	2	NR	NR	NR	Bedroom, master, floor	NR
616	Property 1	Residential	4/9/2016	13:59	2168	1869	2079	2038	14	NR	NR	ng/m3	Stairwell-Upstairs	2	NR	NR	NR	Upstairs stairwell, floor (repeat)	NR
616	Property 3	Residential	4/9/2016	18:04	1591	1643	1638	1624	3	NR	NR	ng/m3	Hallyway-Upstairs	2	NR	NR	NR	Upstairs hall closet, floor	NR
616	Property 1	Residential	4/9/2016	19:12	1981	2016	2050	2016	3	NR	NR	ng/m3	Bathroom-Upstairs	2	NR	NR	NR	Upstairs hall bathroom, ceiling	NR
616	Property 1	Residential	4/9/2016	19:12	1954	2033	2027	2005	3	NR	NR	ng/m3	Bathroom-Upstairs	2	NR	NR	NR	Upstairs hall bathroom, floor	NR
616	Property 3	Residential	4/9/2016	17:23	1568	1603	1539	1570	4	NR	NR	ng/m3	Hallway-Downstairs	1	NR	NR	NR	Front entrance, floor	NR
616	Property 1	Residential	4/9/2016	14:16	1975	1934	1982	1964	2	NR	NR	ng/m3	Bedroom-Master	2	NR	NR	NR	Bedroom, master, floor	NR
616	Property 1	Residential	4/9/2016	14:19	1964	1951	1950	1955	0	NR	NR	ng/m3	Bedroom-Master	2	NR	NR	NR	Bedroom, master, ceiling (repeat)	NR
616	Property 3	Residential	4/9/2016	17:25	1508	1534	1528	1523	1	NR	NR	ng/m3	Hallway-Downstairs	1	NR	NR	NR	Front entrance, ceiling	NR
616	Property 1	Residential	4/9/2016	14:17	1946	1954	1955	1951	0	NR	NR	ng/m3	Bedroom-Master	2	NR	NR	NR	Bedroom, master, ceiling	NR
616	Property 3	Residential	4/9/2016	18:13	1052	1258	1859	1390	58	NR	NR	ng/m3	Garage	1	NR	NR	NR	Garage, floor	NR
616	Property 1	Residential	4/9/2016	14:00	1909	1974	1855	1912	6	NR	NR	ng/m3	Stairwell-Upstairs	2	NR	NR	NR	Upstairs stairwell, ceiling	NR
616	Property 1	Residential	4/9/2016	14:03	1791	1915	1981	1896	10	NR	NR	ng/m3	Bedroom-Son	2	NR	NR	NR	Bedroom, son, entrance to room, ceiling	NR

NA- Not Applicable
NR- Not Recorded
R - Standard Deviation

Appendix G: Lumex Screening Results Summary Table
Greenleafe Drive Mercury Response Site
Baldwinsville, Onondaga County, New York

Serial Number	Property Number	Land Use	Date	Time	Screeining-1	Screeining-2	Screeining-3	Average Screening Result	R	Minimum	Maximum	Units	Location	Floor	Floor Cover	Height	Item Type	Description	Temperature (°F)
616	Property 1	Residential	4/9/2016	14:06	1818	1946	1907	1890	6	NR	NR	ng/m3	Bedroom-Son	2	NR	NR	NR	Bedroom, son, floor, clothes pile, floor	NR
616	Property 1	Residential	4/9/2016	14:22	1895	1896	1869	1886	1	NR	NR	ng/m3	Bedroom-Master	2	NR	NR	NR	Bedroom, master, closet, ceiling	NR
616	Property 1	Residential	4/9/2016	14:11	1913	1869	1870	1884	2	NR	NR	ng/m3	Bedroom-Son	2	NR	NR	NR	Bedroom, son, ceiling, back corner (repeat)	NR
616	Property 1	Residential	4/9/2016	14:21	1971	1843	1805	1873	8	NR	NR	ng/m3	Bedroom-Master	2	NR	NR	NR	Bedroom, master, closet, floor	NR
616	Property 3	Residential	4/9/2016	18:14	1213	1125	1078	1139	11	NR	NR	ng/m3	Garage	1	NR	NR	NR	Garage, floor (repeat)	NR
616	Property 1	Residential	4/9/2016	14:08	1825	1881	1881	1862	3	NR	NR	ng/m3	Bedroom-Son	2	NR	NR	NR	Bedroom, son, floor, clothes pile, ceilng	NR
616	Property 1	Residential	4/9/2016	14:14	1787	1893	1883	1854	5	NR	NR	ng/m3	Bedroom-Son	2	NR	NR	NR	Bedroom, son, closet, ceiling	NR
616	Property 1	Residential	4/9/2016	14:10	1854	1849	1854	1852	0	NR	NR	ng/m3	Bedroom-Son	2	NR	NR	NR	Bedroom, son, ceiling, back corner	NR
616	Property 3	Residential	4/9/2016	17:47	1082	1143	1106	1110	5	NR	NR	ng/m3	Basement	BA	NR	NR	NR	Basement, ceiling	NR
616	Property 1	Residential	4/9/2016	14:09	1851	1823	1838	1837	1	NR	NR	ng/m3	Bedroom-Son	2	NR	NR	NR	Bedroom, son, floor, back corner	NR
616	Property 1	Residential	4/9/2016	19:19	1807	1810	1834	1817	1	NR	NR	ng/m3	Bedroom-Son	2	NR	NR	NR	Bedroom, son, floor	NR
616	Property 1	Residential	4/9/2016	14:40	1755	1784	1837	1792	4	NR	NR	ng/m3	Hallway-Upstairs	2	NR	NR	NR	Upstairs hall closet, floor	NR
616	Property 1	Residential	4/9/2016	14:02	1808	1791	1752	1784	3	NR	NR	ng/m3	Bedroom-Son	2	NR	NR	NR	Bedroom, son, entrance to room	NR
616	Property 1	Residential	4/9/2016	19:20	1767	1779	1775	1774	0	NR	NR	ng/m3	Bedroom-Son	2	NR	NR	NR	Bedroom, son, ceiling	NR
616	Property 1	Residential	4/9/2016	19:15	1723	1834	1745	1767	6	NR	NR	ng/m3	Bathroom-Master	2	NR	NR	NR	Master bathroom, floor	NR
616	Property 3	Residential	4/9/2016	17:45	1133	1050	1010	1064	11	NR	NR	ng/m3	Basement	BA	NR	NR	NR	Basement, floor	NR
616	Property 1	Residential	4/9/2016	19:15	1716	1728	1731	1725	0	NR	NR	ng/m3	Bathroom-Master	2	NR	NR	NR	Master bathroom, ceiling	NR
616	Property 1	Residential	4/9/2016	19:17	1720	1697	1721	1712	1	NR	NR	ng/m3	Bedroom-Master	2	NR	NR	NR	Master bedroom, floor	NR
616	Property 1	Residential	4/9/2016	14:12	1774	1691	1659	1708	6	NR	NR	ng/m3	Bedroom-Son	2	NR	NR	NR	Bedroom, son, closet, floor	NR
616	Property 1	Residential	4/9/2016	19:18	1700	1697	1693	1697	0	NR	NR	ng/m3	Bedroom-Master	2	NR	NR	NR	Master bedroom, ceiling	NR
616	Property 1	Residential	4/9/2016	19:10	1688	1648	1655	1664	2	NR	NR	ng/m3	Stairwell-Upstairs	2	NR	NR	NR	Top of stairs, ceiling	NR
616	Property 1	Residential	4/9/2016	13:48	1727	1655	1564	1648	9	NR	NR	ng/m3	Bedroom-Daughter	2	NR	NR	NR	Bedroom, daughter (17), floor carpet	NR
616	Property 1	Residential	4/9/2016	13:52	1627	1559	1536	1574	5	NR	NR	ng/m3	Bedroom-Baby	2	NR	NR	NR	Bedroom, baby, carpet	NR
616	Property 1	Residential	4/9/2016	13:50	1541	1535	1543	1539	0	NR	NR	ng/m3	Bedroom-Daughter	2	NR	NR	NR	Bedroom, daughter (17), floor ceiling	NR
616	Property 1	Residential	4/9/2016	13:53	1506	1509	1507	1507	0	NR	NR	ng/m3	Bedroom-Baby	2	NR	NR	NR	Bedroom, baby, ceiling	NR
616	Property 1	Residential	4/9/2016	15:09	1237	1253	1289	1260	4	NR	NR	ng/m3	Basement	BA	NR	NR	NR	Basement, bottom stairs, ceiling	NR
616	Property 1	Residential	4/9/2016	15:16	1169	1120	1138	1143	4	NR	NR	ng/m3	Basement	BA	NR	NR	NR	Basement, stairs closet, floor	NR
616	Property 3	Residential	4/9/2016	18:15	823	846	888	852	7	NR	NR	ng/m3	Garage	1	NR	NR	NR	Garage, ceiling	NR
616	Property 1	Residential	4/9/2016	15:11	1081	1111	1125	1106	3	NR	NR	ng/m3	Basement	BA	NR	NR	NR	Basement, couches, ceiling	NR
616	Property 1	Residential	4/9/2016	15:14	1096	1106	1107	1103	1	NR	NR	ng/m3	Basement	BA	NR	NR	NR	Basement, back hoops room, ceiling	NR
616	Property 1	Residential	4/9/2016	15:12	1086	1149	1072	1102	6	NR	NR	ng/m3	Basement	BA	NR	NR	NR	Basement, back hoops room, floor	NR
616	Property 1	Residential	4/9/2016	15:08	1156	1064	1045	1088	10	NR	NR	ng/m3	Basement	BA	NR	NR	NR	Basement, bottom stairs, floor	NR
616	Property 1	Residential	4/9/2016	15:10	1094	1097	1056	1082	3	NR	NR	ng/m3	Basement	BA	NR	NR	NR	Basement, couches, floor	NR
616	Property 1	Residential	4/9/2016	16:37	235	386	512	378	73	NR	NR	ng/m3	Outdoor	NA	NR	NR	NR	Soil, 4 feet north of basketball hoop	NR
616	Property 1	Residential	4/9/2016	16:39	243	282	492	339	73	NR	NR	ng/m3	Outdoor	NA	NR	NR	NR	Soil, 4 feet north of basketball hoop	NR
616	Property 1	Residential	4/9/2016	16:38	172	275	213	220	46	NR	NR	ng/m3	Outdoor	NA	NR	NR	NR	Soil, 4 feet north of basketball hoop	NR
616	Property 1	Residential	4/9/2016	16:30	154	246	221	207	44	NR	NR	ng/m3	Outdoor	NA	NR	NR	NR	Soil, 4 feet south of basketball hoop	NR
616	Property 1	Residential	4/9/2016	16:32	166	193	262	207	45	NR	NR	ng/m3	Outdoor	NA	NR	NR	NR	Soil, 4 feet south of basketball hoop	NR
616	Property 1	Residential	4/9/2016	16:33	213	169	62	148	101	NR	NR	ng/m3	Outdoor	NA	NR	NR	NR	Soil, under basketball hoop	NR
616	Property 1	Residential	4/9/2016	16:30	58	90	198	116	119	NR	NR	ng/m3	Outdoor	NA	NR	NR	NR	Soil, 4 feet south of basketball hoop	NR
616	Property 1	Residential	4/9/2016	16:35	82	122	105	103	38	NR	NR	ng/m3	Outdoor	NA	NR	NR	NR	Soil, under basketball hoop	NR
616	Property 1	Residential	4/9/2016	16:35	70	65	82	72	24	NR	NR	ng/m3	Outdoor	NA	NR	NR	NR	Soil, under basketball hoop	NR
616	Property 4	Residential	4/9/2016	19:50	21	42	46	36	66	NR	NR	ng/m3	Living Room	1	NR	NR	NR	TV room, ceiling (repeat)	NR
616	Property 1	Residential	4/9/2016	15:25	39	31	28	33	34	NR	NR	ng/m3	Outdoor	NA	NR	NR	NR	Outdoor, end of driveway	NR
616	Property 4	Residential	4/9/2016	19:46	23	27	41	30	60	NR	NR	ng/m3	Stairwell-Downstairs	1	NR	NR	NR	Stairs, ground level, ceiling	NR
616	Property 1	Residential	4/9/2016	15:26	23	28	27	26	16	NR	NR	ng/m3	Outdoor	NA	NR	NR	NR	Outdoor, end of driveway (repeat)	NR
616	Property 4	Residential	4/9/2016	19:49	20	32	27	26	41	NR	NR	ng/m3	Living Room	1	NR	NR	NR	TV room, ceiling	NR
616	Property 4	Residential	4/9/2016	19:51	15	27	36	26	78	NR	NR	ng/m3	Living Room	1	NR	NR	NR	TV room, ceiling (repeat)	NR
616	Property 4	Residential	4/9/2016	19:41	22	24	27	24	20	NR	NR	ng/m3	Stairwell-Downstairs	1	NR	NR	NR	Stairs, ground level, ceiling	NR
616	Property 4	Residential	4/9/2016	19:47	15	26	18	20	55	NR	NR	ng/m3	Stairwell-Downstairs	1	NR	NR	NR	Stairs, ground level, ceiling (repeat)	NR
616	Property 4	Residential	4/9/2016	19:42	18	13	11	14	45	NR	NR	ng/m3	Stairwell-Upstairs	2	NR	NR	NR	Stairs, upstairs, floor	NR
616	Property 4	Residential	4/9/2016	19:44	14	13	13	13	3	NR	NR	ng/m3	Stairwell-Upstairs	2	NR	NR	NR	Stairs, upstairs, floor (repeat)	NR
616	Property 3	Residential	4/9/2016	18:18	13	12	8	10		NR	NR	ng/m3	Outdoor	NA	NR	NR	NR	End of driveway	NR
616	Property 3	Residential	4/9/2012	14:41	1308	163	137	444	69	NR	NR	ng/m3	Stairwell-Downstairs	1	NR	NR	NR	Ground level, stairs, floor	NR
616	Property 3	Residential	4/9/2012	14:38	577	184	1441	734	171	NR	NR	ng/m3	Bathroom-Downstairs	1	NR	NR	NR	Ground level bathroom, floor	NR
616	Property 3	Residential	4/9/2012	14:42	763	1509	227	833	153	NR	NR	ng/m3	Stairwell-Downstairs	1	NR	NR	NR	Ground level, stairs, floor (repeat)	NR
616	Property 3	Residential	4/9/2012	14:33	811	733	994	846	30	NR	NR	ng/m3	Hallway-Downstairs	1	NR	NR	NR	Front entrance, floor (repeat)	NR
616	Property 3	Residential	4/10/2016	14:39	436	943	1217	865	90	NR	NR	ng/m3	Bathroom-Downstairs	1	NR	NR	NR	Ground level bathroom, floor (repeat)	NR
616	Property 1	Residential	4/10/2016	14:25	830	752	1104	895	39	NR	NR	ng/m3	Bedroom-Son	1	NR	NR	NR	Bags from Residence	NR
616	Property 3	Residential	4/10/2016	14:34	1167	1308	231	902	119	NR	NR	ng/m3	Hallway-Downstairs	1	NR	NR	NR	Front entrance, ceiling	NR
616	Property 3	Residential	4/10/2016	14:45	825	749	1674	1082	85	NR	NR	ng/m3	Basement	BA	NR	NR	NR	Basement, floor	NR
616	Property 3	Residential	4/10/2016	14:32	1772	524	1080	1125	110	NR	NR	ng/m3	Hallway-Downstairs	1	NR	NR	NR	Front entrance, floor	NR
616	Property 3	Residential	4/10/2016	14:46	591	1507	1310	1136	80	NR	NR	ng/m3	Basement	BA	NR	NR	NR	Basement, floor	NR
616	Property 3	Residential	4/10/2016	14:44	1120	56	2531	1198	215	NR	NR	ng/m3	Basement	BA	NR	NR	NR	Basement, floor	NR
616	Property 1	Residential	4/10/2016	14:26	4690	2529	1594	2938	3240	NR	NR	ng/m3	Bedroom-Son	1	NR	NR	NR	Bags from Residence	NR
1210	Property 1	Residential	4/11/2016	14:38	5072	6653	6491	6072	26	NR	NR	ng/m3	Bedroom-Master	2	NR	NR	NR	Entrance	NR
1210	Property 1	Residential	4/11/2016	19:01	3499	3968	4727	4065	30	NR	NR	ng/m3	Bedroom-Master	2	NR	NR	NR	Entrance	NR
1210	Property 1	Residential	4/11/2016	19:32	2655	3072	2638	2788	15	NR	NR	ng/m3	Living Room	1	NR	NR	NR	Rug	NR
1210	Property 1	Residential	4/11/2016	19:23	1869	2095	2486	2150	28	NR	NR	ng/m3	Office	1	NR	NR	NR	Rug in office	NR
1210	Property 1	Residential	4/11/2016	19:37	2065	2131	2100	2099	3	NR	NR	ng/m3	Bathroom-Downstairs	1	NR	NR	NR	Floor	NR
1210	457 Main Street	Residential	4/11/2016	18:05	158	160	159	159	1	NR	NR	ng/m3	Garage	1	NR	NR	NR	SCBA back pack	NR
1210	457 Main Street	Residential	4/11/2016	18:01	1405	1386	1245	1345	11	NR	NR	ng/m3	Garage	1	NR	NR	NR	Gear in poly bag underneath boots	NR
1210	457 Main Street	Residential	4/11/2016	17:52	540	208	331	360	92	NR	NR	ng/m3	Cubby	1	NR	NR	NR	Cubby (J. Wood) peaked at 1200 ng/m3	NR
1210	457 Main Street	Residential	4/11/2016	17:43	1499	1641	1547	1562	9	NR	NR	ng/m3	Truck	1	NR	NR	NR	R1	NR
1210	457 Main Street	Residential	4/11/2016	17:40	674	806	595	692	30	NR	NR	ng/m3	Washer	1	NR	NR	NR	NR	NR
1210	457 Main Street	Residential	4/11/2016	17:38	501	444	398	448	22	NR	NR	ng/m3	Garage	1	NR	NR	NR	Used Gear in poly bag	NR
1210	lementary Schoo	Residential	4/11/2016	17:11	8	7	7	10	<10	NR	NR	ng/m3	Room 146	1	NR	NR	NR	Carpet by book shelves	NR
1210	lementary Schoo	Residential	4/11/2016	17:08	29	30	38	32	6	NR	NR	ng/m3	Room 146	1	NR	NR	NR	Inside desk of son of 3244 Greenleafe Drive	NR
1210	Property 3	Residential	4/11/2016	16:06	12420	7732	9668	9941	47	NR	NR	ng/m3	Kitchen	1	NR	NR	NR	Floor rug at basement entrance	NR
1210	Property 3	Residential	4/11/2016	16:01	2673	5162	5138	4324	57	NR	NR	ng/m3	Kitchen	1	NR	NR	NR	One foot off sliding glass door (floor rug)	NR
1210	Property 3	Residential	4/11/2016	16:07	3836	3588	3665	3696	6	NR	NR	ng/m3	Living Room	1	NR	NR	NR	Boundary of living room and kitchen	NR
1210	Property 3	Residential	4/11/2016	16:18	3014	3292	3483	3263	14	NR	NR	ng/m3	Kitchen	1	NR	NR	NR	Throw rug adjacent to stove	NR
1210	Property 3	Residential	4/11/2016	15:59	2157	2181	2303	2213	6	NR	NR	ng/m3	Kitchen	1	NR	NR	NR	One foot off stove	NR
1210	Property 3	Residential	4/11/2016	15:46	2143	1960	1993	2032	9	NR	NR	ng/m3	Bedroom-Son (12)	2	NR	NR	NR	Center of room	NR
1210	Property 3	Residential	4/11/2016	16:00	1963	1950	1950	1954	0	NR	NR	ng/m3	Kitchen	1	NR	NR	NR	One foot off stove (breathing zone)	NR

NA- Not Applicable
NR- Not Recorded
R - Standard Deviation

Appendix G: Lumex Screening Results Summary Table
Greenleafe Drive Mercury Response Site
Baldwinsville, Onondaga County, New York

Serial Number	Property Number	Land Use	Date	Time	Screeining-1	Screeining-2	Screeining-3	Average Screening Result	R	Minimum	Maximum	Units	Location	Floor	Floor Cover	Height	Item Type	Description	Temperature (°F)
1210	Property 3	Residential	4/11/2016	16:14	1935	1905	1910	1917	1	NR	NR	ng/m3	Dining Room	1	NR	NR	NR	Door way between dining room and kitchen	NR
1210	Property 3	Residential	4/11/2016	15:57	1857	1773	1858	1830	4	NR	NR	ng/m3	Kitchen	1	NR	NR	NR	One foot off refrigerator	NR
1210	Property 3	Residential	4/11/2016	15:45	1765	1775	1814	1785	2	NR	NR	ng/m3	Bedroom-Son (12)	2	NR	NR	NR	Entrance	NR
1210	Property 3	Residential	4/11/2016	15:43	1700	1729	1764	1731	3	NR	NR	ng/m3	Stairwell-Upstairs	2	NR	NR	NR	Top of stairs	NR
1210	Property 3	Residential	4/11/2016	15:41	1707	1721	1722	1717	0	NR	NR	ng/m3	Stairwell-Downstairs	1	NR	NR	NR	Landing at bottom of stairs	NR
1210	Property 3	Residential	4/11/2016	15:50	1653	1643	1644	1647	0	NR	NR	ng/m3	Bedroom-Son (12)	2	NR	NR	NR	Center of room (breathing zone)	NR
1210	Property 3	Residential	4/11/2016	15:53	1560	1544	1536	1547	1	NR	NR	ng/m3	Spare Room	2	NR	NR	NR	Behind door	NR
1210	Property 3	Residential	4/11/2016	16:24	1344	1327	1565	1412	16	NR	NR	ng/m3	Garage	1	NR	NR	NR	Steps leading into house	NR
1210	Property 3	Residential	4/11/2016	16:10	1123	1622	1280	1342	37	NR	NR	ng/m3	Basement	BA	NR	NR	NR	Floor rug at landing	NR
1210	Property 3	Residential	4/11/2016	16:12	1011	1022	1011	1015	1	NR	NR	ng/m3	Basement	BA	NR	NR	NR	At landing (breathing zone)	NR
1210	Property 1	Residential	4/11/2016	19:34	2027	2004	1991	2007	1	NR	NR	ng/m3	Living Room	1	NR	NR	NR	Breathing zone	NR
1210	Property 1	Residential	4/11/2016	19:38	1987	1989	1988	1988	0	NR	NR	ng/m3	Bathroom-Downstairs	1	NR	NR	NR	Breathing Zone	NR
1210	Property 1	Residential	4/11/2016	19:00	1936	1845	2173	1985	16	NR	NR	ng/m3	Stairwell-Upstairs	2	NR	NR	NR	Entrance to bathroom	NR
1210	Property 1	Residential	4/11/2016	19:42	1932	1914	2069	1972	7	NR	NR	ng/m3	Bedroom-Baby	2	NR	NR	NR	Breathing zone	NR
1210	Property 1	Residential	4/11/2016	19:35	1977	1917	2003	1966	4	NR	NR	ng/m3	Hallway-Downstairs	1	NR	NR	NR	Adjacent to closet	NR
1210	Property 1	Residential	4/11/2016	19:42	1994	1913	1912	1939	4	NR	NR	ng/m3	Bedroom-Baby	2	NR	NR	NR	Floor	NR
1210	Property 1	Residential	4/11/2016	19:25	1878	1868	1870	1872	0	NR	NR	ng/m3	Office	1	NR	NR	NR	Office (breathing zone)	NR
1210	Property 1	Residential	4/11/2016	19:26	1796	1827	1850	1823	2	NR	NR	ng/m3	Kitchen	1	NR	NR	NR	Adjacent to stove	NR
1210	Property 1	Residential	4/11/2016	19:30	1802	1814	1813	1810	0	NR	NR	ng/m3	Dining Room	1	NR	NR	NR	Breathing zone	NR
1210	Property 1	Residential	4/11/2016	19:27	1804	1808	1850	1809	0	NR	NR	ng/m3	Kitchen	1	NR	NR	NR	Breathing zone	NR
1210	Property 1	Residential	4/11/2016	18:57	1540	1680	2110	1777	32	NR	NR	ng/m3	Stairwell-Upstairs	2	NR	NR	NR	Top of stairs	NR
1210	Property 1	Residential	4/11/2016	19:29	1757	1743	1753	1751	0	NR	NR	ng/m3	Dining Room	1	NR	NR	NR	Throw rug by back door	NR
1210	Property 1	Residential	4/11/2016	19:20	1786	1605	1578	1655	12	NR	NR	ng/m3	Hallway-Downstairs	2	NR	NR	NR	Throw rug at entrance	NR
1210	Property 1	Residential	4/11/2016	19:22	1621	1637	1694	1651	4	NR	NR	ng/m3	Hallway-Downstairs	2	NR	NR	NR	Front entrance (breathing zone)	NR
1210	Property 1	Residential	4/11/2016	14:25	2021	1932	837	1597	74	NR	NR	ng/m3	Stairwell-Upstairs	2	NR	NR	NR	Bathroom entrance	NR
1210	Property 1	Residential	4/11/2016	19:08	1517	1543	1517	1525	1	NR	NR	ng/m3	Stairwell-Upstairs	2	NR	NR	NR	Top of stairs	NR
1210	Property 1	Residential	4/11/2016	19:01	1466	1511	1459	1479	3	NR	NR	ng/m3	Bedroom-Son	2	NR	NR	NR	Adjacent to dresser	NR
1210	Property 1	Residential	4/11/2016	14:20	747	1064	784	865	36	NR	NR	ng/m3	Stairwell-Upstairs	2	NR	NR	NR	1 inch off floor, top of stairs	NR
1210	Property 1	Residential	4/11/2016	14:30	533	1081	590	735	74	NR	NR	ng/m3	Bedroom-Master	2	NR	NR	NR	Entrance	NR
1210	Property 1	Residential	4/11/2016	14:34	559	484	425	489	27	NR	NR	ng/m3	Bathroom-Master	2	NR	NR	NR	Bathroom rug by entrance	NR
1210	Property 1	Residential	4/11/2016	14:12	306	523	454	428	50	NR	NR	ng/m3	Bedroom-Son	2	NR	NR	NR	One inch off floor	NR
1210	Property 1	Residential	4/11/2016	14:40	162	144	146	151	11	NR	NR	ng/m3	Bedroom-Master	2	NR	NR	NR	Behind front door	NR
1210	Property 1	Residential	4/12/2016	10:48	4830	4849	4529	4736	6	NR	NR	ng/m3	Garage	1	NR	NR	NR	Poly bag with stuffed snowman	NR
1210	Property 1	Residential	4/12/2016	10:46	411	453	414	426	9	NR	NR	ng/m3	Garage	1	NR	NR	NR	Poly bag with radio	NR
1210	Property 1	Residential	4/12/2016	10:42	218	341	387	315	53	NR	NR	ng/m3	Garage	1	NR	NR	NR	Poly bag with lacrosse equipment	NR
1210	Property 1	Residential	4/12/2016	10:37	655	715	705	692	8	NR	NR	ng/m3	Garage	1	NR	NR	NR	Poly bag with HW	NR
1210	Property 1	Residential	4/12/2016	10:50	287	303	340	310	17	NR	NR	ng/m3	Garage	1	NR	NR	NR	Poly bag with homework	NR
1210	Property 1	Residential	4/12/2016	10:39	348	442	475	422	30	NR	NR	ng/m3	Garage	1	NR	NR	NR	Poly bag with compressor	NR
1210	Property 1	Residential	4/12/2016	10:44	2003	2006	1895	1968	5	NR	NR	ng/m3	Garage	1	NR	NR	NR	Poly bag with Christmas decorations	NR
1210	Property 1	Residential	4/12/2016	10:35	1022	929	941	964	9	NR	NR	ng/m3	Garage	1	NR	NR	NR	Poly bag with backpack	NR
1210	Property 1	Residential	4/12/2016	11:08	2516	2045	1987	2183	24	NR	NR	ng/m3	Laundry Room	1	NR	NR	NR	Inside washer hose	NR
1210	Property 1	Residential	4/12/2016	11:03	855	1062	1062	993	20	NR	NR	ng/m3	Laundry Room	1	NR	NR	NR	Inside washer	NR
1210	Property 1	Residential	4/12/2016	11:10	949	703	396	683	80	NR	NR	ng/m3	Laundry Room	1	NR	NR	NR	Inside dryer	NR
1210	Property 1	Residential	4/12/2016	11:02	1452	1134	1337	1300	24	NR	NR	ng/m3	Laundry Room	1	NR	NR	NR	In front of washer	NR
1210	Property 1	Residential	4/12/2016	11:14	1069	1161	1056	1095	9	NR	NR	ng/m3	Laundry Room	1	NR	NR	NR	Breathing zone	NR
1210	Property 1	Residential	4/13/2016	18:08	575	574	573	574	0	NR	NR	ng/m3	Laundry Room	1	NR	NR	NR	Breathing zone	NR
1210	Property 1	Residential	4/13/2016	18:09	933	954	955	948	2	NR	NR	ng/m3	Laundry Room	1	NR	NR	NR	Inside washer	NR
1210	Property 1	Residential	4/13/2016	18:12	72	30	50	51	80	NR	NR	ng/m3	Laundry Room	1	NR	NR	NR	Inside dryer	NR
1210	Property 1	Residential	4/13/2016	18:15	1454	1201	1031	1229	34	NR	NR	ng/m3	Laundry Room	1	Tile	NR	NR	Floor of laundry room	NR
1210	Property 1	Residential	4/14/2016	18:07	5247	5098	5103	5149	2	NR	NR	ng/m3	Laundry room	1	Tile	NR	NR	Inside Washer	71
1210	Property 1	Residential	4/14/2016	18:09	1176	1091	1122	1130	7	NR	NR	ng/m3	Laundry room	1	Tile	NR	NR	Breathing Zone	71
1210	Property 1	Residential	4/15/2016	11:04	51	59	62	57	20	NR	NR	ng/m3	Driveway	Outside	Area rug	NR	NR	Living Room Area Rug, following ventilation	55
1210	Property 1	Residential	4/15/2016	11:10	85	91	89	88	6	NR	NR	ng/m3	Driveway	Outside	Area rug	NR	NR	Living Room Area Rug, following ventilation	55
1210	Property 1	Residential	4/15/2016	11:11	73	102	82	86	34	NR	NR	ng/m3	Driveway	Outside	Area rug	NR	NR	Living Room Area Rug, following ventilation	55
1210	Property 1	Residential	4/15/2016	11:12	536	663	540	579	21	NR	NR	ng/m3	Driveway	Outside	Area rug	NR	NR	Living Room Area Rug, following ventilation	55
1210	Property 1	Residential	4/15/2016	11:13	58	62	42	54	35	NR	NR	ng/m3	Driveway	Outside	Area rug	NR	NR	Living Room Area Rug, following ventilation	55
1210	Property 2	Residential	4/15/2016	13:04	2705	1844	2103	2217	38	NR	NR	ng/m3	Kitchen Entrance-Garage	1	Hardwood	NR	NR	"Wipe Your Paws" mat	66
1210	Property 2	Residential	4/15/2016	13:06	1967	1996	2063	2008	4	NR	NR	ng/m3	Kitchen Entrance-Garage	1	Hardwood	NR	NR	Breathing Zone	66
1210	Property 2	Residential	4/15/2016	13:10	1906	1970	1944	1940	3	NR	NR	ng/m3	Living Room	1	Hardwood	NR	NR	Floor	66
1210	Property 2	Residential	4/15/2016	13:12	1911	1919	1924	1918	0	NR	NR	ng/m3	Living Room	1	Hardwood	NR	NR	Breathing Zone	66
1210	Property 2	Residential	4/15/2016	13:15	2587	1915	2025	2176	30	NR	NR	ng/m3	Bathroom-Downstairs	1	Tile	NR	NR	Floor	66
1210	Property 2	Residential	4/15/2016	13:16	1966	1988	2032	1995	3	NR	NR	ng/m3	Bathroom-Downstairs	1	Tile	NR	NR	Breathing Zone	66
1210	Property 2	Residential	4/15/2016	13:17	2316	2519	2355	2397	8	NR	NR	ng/m3	Bathroom-Downstairs	1	Tile	NR	NR	Sink drain	66
1210	Property 2	Residential	4/15/2016	13:21	2141	2328	2344	2271	8	NR	NR	ng/m3	Dining Room	1	Hardwood	NR	NR	Floor	66
1210	Property 2	Residential	4/15/2016	13:22	2075	2060	2041	2059	1	NR	NR	ng/m3	Dining Room	1	Hardwood	NR	NR	Breathing Zone	66
1210	Property 2	Residential	4/15/2016	13:24	3164	4459	3991	3871	33	NR	NR	ng/m3	Office	1	Carpet	NR	NR	Entrance to office	66
1210	Property 2	Residential	4/15/2016	13:26	2427	2617	3095	2713	24	NR	NR	ng/m3	Office	1	Carpet	NR	NR	Entrance to office	66
1210	Property 2	Residential	4/15/2016	13:28	2619	2559	2614	2598	2	NR	NR	ng/m3	Kitchen	1	Hardwood	NR	NR	Center of kitchen	66
1210	Property 2	Residential	4/15/2016	13:29	2114	2109	2159	2128	2	NR	NR	ng/m3	Kitchen	1	Hardwood	NR	NR	Center of Kitchen, Breathing Zone	66
1210	Property 2	Residential	4/15/2016	13:30	2336	2424	2187	2315	10	NR	NR	ng/m3	Kitchen	1	Hardwood	NR	NR	Sink Drain	66
1210	Property 2	Residential	4/15/2016	13:35	2971	2934	2964	2956	1	NR	NR	ng/m3	Stairs-Landing	1	Carpet	NR	NR	Landing, Initial Step	66
1210	Property 2	Residential	4/15/2016	13:36	2134	2212	2268	2204	6	NR	NR	ng/m3	Stairs-Landing	1	Carpet	NR	NR	Landing, Initial Step, Breathing Zone	66
1210	Property 2	Residential	4/15/2016	13:39	2279	2342	2330	2317	2	NR	NR	ng/m3	Stairs-Top landing	2	Carpet	NR	NR	Top Landing, Floor	66
1210	Property 2	Residential	4/15/2016	13:40	2009	2012	2073	2031	3	NR	NR	ng/m3	Stairs-Top landing	2	Carpet	NR	NR	Top Landing, Breathing Zone	66
1210	Property 2	Residential	4/15/2016	13:41	2504	2087	2199	2263	18	NR	NR	ng/m3	Bathroom-Upstairs	2	Tile	NR	NR	Floor Mat	66
1210	Property 2	Residential	4/15/2016	13:44	2102	2111	2181	2132	3	NR	NR	ng/m3	Bathroom-Upstairs	2	Tile	NR	NR	Breathing Zone	66
1210	Property 2	Residential	4/15/2016	13:45	2006	2037	2097	2047	4	NR	NR	ng/m3	Bathroom-Upstairs	2	Tile	NR	NR	Sink Drain	66
1210	Property 2	Residential	4/15/2016	13:46	1883	1794	1830	1836	4	NR	NR	ng/m3	Bathroom-Upstairs	2	Tile	NR	NR	Bath Drain	66
1210	Property 2	Residential	4/15/2016	13:48	2495	2216	2330	2347	11	NR	NR	ng/m3	Bedroom-Son	2	Carpet	NR	NR	Entrance, Floor	66
1210	Property 2	Residential	4/15/2016	13:50	1961	1966	1967	1965	0	NR	NR	ng/m3	Bedroom-Son	2	Carpet	NR	NR	Entrance, breathing zone	66
1210	Property 2	Residential	4/15/2016	13:51	1893	1905	1912	1903	0	NR	NR	ng/m3	Bedroom-Son	2	Carpet	NR	NR	Mattress	66
1210	Property 2	Residential	4/15/2016	13:52	1964	1963	1954	1960	0	NR	NR	ng/m3	Bedroom-Son	2	Carpet	NR	NR	Closet	66
1210	Property 2	Residential	4/15/2016	13:54	1686	1754	1768	1736	4	NR	NR	ng/m3	Bedroom-Master	2	Carpet	NR	NR	Air mattress	66
1210	Property 2	Residential	4/15/2016	13:55	1623	1672	1710	1668	5	NR	NR	ng/m3	Bedroom-Master	2	Carpet	NR	NR	Mattress	66
1210	Property 2	Residential	4/15/2016	13:57	1513	1493	1497	1501	1	NR	NR	ng/m3	Bathroom-Master	2	Carpet	NR	NR	Shower drain	66

NA- Not Applicable
NR- Not Recorded
R - Standard Deviation

Appendix G: Lumex Screening Results Summary Table
Greenleafe Drive Mercury Response Site
Baldwinsville, Onondaga County, New York

Serial Number	Property Number	Land Use	Date	Time	Screeining-1	Screeining-2	Screeining-3	Average Screening Result	R	Minimum	Maximum	Units	Location	Floor	Floor Cover	Height	Item Type	Description	Temperature (°F)
1210	Property 2	Residential	4/15/2016	13:59	1672	1711	1722	1702	2	NR	NR	ng/m3	Bathroom-Master	2	Carpet	NR	NR	Sink drain	66
1210	Property 2	Residential	4/15/2016	14:00	1752	1852	1839	1815	5	NR	NR	ng/m3	Bathroom-Master	2	Carpet	NR	NR	Tub drain	66
1210	Property 2	Residential	4/15/2016	14:01	2047	2041	2053	2047	0	NR	NR	ng/m3	Bathroom-Master	2	Carpet	NR	NR	Breathing zone	66
1210	Property 2	Residential	4/15/2016	14:02	2538	3804	2687	3009	42	NR	NR	ng/m3	Bathroom-Master	2	Carpet	NR	NR	Bath mat	66
1210	Property 2	Residential	4/15/2016	14:04	1974	1982	1999	1985	1	NR	NR	ng/m3	Bedroom-Master	2	Carpet	NR	NR	Closet	66
1210	Property 2	Residential	4/15/2016	14:05	2170	2314	2380	2288	9	NR	NR	ng/m3	Bedroom-Guest	2	Carpet	NR	NR	Floor	66
1210	Property 2	Residential	4/15/2016	14:06	2207	2240	2252	2233	2	NR	NR	ng/m3	Bedroom-Guest	2	Carpet	NR	NR	Bed	66
1210	Property 2	Residential	4/15/2016	14:08	2234	2257	2260	2250	1	NR	NR	ng/m3	Bedroom-Guest	2	Carpet	NR	NR	Breathing zone	66
1210	Property 2	Residential	4/15/2016	14:11	3547	5017	6338	4967	56	NR	NR	ng/m3	Hallway-Upstairs	2	Carpet	NR	NR	Suitcase	66
1210	Property 2	Residential	4/15/2016	14:14	8420	8163	7864	8149	6	NR	NR	ng/m3	Hallway-Upstairs	2	Carpet	NR	NR	Suitcase, closed	66
1210	Property 2	Residential	4/15/2016	14:22	657	818	703	726	22	NR	NR	ng/m3	Basement-Stairs	BA	Wood	NR	NR	First step from top	66
1210	Property 2	Residential	4/15/2016	14:24	2422	2441	2630	2498	8	NR	NR	ng/m3	Laundry Room	1	Tile	NR	NR	Washer	66
1210	Property 2	Residential	4/15/2016	14:25	659	695	842	732	24	NR	NR	ng/m3	Laundry Room	1	Tile	NR	NR	Dryer	66
1210	Property 2	Residential	4/15/2016	14:26	2007	1983	1985	1992	1	NR	NR	ng/m3	Laundry Room	1	Tile	NR	NR	Breathing zone	66
1210	Property 2	Residential	4/15/2016	14:27	1338	1131	2055	1508	61	NR	NR	ng/m3	Garage	1	Cement	NR	NR	First step	70
1210	Property 2	Residential	4/15/2016	14:30	803	2066	1124	1331	94	NR	NR	ng/m3	Garage	1	Cement	NR	NR	Floor	70
1210	Property 2	Residential	4/15/2016	14:31	399	308	301	336	29	NR	NR	ng/m3	Garage	1	Cement	NR	NR	Breathing zone	70
1210	Property 2	Residential	4/15/2016	14:41	12380	11320	14210	12640	22	NR	NR	ng/m3	Garage	1	Cement	NR	NR	Crack, door closed	70
1210	Property 2	Residential	4/15/2016	14:44	571	653	783	671	3	NR	NR	ng/m3	Garage	1	Cement	NR	NR	Breathing zone	70
1210	Property 2	Residential	4/15/2016	14:45	1149	1124	1380	1218	20	NR	NR	ng/m3	Garage	1	Cement	NR	NR	Floor	70
1210	Property 2	Residential	4/15/2016	14:55	2519	2599	2392	2503	8	NR	NR	ng/m3	Garage	1	Cement	NR	NR	Floor-crack	70
1210	Property 2	Residential	4/15/2016	14:59	1931	1100	1075	1369	62	NR	NR	ng/m3	Garage	1	Cement	NR	NR	Floor-mid seam	70
1210	Property 2	Residential	4/15/2016	15:03	3853	2617	1311	2594	97	NR	NR	ng/m3	Garage	1	Cement	NR	NR	Floor-seam/near door	70
1210	Property 2	Residential	4/15/2016	15:08	395	269	511	392	61	NR	NR	ng/m3	Driveway, NW	Outside	Asphalt	NR	NR	Asphalt	70
1210	Property 2	Residential	4/15/2016	15:10	319	313	480	371	45	NR	NR	ng/m3	Driveway, NW	Outside	Grass	NR	NR	Grass	70
1210	Property 2	Residential	4/15/2016	15:12	4799	9366	4134	6100	85	NR	NR	ng/m3	Sidewalk, West	Outside	Grass	NR	NR	Grass	70
1210	Property 2	Residential	4/15/2016	15:13	4814	3350	5846	4670	53	NR	NR	ng/m3	Sidewalk, East	Outside	Stone	NR	NR	Stone	70
1210	Property 2	Residential	4/15/2016	15:17	10940	7044	10870	9620	40	NR	NR	ng/m3	Sidewalk	Outside	Stone	NR	NR	Stone	70
1210	Property 1	Residential	4/15/2016	15:47	124	129	132	128	6	NR	NR	ng/m3	Bedroom-Son	2	Plywood	NR	NR	In Front of Former Dresser Location	72
1210	Property 1	Residential	4/15/2016	15:49	149	150	152	152	2	NR	NR	ng/m3	Bedroom-Son	2	Plywood	NR	NR	Breathing Zone	72
1210	Property 1	Residential	4/15/2016	15:52	304	283	306	297	7	NR	NR	ng/m3	Hallway-Upstairs	2	Plywood	NR	NR	Floor, Top of Stairs	72
1210	Property 1	Residential	4/15/2016	15:53	278	219	230	242	24	NR	NR	ng/m3	Hallway-Upstairs	2	Plywood	NR	NR	Floor, Entrance to Bathroom	72
1210	Property 1	Residential	4/15/2016	15:56	735	734	718	729	2	NR	NR	ng/m3	Bedroom-Daughter(baby)	2	Hardwood	NR	NR	Breathing Zone	72
1210	Property 1	Residential	4/15/2016	15:57	237	197	201	211	18	NR	NR	ng/m3	Bedroom-Master	2	Plywood	NR	NR	Floor, Entrance	72
1210	Property 1	Residential	4/15/2016	15:59	262	267	268	266	2	NR	NR	ng/m3	Bedroom-Master	2	Plywood	NR	NR	Breathing Zone	72
1210	Property 1	Residential	4/15/2016	16:00	276	265	288	276	8	NR	NR	ng/m3	Bedroom-Master	2	Plywood	NR	NR	Closet, Floor	72
1210	Property 1	Residential	4/15/2016	16:01	235	230	223	229	5	NR	NR	ng/m3	Bedroom-Master	2	Plywood	NR	NR	Bathroom, Breathing Space	72
1210	Property 1	Residential	4/15/2016	16:03	1743	1220	1195	1386	39	NR	NR	ng/m3	Bathroom-Upstairs	2	Tile	NR	NR	Shower Drain	72
1210	Property 1	Residential	4/15/2016	16:04	770	1013	938	907	26	NR	NR	ng/m3	Bathroom-Upstairs	2	Tile	NR	NR	Sink Drain	72
1210	Property 1	Residential	4/15/2016	16:06	288	288	293	290	1	NR	NR	ng/m3	Bedroom-Daughter (17)	2	Hardwood	NR	NR	Breathing Zone	72
1210	Property 1	Residential	4/15/2016	16:08	341	337	340	340	1	NR	NR	ng/m3	Bathroom-Downstairs	1	Hardwood	NR	NR	Sink Drain	72
1210	Property 1	Residential	4/15/2016	16:10	300	302	302	302	0	NR	NR	ng/m3	Living Room	1	Hardwood	NR	NR	Center of Room	72
1210	Property 1	Residential	4/15/2016	16:11	293	296	300	296	2	NR	NR	ng/m3	Kitchen	1	Hardwood	NR	NR	Center of Room	72
1210	Property 1	Residential	4/15/2016	16:12	296	291	290	292	2	NR	NR	ng/m3	Office	1	Hardwood	NR	NR	Breathing Zone	72
1210	Property 1	Residential	4/16/2016	10:51	1091	1249	1075	1138	15	NR	NR	ng/m3	Basement	BA	Carpet	NR	NR	Landing	75
1210	Property 1	Residential	4/16/2016	10:53	111	100	106	106	10	NR	NR	ng/m3	Basement	BA	Carpet	NR	NR	Center of Room, Breathing Zone	75
1210	Property 1	Residential	4/16/2016	10:59	1941	1899	1109	1649	50	NR	NR	ng/m3	Basement	BA	Carpet	NR	NR	Landing, Turn	75
1210	Property 1	Residential	4/17/2016	10:02	1525	1543	1546	1538	1	NR	NR	ng/m3	Laundry Room	1	Vinyl laminate	NR	NR	Washer	65
1210	Property 1	Residential	4/17/2016	10:05	1433	1427	1450	1437	1	NR	NR	ng/m3	Laundry Room	1	Vinyl laminate	NR	NR	Breathing Zone	65
1210	Property 1	Residential	4/17/2016	10:36	204	190	187	194	8	NR	NR	ng/m3	Basement	BA	Carpet	NR	NR	Landing, Breathing Zone	70
1210	Property 1	Residential	4/17/2016	10:38	1176	1058	1052	1095	11	NR	NR	ng/m3	Basement	BA	Carpet	NR	NR	Landing	70
1210	Property 1	Residential	4/17/2016	10:39	1423	1420	1053	1292	29	NR	NR	ng/m3	Basement	BA	Carpet	NR	NR	Landing, Turn	70
1210	Property 1	Residential	4/17/2016	10:40	107	112	114	111	5	NR	NR	ng/m3	Basement	BA	Carpet	NR	NR	Center of Room, Breathing Zone	70
1210	Property 1	Residential	4/17/2016	10:42	642	640	588	623	8	NR	NR	ng/m3	Basement	BA	Carpet	NR	NR	Landing, Turn	70
1210	Property 1	Residential	4/17/2016	10:50	1093	1170	1019	1094	13	NR	NR	ng/m3	Basement	BA	Carpet	NR	NR	Stairs, 5th from top	70
1210	Property 1	Residential	4/17/2016	10:52	1598	1242	1462	1434	24	NR	NR	ng/m3	Basement	BA	Carpet	NR	NR	Stairs, 2nd from bottom	70
1210	Property 1	Residential	4/17/2016	10:54	1234	1270	1108	1204	13	NR	NR	ng/m3	Basement	BA	Carpet	NR	NR	Stairs, 2nd from top	70
1210	Property 1	Residential	4/17/2016	11:04	2429	2388	2364	2393	2	NR	NR	ng/m3	Garage	Garage	Asphalt	NR	NR	Asphalt-Concrete Joint, North	65
1210	Property 1	Residential	4/17/2016	11:06	3163	2471	3424	3020	31	NR	NR	ng/m3	Garage	Garage	Asphalt	NR	NR	Asphalt-Concrete Joint, Mid	65
1210	Property 1	Residential	4/17/2016	11:10	5364	5699	2889	4651	60	NR	NR	ng/m3	Garage	Garage	Asphalt	NR	NR	Asphalt-Concrete Joint, South	65
1210	Property 1	Residential	4/17/2016	13:24	35750	33130	29380	32750	19	NR	NR	ng/m3	Basement	BA	Carpet	NR	NR	Carpet, Bag 1	70
1210	Property 1	Residential	4/17/2016	13:26	10910	10390	10300	10530	5	NR	NR	ng/m3	Basement	BA	Carpet	NR	NR	Carpet, Bag 2	70
1210	Property 1	Residential	4/17/2016	13:28	21390	20800	21260	21150	2	NR	NR	ng/m3	Basement	BA	Carpet	NR	NR	Carpet, Bag 3	70
1210	Property 1	Residential	4/17/2016	13:30	14220	13540	13680	13810	4	NR	NR	ng/m3	Basement	BA	Carpet	NR	NR	Carpet, Bag 4	70
1210	Property 2	Residential	4/17/2016	13:52	410	404	406	406	1	NR	NR	ng/m3	Front Sidewalk	Outside	Grass	NR	NR	Hot Spot 5, 1 ft from sidewalk	75
1210	Property 2	Residential	4/17/2016	13:54	218	206	147	190	37	NR	NR	ng/m3	Front Sidewalk	Outside	Grass	NR	NR	Hot Spot 5, 5ft from sidewalk	75
1210	Property 2	Residential	4/17/2016	13:56	189	278	258	242	36	NR	NR	ng/m3	Front Sidewalk	Outside	Grass	NR	NR	Hot Spot 6, 1ft south of sidewalk	75
1210	Property 2	Residential	4/17/2016	13:58	94	69	94	86	28	NR	NR	ng/m3	Front Sidewalk	Outside	Grass	NR	NR	Hot Spot 6, 5ft south of sidewalk	75
1210	Property 2	Residential	4/17/2016	14:28	3606	3056	2319	2994	42	NR	NR	ng/m3	Driveway-North	Outside	Grass	NR	NR	G1, 1ft off driveway, near backyard fence	75
1210	Property 2	Residential	4/17/2016	14:36	1947	2638	2305	2296	30	NR	NR	ng/m3	Driveway-North	Outside	Grass	NR	NR	G2,1 ft off driveway	75
1210	Property 2	Residential	4/17/2016	14:38	689	793	931	804	30	NR	NR	ng/m3	Driveway-North	Outside	Grass	NR	NR	G3,1 ft off driveway	75
1210	Property 2	Residential	4/17/2016	14:40	107	103	101	104	6	NR	NR	ng/m3	Driveway-North	Outside	Grass	NR	NR	G4,1 ft off driveway	75
1210	Property 2	Residential	4/17/2016	14:42	44	47	50	47	10	NR	NR	ng/m3	Driveway-North	Outside	Grass	NR	NR	G5,1 ft off driveway	75
1210	Property 2	Residential	4/17/2016	14:44	25	25	24	25	3	NR	NR	ng/m3	Driveway-North	Outside	Grass	NR	NR	G6,1 ft off driveway	75
1210	Property 2	Residential	4/17/2016	14:46	59	58	57	58	3	NR	NR	ng/m3	Driveway-North	Outside	Grass	NR	NR	G7,1 ft off driveway	75
1210	Property 2	Residential	4/17/2016	14:48	30	29	34	31	15	NR	NR	ng/m3	Driveway-North	Outside	Grass	NR	NR	G8,1 ft off driveway	75
1210	Property 2	Residential	4/17/2016	14:50	31	36	36	34	15	NR	NR	ng/m3	Driveway-North	Outside	Grass	NR	NR	G9,1 ft off driveway	75
1210	Property 2	Residential	4/17/2016	14:51	34	37	42	38	21	NR	NR	ng/m3	Driveway-North	Outside	Grass	NR	NR	G10,1 ft off driveway	75
1210	Property 2	Residential	4/17/2016	14:52	37	31	26	31	33	NR	NR	ng/m3	Driveway-North	Outside	Grass	NR	NR	G11,1 ft off driveway	75
1210	Property 2	Residential	4/17/2016	14:54	18	18	18	18	4	NR	NR	ng/m3	Driveway-North	Outside	Grass	NR	NR	G12,1 ft off driveway	75
1210	Property 2	Residential	4/17/2016	14:56	44	45	49	46	11	NR	NR	ng/m3	Driveway-North	Outside	Grass	NR	NR	G13,1 ft off driveway, adjacent to road	75
1210	Property 2	Residential	4/17/2016	15:00	161	104	137	134	42	NR	NR	ng/m3	Driveway-North	Outside	Grass	NR	NR	G1A, 5 ft off driveway, near backyard fence	75
1210	Property 2	Residential	4/17/2016	15:02	860	456	549	621	64	NR	NR	ng/m3	Driveway-North	Outside	Grass	NR	NR	G2A, 5 ft off driveway	75
1210	Property 2	Residential	4/17/2016	15:04	93	100	116	103	22	NR	NR	ng/m3	Driveway-North	Outside	Grass	NR	NR	G3A, 5 ft off driveway	75
1210	Property 2	Residential	4/17/2016	15:06	29	29	25	28	15	NR	NR	ng/m3	Driveway-North	Outside	Grass	NR	NR	G4A, 5 ft off driveway	75

NA- Not Applicable
NR- Not Recorded
R - Standard Deviation

Appendix G: Lumex Screening Results Summary Table
Greenleafe Drive Mercury Response Site
Baldwinsville, Onondaga County, New York

Serial Number	Property Number	Land Use	Date	Time	Screeining-1	Screeining-2	Screeining-3	Average Screening Result	R	Minimum	Maximum	Units	Location	Floor	Floor Cover	Height	Item Type	Description	Temperature (°F)
1210	Property 2	Residential	4/17/2016	15:08	22	27	25	24	21	NR	NR	ng/m3	Driveway-North	Outside	Grass	NR	NR	G5A, 5 ft off driveway	75
1210	Property 1	Residential	4/17/2016	15:26	136	162	183	160	29	NR	NR	ng/m3	Laundry Room	1	Plywood	NR	NR	Post-Remedial, Breathing Zone	70
1210	Property 1	Residential	4/17/2016	15:28	982	1434	1545	1320	42	NR	NR	ng/m3	Laundry Room	1	Plywood	NR	NR	Post-Remedial, Floor	70
1210	Property 1	Residential	4/17/2016	15:32	1040	1113	839	997	27	NR	NR	ng/m3	Laundry Room	1	Plywood	NR	NR	Floor, South Corner	70
1210	Property 1	Residential	4/17/2016	15:34	8178	9078	9281	8846	12	NR	NR	ng/m3	Laundry Room	1	Plywood	NR	NR	Washer	70
1210	Property 1	Residential	4/17/2016	17:06	358	497	360	405	34	NR	NR	ng/m3	Basement	BA	Cement	NR	NR	Landing, Turn, Post-Remedial	70
1210	Property 1	Residential	4/17/2016	17:08	202	200	156	186	24	NR	NR	ng/m3	Basement	BA	Cement	NR	NR	Landing, Post-Remedial	70
1210	Property 1	Residential	4/17/2016	17:10	38	38	33	36	14	NR	NR	ng/m3	Basement	BA	Carpet	NR	NR	Center of Room, Breathing Zone	70
1210	Property 1	Residential	4/17/2016	17:12	134	151	171	152	24	NR	NR	ng/m3	Basement	BA	Wood	NR	NR	Stairs, 5th from top	70
1210	Property 1	Residential	4/17/2016	17:14	199	250	290	246	36	NR	NR	ng/m3	Basement	BA	Wood	NR	NR	Stairs, 2nd from bottom	70
1210	Property 1	Residential	4/17/2016	17:16	164	167	192	174	15	NR	NR	ng/m3	Basement	BA	Wood	NR	NR	Stairs, 2nd from top	70
1210	Property 1	Residential	4/17/2016	17:24	233	239	248	240	6	NR	NR	ng/m3	Bathroom-Downstairs	1	Tile	NR	NR	Sink Drain	70
1210	Property 1	Residential	4/17/2016	17:28	1051	1056	1073	1060	2	NR	NR	ng/m3	Bathroom-Upstairs	2	Tile	NR	NR	Tub Drain	70
1210	Property 1	Residential	4/17/2016	17:30	1045	1019	1005	1023	3	NR	NR	ng/m3	Bathroom-Upstairs	2	Tile	NR	NR	Tub Drain, 2nd reading	70
1210	Property 1	Residential	4/17/2016	17:38	545	587	606	579	10	NR	NR	ng/m3	Bathroom-Upstairs	2	Tile	NR	NR	Sink Drain	70
1210	Property 1	Residential	4/18/2016	12:16	703	780	778	754	10	NR	NR	ng/m3	G1	Outside	Grass	NR	NR	Grass,1ft off asphalt, adjacent to house	70
1210	Property 1	Residential	4/18/2016	12:18	18880	22420	23170	21490	20	NR	NR	ng/m3	G2	Outside	Grass	NR	NR	Grass,1ft off asphalt	70
1210	Property 1	Residential	4/18/2016	12:20	1831	1547	1060	1479	52	NR	NR	ng/m3	G3	Outside	Grass	NR	NR	Grass,1ft off asphalt	70
1210	Property 1	Residential	4/18/2016	13:04	750	639	319	569	75	NR	NR	ng/m3	G4	Outside	Grass	NR	NR	Grass,1ft off asphalt	70
1210	Property 1	Residential	4/18/2016	13:06	5806	5875	5410	5697	8	NR	NR	ng/m3	G5	Outside	Grass	NR	NR	Grass,1ft off asphalt	70
1210	Property 1	Residential	4/18/2016	13:08	5437	6650	4018	5368	49	NR	NR	ng/m3	G6	Outside	Grass	NR	NR	Grass,1ft off asphalt	70
1210	Property 1	Residential	4/18/2016	13:10	7366	9661	9802	8943	27	NR	NR	ng/m3	G7	Outside	Grass	NR	NR	Grass,1ft off asphalt	70
1210	Property 1	Residential	4/18/2016	13:12	5934	6725	7460	6706	22	NR	NR	ng/m3	G8	Outside	Grass	NR	NR	Grass,1ft off asphalt	70
1210	Property 1	Residential	4/18/2016	13:14	1228	1249	1227	1235	1	NR	NR	ng/m3	G9	Outside	Grass	NR	NR	Grass,1ft off asphalt	70
1210	Property 1	Residential	4/18/2016	13:16	1358	1479	1586	1474	15	NR	NR	ng/m3	G10	Outside	Grass	NR	NR	Grass,1ft off asphalt	70
1210	Property 1	Residential	4/18/2016	13:18	166	150	138	152	18	NR	NR	ng/m3	G11	Outside	Grass	NR	NR	Grass,1ft off asphalt	70
1210	Property 1	Residential	4/18/2016	13:20	114	127	137	126	17	NR	NR	ng/m3	G12	Outside	Grass	NR	NR	Grass,1ft off asphalt	70
1210	Property 1	Residential	4/18/2016	13:21	242	267	235	248	13	NR	NR	ng/m3	G13	Outside	Grass	NR	NR	Grass,1ft off asphalt	70
1210	Property 1	Residential	4/18/2016	13:22	141	157	148	161	26	NR	NR	ng/m3	G14	Outside	Grass	NR	NR	Grass,1ft off asphalt	70
1210	Property 1	Residential	4/18/2016	13:23	199	236	262	232	27	NR	NR	ng/m3	G15	Outside	Grass	NR	NR	Grass,1ft off asphalt	70
1210	Property 1	Residential	4/18/2016	13:24	333	382	424	380	23	NR	NR	ng/m3	G16	Outside	Grass	NR	NR	Grass,1ft off asphalt	70
1210	Property 1	Residential	4/18/2016	13:26	212	259	311	260	37	NR	NR	ng/m3	G17	Outside	Grass	NR	NR	Grass,1ft off asphalt,adjacent to street	70
1210	Property 1	Residential	4/18/2016	14:42	12570	12350	9867	11590	23	NR	NR	ng/m3	Laundry Room	1	Vinyl	NR	NR	Post-Remedial Headspace, Bag 1	75
1210	Property 1	Residential	4/18/2016	14:44	11360	10510	9557	10480	17	NR	NR	ng/m3	Laundry Room	1	Vinyl	NR	NR	Post-Remedial Headspace, Bag 2	75
1210	Property 1	Residential	4/18/2016	14:48	464	520	588	524	23	NR	NR	ng/m3	Laundry room	1	Plywood	NR	NR	Post-Remedial, Breathing Zone	75
1210	Property 1	Residential	4/18/2016	14:48	1723	1020	1226	1323	53	NR	NR	ng/m3	Laundry room	1	Plywood	NR	NR	Post-Remedial, floor	75
1210	Property 1	Residential	4/18/2016	15:36	2195	2403	2301	2299	9	NR	NR	ng/m3	Driveway	Outside	Asphalt	NR	NR	Asphalt, See Photo	75
1210	Property 3	Residential	4/18/2016	15:58	703	699	698	700	0	NR	NR	ng/m3	Kitchen	1	Hardwood	NR	NR	Breathing Zone	70
1210	Property 3	Residential	4/18/2016	16:04	1080	1292	1404	1259	25	NR	NR	ng/m3	Stairway	1	carpet	NR	NR	5th Stair from Landing	70
1210	Property 3	Residential	4/18/2016	16:06	1016	1040	1033	1030	2	NR	NR	ng/m3	Bedroom-son(12)	2	Carpet	NR	NR	Breathing Zone	70
1210	Property 3	Residential	4/18/2016	16:08	1694	1720	1551	1655	10	NR	NR	ng/m3	Bedroom-son(12)	2	Carpet	NR	NR	Floor, foot of bed	70
1210	Property 3	Residential	4/18/2016	16:12	978	1018	1068	1021	8	NR	NR	ng/m3	Bathroom-upstairs	2	Carpet	NR	NR	Tub Drain	70
1210	Property 3	Residential	4/18/2016	16:14	659	656	667	661	1	NR	NR	ng/m3	Bedroom-master	2	Carpet	NR	NR	Breathing zone	70
1210	Property 3	Residential	4/18/2016	16:16	722	719	721	721	0	NR	NR	ng/m3	Hallway-upstairs	2	Carpet	NR	NR	Breathing zone	70
1210	Property 3	Residential	4/18/2016	16:18	205	211	212	209	3	NR	NR	ng/m3	Basement	BA	cement	NR	NR	Breathing zone	60
1210	Property 3	Residential	4/18/2016	16:20	1848	1762	1725	1779	6	NR	NR	ng/m3	Basement	BA	cement	NR	NR	Washer	60
1210	Property 3	Residential	4/18/2016	16:28	1447	1245	1383	1359	14	NR	NR	ng/m3	Living room	1	carpet	NR	NR	Floor, Between Two Chairs	70
1210	Property 1	Residential	4/19/2016	15:15	NR	NR	NR	NR	NR	140	150	ng/m3	Hallway-Downstairs	1	Hardwood	NR	NR	Breathing zone	78
1210	Property 1	Residential	4/19/2016	15:16	NR	NR	NR	NR	NR	123	150	ng/m3	Living Room	1	Hardwood	NR	NR	Breathing zone	78
1210	Property 1	Residential	4/19/2016	15:17	NR	NR	NR	NR	NR	131	147	ng/m3	Dining Room	1	Hardwood	NR	NR	Breathing zone	78
1210	Property 1	Residential	4/19/2016	15:18	NR	NR	NR	NR	NR	127	151	ng/m3	Kitchen	1	Hardwood	NR	NR	Breathing zone	78
1210	Property 1	Residential	4/19/2016	15:21	NR	NR	NR	NR	NR	136	146	ng/m3	Office	1	Hardwood	NR	NR	Breathing zone	78
1210	Property 1	Residential	4/19/2016	15:22	NR	NR	NR	NR	NR	141	150	ng/m3	Stairwell-Upstairs	2	Plywood	NR	NR	Breathing zone	78
1210	Property 1	Residential	4/19/2016	15:23	NR	NR	NR	NR	NR	145	168	ng/m3	Hallway-Upstairs	2	Plywood	NR	NR	Breathing zone	78
1210	Property 1	Residential	4/19/2016	15:26	NR	NR	NR	NR	NR	98	116	ng/m3	Bedroom-Baby	2	Hardwood	NR	NR	Breathing zone	78
1210	Property 1	Residential	4/19/2016	15:27	NR	NR	NR	NR	NR	151	157	ng/m3	Bedroom-Daughter	2	Carpet	NR	NR	Breathing zone	78
1210	Property 1	Residential	4/19/2016	15:28	NR	NR	NR	NR	NR	190	204	ng/m3	Bedroom-Master	2	Plywood	NR	NR	Breathing zone	78
1210	Property 1	Residential	4/19/2016	15:30	NR	NR	NR	NR	NR	203	215	ng/m3	Bedroom-Master	2	Carpet	NR	NR	Breathing zone (closet)	78
1210	Property 1	Residential	4/19/2016	15:32	NR	NR	NR	NR	NR	93	101	ng/m3	Bedroom-Son	2	Plywood	NR	NR	Breathing zone	78
1210	Property 1	Residential	4/19/2016	15:33	NR	NR	NR	NR	NR	162	171	ng/m3	Bathroom-upstairs	2	Tile	NR	NR	Breathing zone	78
1210	Property 1	Residential	4/19/2016	15:34	NR	NR	NR	NR	NR	NR	NR	ng/m3	Bathroom-upstairs	2	Tile	NA	NR	Bath tub	78
1210	Property 1	Residential	4/19/2016	15:36	NR	NR	NR	NR	NR	492	507	ng/m3	Bathroom-upstairs	2	Tile	NA	NR	Sink	78
1210	Property 1	Residential	4/19/2016	15:40	NR	NR	NR	NR	NR	62	74	ng/m3	Basement	BA	Wood	Breathing Zone	NR	Breathing zone (stairwell)	78
1210	Property 1	Residential	4/19/2016	15:42	NR	NR	NR	NR	NR	69	72	ng/m3	Basement	BA	Cement	Breathing Zone	NR	Breathing zone (landing)	78
1210	Property 1	Residential	4/19/2016	15:44	NR	NR	NR	NR	NR	68	76	ng/m3	Basement	BA	Cement	Breathing Zone	NR	Breathing zone	78
1210	Property 1	Residential	4/19/2016	15:45	NR	NR	NR	NR	NR	202	209	ng/m3	Bathroom-Downstairs	1	Tile	Breathing Zone	NR	Breathing zone	78
1210	Property 1	Residential	4/19/2016	15:50	NR	NR	NR	NR	NR	193	214	ng/m3	Laundry Room	1	Plywood	Breathing Zone	NR	Breathing zone	78
1210	Property 1	Residential	4/19/2016	15:54	NR	NR	NR	NR	NR	138	245	ng/m3	Garage	1	Cement	Breathing Zone	NR	Breathing zone	78
1210	Property 1	Residential	4/19/2016	15:56	NR	NR	NR	NR	NR	43	862	ng/m3	Laundry Room	1	Plywood	Floor	NR	Floor (highest by washer)	78
1210	Property 2	Residential	4/19/2016	16:28	NR	NR	NR	NR	NR	1407	6783	ng/m3	Bedroom-son(12)	2	Carpet	Floor	NR	Adjacent to hamper	80
1210	Property 2	Residential	4/19/2016	16:15	NR	NR	NR	NR	NR	2145	2520	ng/m3	Living Room	1	Carpet	Floor	NR	Floor at boundary with kitchen	80
1210	Property 2	Residential	4/19/2016	16:22	NR	NR	NR	NR	NR	1104	1785	ng/m3	Stairwell	1	Carpet	Floor	NR	Landing	80
1210	Property 2	Residential	4/19/2016	16:30	NR	NR	NR	NR	NR	1197	1410	ng/m3	Bedroom-son(12)	2	Carpet	Breathing Zone	NR	Breathing zone	80
1210	Property 2	Residential	4/19/2016	16:31	NR	NR	NR	NR	NR	1233	1340	ng/m3	Bedroom-Son(17)	2	Carpet	Floor	NR	Adjacent to bed	80
1210	Property 3	Residential	4/19/2016	16:35	NR	NR	NR	NR	NR	994	1074	ng/m3	Bedroom-Son(14)	2	Carpet	Floor	NR	Center of room	80
1210	Property 3	Residential	4/19/2016	16:36	NR	NR	NR	NR	NR	903	937	ng/m3	Bedroom-Son(14)	2	Carpet	Breathing Zone	NR	Breathing zone	80
1210	Property 3	Residential	4/19/2016	16:34	NR	NR	NR	NR	NR	895	934	ng/m3	Bedroom-Son(17)	2	Carpet	Breathing Zone	NR	Breathing zone	80
1210	Property 3	Residential	4/19/2016	16:23	NR	NR	NR	NR	NR	800	900	ng/m3	Stairwell	1	Carpet	Floor	NR	Steps	80
1210	Property 3	Residential	4/19/2016	16:27	NR	NR	NR	NR	NR	833	873	ng/m3	Hallway-Upstairs	2	Carpet	Floor	NR	Top of stairs	80
1210	Property 3	Residential	4/19/2016	16:39	NR	NR	NR	NR	NR	816	865	ng/m3	Bedroom-Master	2	Carpet	Floor	NR	Adjacent to tall dresser	80
1210	Property 3	Residential	4/19/2016	16:40	NR	NR	NR	NR	NR	794	837	ng/m3	Bedroom-Master	2	Carpet	Breathing Zone	NR	Breathing zone	80
1210	Property 3	Residential	4/19/2016	16:46	NR	NR	NR	NR	NR	804	828	ng/m3	Bathroom-Master	2	Tile	Breathing Zone	NR	Breathing zone	80
1210	Property 3	Residential	4/19/2016	16:17	NR	NR	NR	NR	NR	760	776	ng/m3	Living Room	1	Carpet	Breathing Zone	NR	Breathing zone	80
1210	Property 3	Residential	4/19/2016	16:37	NR	NR	NR	NR	NR	760	771	ng/m3	Bedroom-Spare	2	Carpet	Floor	NR	Center of room	80
1210	Property 3	Residential	4/19/2016	16:38	NR	NR	NR	NR	NR	753	768	ng/m3	Bedroom-Spare	2	Carpet	Breathing Zone	NR	Breathing zone	80

NA- Not Applicable
NR- Not Recorded
R - Standard Deviation

Appendix G: Lumex Screening Results Summary Table
Greenleafe Drive Mercury Response Site
Baldwinsville, Onondaga County, New York

Serial Number	Property Number	Land Use	Date	Time	Screeining-1	Screeining-2	Screeining-3	Average Screening Result	R	Minimum	Maximum	Units	Location	Floor	Floor Cover	Height	Item Type	Description	Temperature (˚F)
1210	Property 3	Residential	4/19/2016	16:19	NR	NR	NR	NR	NR	718	747	ng/m3	Kitchen	1	Hardwood	Breathing Zone	NR	Breathing zone	80
1210	Property 3	Residential	4/19/2016	16:25	NR	NR	NR	NR	NR	731	743	ng/m3	Hallway-Upstairs	2	Carpet	Breathing Zone	NR	Top of stairs (breathing zone)	80
1210	Property 3	Residential	4/19/2016	16:43	NR	NR	NR	NR	NR	726	742	ng/m3	Bathroom-Master	2	Tile	NA	NR	Sink	80
1210	Property 3	Residential	4/19/2016	16:44	NR	NR	NR	NR	NR	710	731	ng/m3	Bathroom-Master	2	Tile	NA	NR	Tub	80
1210	Property 3	Residential	4/19/2016	16:20	NR	NR	NR	NR	NR	702	716	ng/m3	Dining Room	1	Hardwood	Breathing Zone	NR	Breathing zone	80
1210	Property 3	Residential	4/19/2016	16:21	NR	NR	NR	NR	NR	691	705	ng/m3	Dining Room	1	Hardwood	Breathing Zone	NR	Breathing zone	80
1210	Property 3	Residential	4/19/2016	16:11	NR	NR	NR	NR	NR	634	687	ng/m3	Hallway-Downstairs	1	Hardwood	Breathing Zone	NR	Breathing zone	80
1210	Property 3	Residential	4/19/2016	16:47	NR	NR	NR	NR	NR	603	621	ng/m3	Basement	BA	Rug	Floor	NR	Over rug	80
1210	Property 3	Residential	4/19/2016	16:49	NR	NR	NR	NR	NR	598	627	ng/m3	Basement	BA	Tile	Breathing Zone	NR	Breathing zone	80
1210	Property 3	Residential	4/19/2016	16:53	NR	NR	NR	NR	NR	852	907	ng/m3	Basement	BA	Tile	NA	NR	Inside washer	80
1210	Property 3	Residential	4/19/2016	17:08	NR	NR	NR	NR	NR	6000	10400	ng/m3	Bag 2	NA	NA	NA	NR	Poly bag with clothes	60
1210	Property 3	Residential	4/19/2016	17:10	NR	NR	NR	NR	NR	1590	2150	ng/m3	Bag 1	NA	NA	NA	NR	Poly bag with clothes	60
1210	Property 3	Residential	4/19/2016	12:26	NR	NR	NR	NR	NR	NR	NR	ng/m3	Living room	1	carpet	Floor	NR	Entrance, between 2 chairs, floor, direct	70
1210	Property 3	Residential	4/19/2016	12:24	NR	NR	NR	NR	NR	NR	NR	ng/m3	Living room	1	carpet	Floor	NR	Entrance, between 2 chairs, floor, headspace	70
1210	Property 3	Residential	4/19/2016	12:40	NR	NR	NR	NR	NR	NR	NR	ng/m3	Bedroom-son(12)	2	carpet	Floor	NR	Foot of bed, floor, direct	70
1210	Property 3	Residential	4/19/2016	12:38	NR	NR	NR	NR	NR	NR	NR	ng/m3	Bedroom-son(12)	2	carpet	Floor	NR	Foot of bed, floor, headspace	70
1210	Property 3	Residential	4/19/2016	12:36	NR	NR	NR	NR	NR	NR	NR	ng/m3	Stairwell	1	carpet	Floor	NR	Landing, floor, direct	70
1210	Property 3	Residential	4/19/2016	12:34	NR	NR	NR	NR	NR	NR	NR	ng/m3	Stairwell	1	carpet	Floor	NR	Landing, floor, headspace	70
1210	Property 3	Residential	4/19/2016	12:44	NR	NR	NR	NR	NR	NR	NR	ng/m3	Bathroom-upstairs	2	tile	NA	NR	sink drain	70
1210	Property 3	Residential	4/19/2016	12:45	NR	NR	NR	NR	NR	NR	NR	ng/m3	Hallway-Upstairs	2	carpet	Floor	NR	top of stairs	70
1210	Property 3	Residential	4/19/2016	12:42	NR	NR	NR	NR	NR	NR	NR	ng/m3	Bathroom-Upstairs	2	tile	NA	NR	Tub drain	70
1210	Property 3	Residential	4/19/2016	12:48	NR	NR	NR	NR	NR	NR	NR	ng/m3	Basement	BA	cement	NA	NR	washer	60
1210	Property 1	Residential	4/20/2016	10:01	NR	NR	NR	NR	NR	1000	10400	ng/m3	Basement	BA	Carpet	Floor	NR	Underneath light switch on northern wall	68
1210	Property 1	Residential	4/20/2016	10:05	NR	NR	NR	NR	NR	193	210	ng/m3	Basement	BA	Carpet	Breathing Zone	NR	Underneath light switch on northern wall	68
1210	Property 1	Residential	4/20/2016	10:10	NR	NR	NR	NR	NR	476	485	ng/m3	Basement	BA	Carpet	Floor	NR	Adjacent to chair	68
1210	Property 1	Residential	4/20/2016	10:18	NR	NR	NR	NR	NR	241	245	ng/m3	Basement	BA	Carpet	Floor	NR	Adjacent to closet under stairwell	68
1210	Property 1	Residential	4/20/2016	10:20	NR	NR	NR	NR	NR	209	211	ng/m3	Basement	BA	Carpet	Floor	NR	Adjacent to door leading to storage room	68
1210	Property 1	Residential	4/20/2016	10:23	NR	NR	NR	NR	NR	180	195	ng/m3	Basement	BA	Carpet	Floor	NR	Piece of carpet in storage room	68
1210	Property 1	Residential	4/20/2016	10:24	NR	NR	NR	NR	NR	180	216	ng/m3	Basement	BA	Cement	Floor	NR	Storage room entrance	68
1210	Property 1	Residential	4/20/2016	10:27	NR	NR	NR	NR	NR	155	167	ng/m3	Basement	BA	Carpet	Floor	NR	Storage room/area rug next to refrigerator	68
1210	Property 1	Residential	4/20/2016	10:30	NR	NR	NR	NR	NR	339	352	ng/m3	Basement	BA	Cement	Breathing Zone	NR	Storage room	68
1210	Property 1	Residential	4/20/2016	10:33	NR	NR	NR	NR	NR	185	212	ng/m3	Living Room	1	Hardwood	Breathing Zone	NR	NR	68
1210	Property 1	Residential	4/20/2016	10:34	NR	NR	NR	NR	NR	155	178	ng/m3	Dining Room	1	Hardwood	Breathing Zone	NR	NR	68
1210	Property 1	Residential	4/20/2016	10:35	NR	NR	NR	NR	NR	135	154	ng/m3	Kitchen	1	Hardwood	Breathing Zone	NR	NR	68
1210	Property 1	Residential	4/20/2016	10:36	NR	NR	NR	NR	NR	103	111	ng/m3	Office	1	Hardwood	Breathing Zone	NR	NR	68
1210	Property 1	Residential	4/20/2016	10:39	NR	NR	NR	NR	NR	88	95	ng/m3	Stairwell-Upstairs	2	Hardwood	Breathing Zone	NR	NR	68
1210	Property 1	Residential	4/20/2016	10:40	NR	NR	NR	NR	NR	77	88	ng/m3	Hallway-Upstairs	2	Plywood	Breathing Zone	NR	NR	68
1210	Property 1	Residential	4/20/2016	10:41	NR	NR	NR	NR	NR	144	156	ng/m3	Bedroom-Son	2	Plywood	Breathing Zone	NR	NR	68
1210	Property 1	Residential	4/20/2016	10:42	NR	NR	NR	NR	NR	117	131	ng/m3	Bedroom-Baby	2	Hardwood	Breathing Zone	NR	NR	68
1210	Property 1	Residential	4/20/2016	10:43	NR	NR	NR	NR	NR	262	310	ng/m3	Bathroom-Upstairs	2	Tile	Floor	NR	Tub drain	68
1210	Property 1	Residential	4/20/2016	10:43	NR	NR	NR	NR	NR	155	175	ng/m3	Bathroom-Upstairs	2	Tile	Breathing Zone	NR	NR	68
1210	Property 1	Residential	4/20/2016	10:45	NR	NR	NR	NR	NR	159	166	ng/m3	Bathroom-Upstairs	2	Tile	Breathing Zone	NR	Sink drain	68
1210	Property 1	Residential	4/20/2016	10:46	NR	NR	NR	NR	NR	99	116	ng/m3	Bedroom-Daughter	2	Carpet	Breathing Zone	NR	NR	68
1210	Property 1	Residential	4/20/2016	10:47	NR	NR	NR	NR	NR	116	144	ng/m3	Bedroom-Master	2	Plywood	Breathing Zone	NR	NR	68
1210	Property 1	Residential	4/20/2016	10:49	NR	NR	NR	NR	NR	388	430	ng/m3	Bathroom-Downstairs	1	Tile	Breathing Zone	NR	Sink drain	68
1210	Property 1	Residential	4/20/2016	11:01	NR	NR	NR	NR	NR	304	582	ng/m3	Bedroom-Daughter	2	Carpet	Floor	NR	Entrance	68
1210	Property 1	Residential	4/20/2016	11:05	NR	NR	NR	NR	NR	216	262	ng/m3	Bedroom-Daughter	2	Carpet	Floor	NR	Closet entrance	68
1210	Property 1	Residential	4/20/2016	11:06	NR	NR	NR	NR	NR	177	257	ng/m3	Bedroom-Daughter	2	Rug	Floor	NR	Throw rug by bed	68
1210	Property 1	Residential	4/20/2016	11:08	NR	NR	NR	NR	NR	153	246	ng/m3	Bedroom-Daughter	2	Carpet	Floor	NR	End of bed	68
1210	Property 1	Residential	4/20/2016	11:10	NR	NR	NR	NR	NR	294	544	ng/m3	Bedroom-Daughter	2	Carpet	Floor	NR	1 foot off dresser	68
1210	Property 1	Residential	4/20/2016	11:11	NR	NR	NR	NR	NR	268	298	ng/m3	Bedroom-Daughter	2	Rug	Floor	NR	Area rug by couch	68
1210	Property 1	Residential	4/20/2016	11:13	NR	NR	NR	NR	NR	329	440	ng/m3	Bedroom-Daughter	2	Carpet	Floor	NR	Center of room	68
1210	Property 1	Residential	4/20/2016	15:55	NR	NR	NR	NR	NR	650	5344	ng/m3	Poly bag 1	NA	NA	Headspace	NR	Poly bag with clothes	82
1210	Property 1	Residential	4/20/2016	15:59	NR	NR	NR	NR	NR	550	16126	ng/m3	Poly bag 2	NA	NA	Headspace	NR	Poly bag with clothes	110
1210	Property 1	Residential	4/20/2016	16:04	NR	NR	NR	NR	NR	1112	6854	ng/m3	Poly bag 3	NA	NA	Headspace	NR	Poly bag with blankets and throw rugs	61
1210	Property 1	Residential	4/20/2016	16:07	NR	NR	NR	NR	NR	394	866	ng/m3	Poly bag 4	NA	NA	Headspace	NR	Poly bag with sheets	78
1210	Property 1	Residential	4/20/2016	16:10	NR	NR	NR	NR	NR	1170	17450	ng/m3	Poly bag 5	NA	NA	Headspace	NR	Poly bag with fleece blanket	115
1210	Property 1	Residential	4/20/2016	16:12	NR	NR	NR	NR	NR	1009	5196	ng/m3	Poly bag 6	NA	NA	Headspace	NR	Poly bag with clothes blankets	108
1210	Property 1	Residential	4/20/2016	16:19	NR	NR	NR	NR	NR	5000	>50000	ng/m3	Poly bag 7	NA	NA	Headspace	NR	Poly bag with clothes	113
1210	Property 1	Residential	4/20/2016	16:20	NR	NR	NR	NR	NR	4005	20080	ng/m3	Poly bag 8	NA	NA	Headspace	NR	Poly bag with clothes	117
1210	Property 1	Residential	4/20/2016	16:21	NR	NR	NR	NR	NR	253	4875	ng/m3	Poly bag 9	NA	NA	Headspace	NR	Poly bag with red sheets	86
1210	Property 1	Residential	4/20/2016	16:25	NR	NR	NR	NR	NR	145	585	ng/m3	Poly bag 10	NA	NA	Headspace	NR	Poly bag with comforter and pillows	83
1210	Property 1	Residential	4/20/2016	16:26	NR	NR	NR	NR	NR	5660	33750	ng/m3	Poly bag 11	NA	NA	Headspace	NR	Poly bag with dog bed	110
1210	Property 1	Residential	4/20/2016	16:28	NR	NR	NR	NR	NR	3286	23440	ng/m3	Poly bag 12	NA	NA	Headspace	NR	Poly bag with clothes	106
1210	Property 1	Residential	4/20/2016	16:30	NR	NR	NR	NR	NR	2061	20545	ng/m3	Poly bag 13	NA	NA	Headspace	NR	Poly bag with clothes	132
1210	Property 1	Residential	4/20/2016	16:36	NR	NR	NR	NR	NR	262	3228	ng/m3	Poly bag 14	NA	NA	Headspace	NR	Poly Bag with mat	96
1210	Property 1	Residential	4/20/2016	16:42	NR	NR	NR	NR	NR	1920	6808	ng/m3	Poly bag 15	NA	NA	Headspace	NR	Poly bag with towels	70
1210	Property 1	Residential	4/20/2016	16:47	NR	NR	NR	NR	NR	1620	7504	ng/m3	Poly bag 16	NA	NA	Headspace	NR	Poly bag with vapor	55
1210	Property 1	Residential	4/20/2016	16:50	NR	NR	NR	NR	NR	1410	3540	ng/m3	Poly bag 17	NA	NA	Headspace	NR	Poly bag with hangers	68
1210	Property 1	Residential	4/20/2016	16:53	NR	NR	NR	NR	NR	970	6352	ng/m3	Poly bag 18	NA	NA	Headspace	NR	Poly bag with towels	65
1210	Property 1	Residential	4/20/2016	16:58	NR	NR	NR	NR	NR	1319	5407	ng/m3	Poly bag 19	NA	NA	Headspace	NR	Poly bag with books	72
1210	Property 1	Residential	4/20/2016	17:02	NR	NR	NR	NR	NR	370	735	ng/m3	Poly bag 20	NA	NA	Headspace	NR	Poly bag with speaker	71
1210	Property 1	Residential	4/20/2016	17:15	NR	NR	NR	NR	NR	277	496	ng/m3	Bedroom-Son	2	Plywood	Headspace	NR	Headspace of mattress	68
1210	Property 1	Residential	4/20/2016	17:20	NR	NR	NR	NR	NR	300	356	ng/m3	Bedroom-Master	2	Plywood	Headspace	NR	Headspace of mattress	68
1210	Property 1	Residential	4/20/2016	17:25	NR	NR	NR	NR	NR	1281	8240	ng/m3	Bathroom-Upstairs	2	NA	Floor	NR	Tub drain	68
1210	Property 1	Residential	4/20/2016	17:42	NR	NR	NR	NR	NR	334	1229	ng/m3	Poly bag 21	NA	NA	Headspace	NR	Poly bag with clothes	70
1210	Property 1	Residential	4/20/2016	17:45	NR	NR	NR	NR	NR	1115	4175	ng/m3	Poly bag 22	NA	NA	Headspace	NR	Poly bag with clothes	72
1318	Property 1	Residential	4/20/2016	18:31	NR	NR	NR	NR	NR	3000	9440	ng/m3	Office	1	Rug	Headspace	NR	Headspace from oriental rug	52
1318	Property 1	Residential	4/20/2016	18:40	NR	NR	NR	NR	NR	4000	>50000	ng/m3	Living Room	1	Rug	Headspace	NR	Area rug	48
1210	Property 1	Residential	4/20/2016	18:45	NR	NR	NR	NR	NR	139	340	ng/m3	Dining Room	1	Rug	Headspace	NR	Pile of Area rugs	52
1318	Property 1	Residential	4/21/2016	12:18	NR	NR	NR	NR	NR	93	104	ng/m3	Bedroom-Master	2	Plywood	Breathing Zone	NA	Windows open	70
1210	Property 1	Residential	4/21/2016	11:20	NR	NR	NR	NR	NR	1000	>50000	ng/m3	Bathroom-Upstairs	2	Tile	Headspace	NA	Tub drain following being capped	70
1318	Property 1	Residential	4/21/2016	12:05	NR	NR	NR	NR	NR	106	123	ng/m3	Basement	BA	Hardwood	Breathing Zone	NA	Stairwell	
1318	Property 1	Residential	4/21/2016	1610	NR	NR	NR	NR	NR	36	74	ng/m3	Poly Bag 43	NA	NA	Headspace	Clothes	Small poly with jeans	70
1318	Property 1	Residential	4/21/2016	16:20	NR	NR	NR	NR	NR	66	103	ng/m3	Poly Bag 49	NA	NA	Headspace	Clothes	Small poly bags with baby clothes	70

NA- Not Applicable
NR- Not Recorded
R - Standard Deviation

Appendix G: Lumex Screening Results Summary Table
Greenleafe Drive Mercury Response Site
Baldwinsville, Onondaga County, New York

Serial Number	Property Number	Land Use	Date	Time	Screeining-1	Screeining-2	Screeining-3	Average Screening Result	R	Minimum	Maximum	Units	Location	Floor	Floor Cover	Height	Item Type	Description	Temperature (˚F)
1318	Property 1	Residential	4/21/2016	16:18	NR	NR	NR	NR	NR	32	58	ng/m3	Poly Bag 47	NA	NA	Headspace	Clothes	Small poly bags with baby clothes	70
1318	Property 1	Residential	4/21/2016	16:19	NR	NR	NR	NR	NR	40	45	ng/m3	Poly Bag 48	NA	NA	Headspace	Clothes	Small poly bags with baby clothes	70
1318	Property 1	Residential	4/21/2016	16:35	NR	NR	NR	NR	NR	170	230	ng/m3	Poly Bag 56	NA	NA	Headspace	Clothes	Small poly bag with T-Shirt	70
1318	Property 1	Residential	4/21/2016	16:14	NR	NR	NR	NR	NR	230	997	ng/m3	Poly Bag 45	NA	NA	Headspace	Clothes	Small poly bag with shirts	70
1318	Property 1	Residential	4/21/2016	16:16	NR	NR	NR	NR	NR	30	51	ng/m3	Poly Bag 46	NA	NA	Headspace	Clothes	Small poly bag with shirts	70
1318	Property 1	Residential	4/21/2016	17:34	NR	NR	NR	NR	NR	80	894	ng/m3	Poly Bag 93	NA	NA	Headspace	Clothes	Small poly bag with moms clothes	67
1318	Property 1	Residential	4/21/2016	17:21	NR	NR	NR	NR	NR	80	874	ng/m3	Poly Bag 84	NA	NA	Headspace	Clothes	Small poly bag with moms clothes	67
1318	Property 1	Residential	4/21/2016	17:32	NR	NR	NR	NR	NR	90	136	ng/m3	Poly Bag 91	NA	NA	Headspace	Clothes	Small poly bag with moms clothes	67
1318	Property 1	Residential	4/21/2016	17:30	NR	NR	NR	NR	NR	40	123	ng/m3	Poly Bag 88	NA	NA	Headspace	Clothes	Small poly bag with moms clothes	67
1318	Property 1	Residential	4/21/2016	17:14	NR	NR	NR	NR	NR	72	108	ng/m3	Poly Bag 79	NA	NA	Headspace	Clothes	Small poly bag with moms clothes	67
1318	Property 1	Residential	4/21/2016	17:20	NR	NR	NR	NR	NR	50	58	ng/m3	Poly Bag 83	NA	NA	Headspace	Clothes	Small poly bag with moms clothes	67
1318	Property 1	Residential	4/21/2016	17:28	NR	NR	NR	NR	NR	50	58	ng/m3	Poly Bag 86	NA	NA	Headspace	Clothes	Small poly bag with moms clothes	67
1318	Property 1	Residential	4/21/2016	17:35	NR	NR	NR	NR	NR	40	51	ng/m3	Poly Bag 94	NA	NA	Headspace	Clothes	Small poly bag with moms clothes	67
1318	Property 1	Residential	4/21/2016	17:33	NR	NR	NR	NR	NR	30	50	ng/m3	Poly Bag 92	NA	NA	Headspace	Clothes	Small poly bag with moms clothes	67
1318	Property 1	Residential	4/21/2016	17:31	NR	NR	NR	NR	NR	40	45	ng/m3	Poly Bag 90	NA	NA	Headspace	Clothes	Small poly bag with moms clothes	67
1318	Property 1	Residential	4/21/2016	17:29	NR	NR	NR	NR	NR	40	42	ng/m3	Poly Bag 87	NA	NA	Headspace	Clothes	Small poly bag with moms clothes	67
1318	Property 1	Residential	4/21/2016	17:34	NR	NR	NR	NR	NR	30	41	ng/m3	Poly Bag 95	NA	NA	Headspace	Clothes	Small poly bag with moms clothes	64
1318	Property 1	Residential	4/21/2016	17:22	NR	NR	NR	NR	NR	20	28	ng/m3	Poly Bag 85	NA	NA	Headspace	Clothes	Small poly bag with moms clothes	67
1318	Property 1	Residential	4/21/2016	17:13	NR	NR	NR	NR	NR	20	27	ng/m3	Poly Bag 78	NA	NA	Headspace	Clothes	Small poly bag with moms clothes	67
1318	Property 1	Residential	4/21/2016	17:38	NR	NR	NR	NR	NR	40	83	ng/m3	Poly Bag 98	NA	NA	Headspace	Decoritive	Small poly bag with decoritve items	64
1318	Property 1	Residential	4/21/2016	17:35	NR	NR	NR	NR	NR	30	37	ng/m3	Poly Bag 96	NA	NA	Headspace	shoes	Small poly bag with daughters shoes	64
1318	Property 1	Residential	4/21/2016	17:09	NR	NR	NR	NR	NR	1000	5500	ng/m3	Poly Bag 74	NA	NA	Headspace	Clothes	Small poly bag with daughters clothes	67
1318	Property 1	Residential	4/21/2016	16:59	NR	NR	NR	NR	NR	200	1500	ng/m3	Poly Bag 63	NA	NA	Headspace	Clothes	Small poly bag with daughters clothes	70
1318	Property 1	Residential	4/21/2016	17:00	NR	NR	NR	NR	NR	104	264	ng/m3	Poly Bag 64	NA	NA	Headspace	Clothes	Small poly bag with daughters clothes	70
1318	Property 1	Residential	4/21/2016	17:04	NR	NR	NR	NR	NR	90	234	ng/m3	Poly Bag 68	NA	NA	Headspace	Clothes	Small poly bag with daughters clothes	67
1318	Property 1	Residential	4/21/2016	17:03	NR	NR	NR	NR	NR	86	201	ng/m3	Poly Bag 67	NA	NA	Headspace	Clothes	Small poly bag with daughters clothes	67
1318	Property 1	Residential	4/21/2016	17:03	NR	NR	NR	NR	NR	90	192	ng/m3	Poly Bag 66	NA	NA	Headspace	Clothes	Small poly bag with daughters clothes	67
1318	Property 1	Residential	4/21/2016	16:58	NR	NR	NR	NR	NR	91	108	ng/m3	Poly Bag 62	NA	NA	Headspace	Clothes	Small poly bag with daughters clothes	70
1318	Property 1	Residential	4/21/2016	17:07	NR	NR	NR	NR	NR	64	98	ng/m3	Poly Bag 70	NA	NA	Headspace	Clothes	Small poly bag with daughters clothes	67
1318	Property 1	Residential	4/21/2016	16:57	NR	NR	NR	NR	NR	71	91	ng/m3	Poly Bag 61	NA	NA	Headspace	Clothes	Small poly bag with daughters clothes	70
1318	Property 1	Residential	4/21/2016	17:08	NR	NR	NR	NR	NR	56	91	ng/m3	Poly Bag 72	NA	NA	Headspace	Clothes	Small poly bag with daughters clothes	67
1318	Property 1	Residential	4/21/2016	17:13	NR	NR	NR	NR	NR	30	74	ng/m3	Poly Bag 77	NA	NA	Headspace	Clothes	Small poly bag with daughters clothes	67
1318	Property 1	Residential	4/21/2016	17:08	NR	NR	NR	NR	NR	45	70	ng/m3	Poly Bag 73	NA	NA	Headspace	Clothes	Small poly bag with daughters clothes	67
1318	Property 1	Residential	4/21/2016	17:01	NR	NR	NR	NR	NR	38	64	ng/m3	Poly Bag 65	NA	NA	Headspace	Clothes	Small poly bag with daughters clothes	67
1318	Property 1	Residential	4/21/2016	17:05	NR	NR	NR	NR	NR	60	62	ng/m3	Poly Bag 69	NA	NA	Headspace	Clothes	Small poly bag with daughters clothes	67
1318	Property 1	Residential	4/21/2016	17:07	NR	NR	NR	NR	NR	31	46	ng/m3	Poly Bag 71	NA	NA	Headspace	Clothes	Small poly bag with daughters clothes	67
1318	Property 1	Residential	4/21/2016	17:10	NR	NR	NR	NR	NR	31	45	ng/m3	Poly Bag 75	NA	NA	Headspace	Clothes	Small poly bag with daughters clothes	67
1318	Property 1	Residential	4/21/2016	17:12	NR	NR	NR	NR	NR	30	39	ng/m3	Poly Bag 76	NA	NA	Headspace	Clothes	Small poly bag with daughters clothes	67
1318	Property 1	Residential	4/21/2016	17:30	NR	NR	NR	NR	NR	80	91	ng/m3	Poly Bag 89	NA	NA	Headspace	Clothes	Small poly bag with daughters clothes	67
1318	Property 1	Residential	4/21/2016	17:37	NR	NR	NR	NR	NR	45	128	ng/m3	Poly Bag 97	NA	NA	Headspace	shoes	Small poly bag with baby's shoes	64
1318	Property 1	Residential	4/21/2016	16:13	NR	NR	NR	NR	NR	100	421	ng/m3	Poly Bag 44	NA	NA	Headspace	Clothes	Small bag with shorts	70
1318	Property 1	Residential	4/21/2016	17:19	NR	NR	NR	NR	NR	100	402	ng/m3	Poly Bag 82	NA	NA	Headspace	Shoes	Small bag with baby's shoes	67
1318	Property 1	Residential	4/21/2016	17:15	NR	NR	NR	NR	NR	70	222	ng/m3	Poly Bag 80	NA	NA	Headspace	Shoes	Small bag with baby's shoes	67
1318	Property 1	Residential	4/21/2016	17:18	NR	NR	NR	NR	NR	70	686	ng/m3	Poly Bag 81	NA	NA	Headspace	Shoes	Small bag with baby's sandels	67
1318	Property 1	Residential	4/21/2016	16:30	NR	NR	NR	NR	NR	989	1677	ng/m3	Poly Bag 54	NA	NA	Headspace	Bedding	Poly bags with pillows	70
1318	Property 1	Residential	4/21/2016	15:14	NR	NR	NR	NR	NR	86	281	ng/m3	Poly Bag 28	NA	NA	Headspace	Bag	Poly bag with trave1 bag	72
1318	Property 1	Residential	4/21/2016	16:33	NR	NR	NR	NR	NR	100	445	ng/m3	Poly Bag 55	NA	NA	Headspace	Clothes	Poly bag with T-Shirts	70
1318	Property 1	Residential	4/21/2016	15:55	NR	NR	NR	NR	NR	93	173	ng/m3	Poly Bag 39	NA	NA	Headspace	Toys	Poly bag with stuffed animals	72
1318	Property 1	Residential	4/21/2016	16:27	NR	NR	NR	NR	NR	63	138	ng/m3	Poly Bag 52	NA	NA	Headspace	Bedding	Poly bag with sheets	70
1318	Property 1	Residential	4/21/2016	16:24	NR	NR	NR	NR	NR	71	116	ng/m3	Poly Bag 51	NA	NA	Headspace	Bedding	Poly bag with pillows	70
1318	Property 1	Residential	4/21/2016	15:20	NR	NR	NR	NR	NR	83	157	ng/m3	Poly Bag 31	NA	NA	Headspace	Clothes	Poly bag with clothes (not involved)	72
1318	Property 1	Residential	4/21/2016	15:10	NR	NR	NR	NR	NR	79	139	ng/m3	Poly Bag 27	NA	NA	Headspace	Clothes	Poly bag with clothes (not involved)	72
1318	Property 1	Residential	4/21/2016	15:15	NR	NR	NR	NR	NR	73	134	ng/m3	Poly Bag 29	NA	NA	Headspace	Clothes	Poly bag with clothes (not involved)	72
1318	Property 1	Residential	4/21/2016	15:07	NR	NR	NR	NR	NR	87	121	ng/m3	Poly Bag 26	NA	NA	Headspace	Clothes	Poly bag with clothes (not involved)	72
1318	Property 1	Residential	4/21/2016	15:20	NR	NR	NR	NR	NR	85	109	ng/m3	Poly Bag 32	NA	NA	Headspace	Clothes	Poly bag with clothes (not involved)	72
1318	Property 1	Residential	4/21/2016	15:06	NR	NR	NR	NR	NR	82	105	ng/m3	Poly Bag 25	NA	NA	Headspace	Clothes	Poly bag with clothes (not involved)	72
1318	Property 1	Residential	4/21/2016	15:50	NR	NR	NR	NR	NR	47	64	ng/m3	Poly Bag 37	NA	NA	Headspace	Clothes	Poly bag with clothes (not involved)	72
1318	Property 1	Residential	4/21/2016	16:39	NR	NR	NR	NR	NR	150	397	ng/m3	Poly Bag 58	NA	NA	Headspace	Clothes	Poly bag with clothes (involved)-Daughters Room	70
1318	Property 1	Residential	4/21/2016	15:25	NR	NR	NR	NR	NR	400	682	ng/m3	Poly Bag 33	NA	NA	Headspace	Clothes	Poly bag with clothes (involved)	72
1318	Property 1	Residential	4/21/2016	15:49	NR	NR	NR	NR	NR	358	501	ng/m3	Poly Bag 36	NA	NA	Headspace	Clothes	Poly bag with clothes (involved)	72
1318	Property 1	Residential	4/21/2016	15:28	NR	NR	NR	NR	NR	177	295	ng/m3	Poly Bag 34	NA	NA	Headspace	Clothes	Poly bag with clothes (involved)	72
1318	Property 1	Residential	4/21/2016	16:38	NR	NR	NR	NR	NR	90	180	ng/m3	Poly Bag 57	NA	NA	Headspace	Clothes	Poly bag with clothes (involved)	70
1318	Property 1	Residential	4/21/2016	15:32	NR	NR	NR	NR	NR	50	53	ng/m3	Poly Bag 35	NA	NA	Headspace	Clothes	Poly bag with clothes (involved)	72
1318	Property 1	Residential	4/21/2016	15:52	NR	NR	NR	NR	NR	1063	>50000	ng/m3	Poly Bag 38	NA	NA	Headspace	Clothes	Poly bag with clothes	72
1318	Property 1	Residential	4/21/2016	12:36	NR	NR	NR	NR	NR	7913	2121	ng/m3	Poly Bag 23	NA	NA	Headspace	Clothes	Poly bag with clothes	NR
1318	Property 1	Residential	4/21/2016	12:24	NR	NR	NR	NR	NR	13240	1576	ng/m3	Poly Bag 21	NA	NA	Headspace	Clothes	Poly bag with clothes	NR
1318	Property 1	Residential	4/21/2016	12:35	NR	NR	NR	NR	NR	1000	12450	ng/m3	Poly Bag 22	NA	NA	Headspace	Clothes	Poly bag with clothes	NR
1318	Property 1	Residential	4/21/2016	15:59	NR	NR	NR	NR	NR	220	519	ng/m3	Poly Bag 40	NA	NA	Headspace	Clothes	Poly bag with clothes	72
1318	Property 1	Residential	4/21/2016	17:40	NR	NR	NR	NR	NR	40	922	ng/m3	Poly Bag 99	NA	NA	Headspace	Clothes	Poly Bag with clothes	64
1318	Property 1	Residential	4/21/2016	15:05	NR	NR	NR	NR	NR	19	28	ng/m3	Poly Bag 24	NA	NA	Headspace	Clothes	Poly bag with brand new clothes	72
1318	Property 1	Residential	4/21/2016	16:28	NR	NR	NR	NR	NR	55	107	ng/m3	Poly Bag 53	NA	NA	Headspace	Bedding	Poly bag with blanket	70
1318	Property 1	Residential	4/21/2016	16:06	NR	NR	NR	NR	NR	1000	3600	ng/m3	Poly Bag 42	NA	NA	Headspace	Clothes	Poly bag with bathrobe	72
1318	Property 1	Residential	4/21/2016	16:23	NR	NR	NR	NR	NR	20	27	ng/m3	Poly Bag 50	NA	NA	Headspace	Bags	Poly bag with backpack	70
1210	Property 1	Residential	4/21/2016	11:03	NR	NR	NR	NR	NR	98	136	ng/m3	Kitchen	1	Hardwood	Breathing Zone	NA	Middle drawer with towels	NR
1210	Property 1	Residential	4/21/2016	11:04	NR	NR	NR	NR	NR	57	71	ng/m3	Kitchen	1	Hardwood	Breathing Zone	NA	Middle drawer with towels	NR
1318	Property 1	Residential	4/21/2016	14:45	NR	NR	NR	NR	NR	300	1307	ng/m3	Front Yard	NA	Grass	Headspace	NA	G9A	76
1318	Property 1	Residential	4/21/2016	14:44	NR	NR	NR	NR	NR	337	973	ng/m3	Front Yard	NA	Grass	Floor	NA	G8A	76
1318	Property 1	Residential	4/21/2016	14:43	NR	NR	NR	NR	NR	100	2250	ng/m3	Front Yard	NA	Grass	Floor	NA	G7A	76
1318	Property 1	Residential	4/21/2016	14:42	NR	NR	NR	NR	NR	100	210	ng/m3	Front Yard	NA	Grass	Headspace	NA	G7A	76
1318	Property 1	Residential	4/21/2016	14:41	NR	NR	NR	NR	NR	55	245	ng/m3	Front Yard	NA	Grass	Headspace	NA	G6A	76
1318	Property 1	Residential	4/21/2016	14:40	NR	NR	NR	NR	NR	100	1383	ng/m3	Front Yard	NA	Grass	Floor	NA	G5A	76
1318	Property 1	Residential	4/21/2016	14:36	NR	NR	NR	NR	NR	114	131	ng/m3	Front Yard	NA	Grass	Headspace	NA	G5A	76
1318	Property 1	Residential	4/21/2016	14:34	NR	NR	NR	NR	NR	50	78	ng/m3	Front Yard	NA	Grass	Headspace	NA	G4B	76
1318	Property 1	Residential	4/21/2016	14:33	NR	NR	NR	NR	NR	50	1410	ng/m3	Front Yard	NA	Grass	Floor	NA	G4A	76
1318	Property 1	Residential	4/21/2016	14:32	NR	NR	NR	NR	NR	30	55	ng/m3	Front Yard	NA	Grass	Headspace	NA	G4A	76

NA- Not Applicable
NR- Not Recorded
R - Standard Deviation

Appendix G: Lumex Screening Results Summary Table
Greenleafe Drive Mercury Response Site
Baldwinsville, Onondaga County, New York

Serial Number	Property Number	Land Use	Date	Time	Screeining-1	Screeining-2	Screeining-3	Average Screening Result	R	Minimum	Maximum	Units	Location	Floor	Floor Cover	Height	Item Type	Description	Temperature (°F)
1318	Property 1	Residential	4/21/2016	14:31	NR	NR	NR	NR	NR	40	101	ng/m3	Front Yard	NA	Grass	Headspace	NA	G3A	76
1318	Property 1	Residential	4/21/2016	14:30	NR	NR	NR	NR	NR	120	480	ng/m3	Front Yard	NA	Grass	Floor	NA	G2A	76
1318	Property 1	Residential	4/21/2016	14:27	NR	NR	NR	NR	NR	50	121	ng/m3	Front Yard	NA	Grass	Headspace	NA	G2A	76
1318	Property 1	Residential	4/21/2016	14:26	NR	NR	NR	NR	NR	33	82	ng/m3	Front Yard	NA	Grass	Headspace	NA	G1A	76
1210	Property 1	Residential	4/21/2016	11:05	NR	NR	NR	NR	NR	37	74	ng/m3	Kitchen	1	Hardwood	Breathing Zone	NA	End drawer with scissors	NR
1210	Property 1	Residential	4/21/2016	11:01	NR	NR	NR	NR	NR	140	150	ng/m3	Kitchen	1	Hardwood	Breathing Zone	NA	Drawers with towels (far drawer closes to middle)	70
1318	Property 1	Residential	4/21/2016	16:54	NR	NR	NR	NR	NR	300	404	ng/m3	Poly Bag 60	NA	NA	Headspace	Clothes	Clothes extracted from bag 59	70
1318	Property 1	Residential	4/21/2016	16:41	NR	NR	NR	NR	NR	100	302	ng/m3	Poly Bag 59	NA	NA	Headspace	Clothes	Clothes (Not involved)-Daughters Room	70
1318	Property 1	Residential	4/21/2016	15:18	NR	NR	NR	NR	NR	103	194	ng/m3	Poly Bag 30	NA	NA	Headspace	Clothes	Clothes (involved)	72
1318	Property 1	Residential	4/21/2016	12:06	NR	NR	NR	NR	NR	133	145	ng/m3	Basement	BA	Carpet	Breathing Zone	NA	NR	NR
1318	Property 1	Residential	4/21/2016	12:08	NR	NR	NR	NR	NR	131	144	ng/m3	Storage Room	BA	Cement	Headspace	NA	NR	NR
1318	Property 1	Residential	4/21/2016	12:10	NR	NR	NR	NR	NR	88	107	ng/m3	Stairwell-Upstairs	2	Hardwood	Breathin-Zone	NA	NR	70
1318	Property 1	Residential	4/21/2016	12:19	NR	NR	NR	NR	NR	97	103	ng/m3	Bathroom-Master	2	Tile	Breathing Zone	NA	NR	70
1318	Property 1	Residential	4/21/2016	12:16	NR	NR	NR	NR	NR	88	97	ng/m3	Bedroom-Daughter	2	Carpet	Breathing Zone	NA	NR	70
1318	Property 1	Residential	4/21/2016	12:17	NR	NR	NR	NR	NR	85	93	ng/m3	Bedroom-Baby	2	Hardwood	Breathing Zone	NA	NR	70
1318	Property 1	Residential	4/21/2016	12:12	NR	NR	NR	NR	NR	79	89	ng/m3	Hallway-Upstairs	2	Plywood	Breathing Zone	NA	NR	70
1318	Property 1	Residential	4/21/2016	12:13	NR	NR	NR	NR	NR	80	88	ng/m3	Bedroom-Son	2	Plywood	Breathing Zone	NA	NR	70
1318	Property 1	Residential	4/21/2016	12:03	NR	NR	NR	NR	NR	49	59	ng/m3	Office	1	Hardwood	Breathing Zone	NA	NR	NR
1318	Property 1	Residential	4/21/2016	11:44	NR	NR	NR	NR	NR	36	49	ng/m3	Dining Room	1	Hardwood	Breathing Zone	NA	NR	NR
1318	Property 1	Residential	4/21/2016	12:01	NR	NR	NR	NR	NR	41	48	ng/m3	Kitchen	1	Hardwood	Breathing Zone	NA	NR	NR
1318	Property 1	Residential	4/21/2016	11:21	NR	NR	NR	NR	NR	22	41	ng/m3	Bathroom-Upstairs	2	Tile	Breathing Zone	NA	NR	70
1318	Property 1	Residential	4/21/2016	11:33	NR	NR	NR	NR	NR	33	41	ng/m3	Living Room	1	Hardwood	Breathing Zone	NA	NR	NR
1210	Property 1	Residential	4/22/2016	10:43	NR	NR	NR	NR	NR	37	41	ng/m3	Bedroom-Master	2	NR	Breathing Zone	NR	Closet	69
1210	Property 1	Residential	4/22/2016	10:47	NR	NR	NR	NR	NR	37	94	ng/m3	Bedroom-Master	2	NR	Breathing Zone	Clothes	Clothes in closet	69
1210	Property 1	Residential	4/22/2016	11:11	NR	NR	NR	NR	NR	100	301	ng/m3	Bedroom-Master	2	NR	Breathing Zone	Clothes	Clothes in second drawer in dresser next to	69
1210	Property 1	Residential	4/22/2016	13:00	NR	NR	NR	NR	NR	1000	>50000	ng/m3	Poly bag 110	NA	NA	Headspace	Bags	Clothes from master bedroom	86
1210	Property 1	Residential	4/22/2016	13:08	NR	NR	NR	NR	NR	1000	5171	ng/m3	Poly bag 117	NA	NA	Headspace	Clothes	Clothes from master bedroom	91
1210	Property 1	Residential	4/22/2016	12:55	NR	NR	NR	NR	NR	1000	4105	ng/m3	Poly bag 107	NA	NA	Headspace	Clothes	Clothes from master bedroom	76
1210	Property 1	Residential	4/22/2016	13:05	NR	NR	NR	NR	NR	1000	3059	ng/m3	Poly bag 115	NA	NA	Headspace	Clothes	Clothes from master bedroom	88
1210	Property 1	Residential	4/22/2016	13:03	NR	NR	NR	NR	NR	1000	3051	ng/m3	Poly bag 112	NA	NA	Headspace	Clothes	Clothes from master bedroom	90
1210	Property 1	Residential	4/22/2016	13:12	NR	NR	NR	NR	NR	237	1249	ng/m3	Poly bag 120	NA	NA	Headspace	Toys	Laundry room basket toys and books	89
1210	Property 1	Residential	4/22/2016	12:52	NR	NR	NR	NR	NR	940	1145	ng/m3	Poly bag 105	NA	NA	Headspace	Clothes	Clothes from master bedroom	75
1210	Property 1	Residential	4/22/2016	13:10	NR	NR	NR	NR	NR	263	917	ng/m3	Poly bag 119	NA	NA	Headspace	Clothes	Laundry room basket	88
1210	Property 1	Residential	4/22/2016	12:59	NR	NR	NR	NR	NR	0:00	701	ng/m3	Poly bag 109	NA	NA	Headspace	Clothes	Clothes from master bedroom	77
1210	Property 1	Residential	4/22/2016	13:10	NR	NR	NR	NR	NR	256	545	ng/m3	Poly bag 118	NA	NA	Headspace	Clothes	Laundry room basket	90
1210	Property 1	Residential	4/22/2016	12:50	NR	NR	NR	NR	NR	113	495	ng/m3	Poly bag 104	NA	NA	Headspace	Clothes	Clothes from master bedroom	78
1210	Property 1	Residential	4/22/2016	12:57	NR	NR	NR	NR	NR	250	495	ng/m3	Poly bag 108	NA	NA	Headspace	Clothes	Clothes from master bedroom	74
1210	Property 1	Residential	4/22/2016	12:54	NR	NR	NR	NR	NR	100	485	ng/m3	Poly bag 106	NA	NA	Headspace	Clothes	Clothes from master bedroom (second drawer from	74
1210	Property 1	Residential	4/22/2016	13:15	NR	NR	NR	NR	NR	175	469	ng/m3	Poly bag 121	NA	NA	Headspace	Clothes	Laundry room basket	NR
1210	Property 1	Residential	4/22/2016	12:47	NR	NR	NR	NR	NR	158	378	ng/m3	Poly bag 102	NA	NA	Headspace	Clothes	Clothes from master bedroom closet	78
1210	Property 1	Residential	4/22/2016	12:42	NR	NR	NR	NR	NR	156	278	ng/m3	Poly bag 101	NA	NA	Headspace	Clothes	Clothes from master bedroom	81
1210	Property 1	Residential	4/22/2016	12:48	NR	NR	NR	NR	NR	124	254	ng/m3	Poly bag 103	NA	NA	Headspace	Clothes	Clothes from master bedroom	75
1210	Property 1	Residential	4/22/2016	13:07	NR	NR	NR	NR	NR	125	205	ng/m3	Poly bag 116	NA	NA	Headspace	Clothes	Clothes from master bedroom	97
1210	Property 1	Residential	4/22/2016	13:00	NR	NR	NR	NR	NR	137	202	ng/m3	Poly bag 111	NA	NA	Headspace	Clothes	Clothes from master bedroom	84
1210	Property 1	Residential	4/22/2016	12:34	NR	NR	NR	NR	NR	87	185	ng/m3	Poly bag 100	NA	NA	Headspace	Clothes	Clothes from master bedroom	83
1210	Property 1	Residential	4/22/2016	13:04	NR	NR	NR	NR	NR	100	154	ng/m3	Poly bag 114	NA	NA	Headspace	Clothes	Clothes from master bedroom	88
1210	Property 1	Residential	4/22/2016	13:03	NR	NR	NR	NR	NR	71	125	ng/m3	Poly bag 113	NA	NA	Headspace	Clothes	Clothes from master bedroom	88
1210	Property 1	Residential	4/22/2016	14:23	NR	NR	NR	NR	NR	340	440	ng/m3	Basement	NR	NR	Headspace	N/A	Inside washer with towels	NR
1210	Property 1	Residential	4/22/2016	16:24	NR	NR	NR	NR	NR	365	403	ng/m3	Basement	NR	NR	Headspace	N/A	Inside washer without towels	NR
1210	Property 1	Residential	4/22/2016	16:26	NR	NR	NR	NR	NR	260	292	ng/m3	Basement	NR	NR	Headspace	Towels	Towels from washer	NR
1210	Property 1	Residential	4/22/2016	16:54	NR	NR	NR	NR	NR	144	417	ng/m3	Poly bag 122	NA	NA	Headspace	Clothes	Baby's pajamas	63
1210	Property 1	Residential	4/22/2016	16:55	NR	NR	NR	NR	NR	25	36	ng/m3	Poly bag 123	NA	NA	Headspace	Clothes	Baby's pajamas	63
1210	Property 1	Residential	4/23/2016	15:50	NR	NR	NR	NR	NR	280	483	ng/m3	Poly bag 114	NA	NA	Headspace	Clothes	Clothes	160
1210	Property 1	Residential	4/23/2016	15:55	NR	NR	NR	NR	NR	200	764	ng/m3	Poly bag 31	NA	NA	Headspace	Clothes	Clothes	150
1210	Property 1	Residential	4/23/2016	16:20	NR	NR	NR	NR	NR	1242	2345	ng/m3	Poly bag124	NA	NA	Headspace	Garage items	NR	123
1210	Property 1	Residential	4/23/2016	16:17	NR	NR	NR	NR	NR	1271	2373	ng/m3	Poly bag 125	NA	NA	Headspace	Garage items	NR	107
1210	Property 1	Residential	4/23/2016	16:22	NR	NR	NR	NR	NR	3344	32350	ng/m3	Poly bag 126	NA	NA	Headspace	Garage items	NR	182
1210	Property 1	Residential	4/23/2016	16:24	NR	NR	NR	NR	NR	9215	28150	ng/m3	Poly bag 127	NA	NA	Headspace	Garage items	Miracle grow	95
1210	Property 1	Residential	4/23/2016	16:26	NR	NR	NR	NR	NR	500	14890	ng/m3	Poly bag 128	NA	NA	Headspace	Garage items	Vacuum hose	88
1210	Property 1	Residential	4/23/2016	16:29	NR	NR	NR	NR	NR	24000	38700	ng/m3	Poly bag 129	NA	NA	Headspace	Garage items	Saw	91
1210	Property 1	Residential	4/23/2016	16:33	NR	NR	NR	NR	NR	890	1128	ng/m3	Poly bag 130	NA	NA	Headspace	Garage items	Ladder	94
1210	Property 1	Residential	4/23/2016	16:35	NR	NR	NR	NR	NR	3515	7810	ng/m3	Poly bag 131	NA	NA	Headspace	Garage items	Vacuum	93
1210	Property 1	Residential	4/23/2016	16:37	NR	NR	NR	NR	NR	1000	>50000	ng/m3	Poly bag 132	NA	NA	Headspace	Garage items	Rug	108
1210	Property 1	Residential	4/23/2016	16:45	NR	NR	NR	NR	NR	100	550	ng/m3	Mud Room	NR	NR	Headspace	Storage	Mud room basket	107
1210	Property 1	Residential	4/23/2016	17:10	NR	NR	NR	NR	NR	89	218	ng/m3	Kitchen	NR	NR	Headspace	Furniture	High top chair 1	98
1210	Property 1	Residential	4/23/2016	17:08	NR	NR	NR	NR	NR	150	406	ng/m3	Kitchen	NR	NR	Headspace	Furniture	High top chair 2	101
1210	Property 1	Residential	4/23/2016	17:18	NR	NR	NR	NR	NR	1117	2516	ng/m3	Dining room	NR	NR	Headspace	Flooring	Area rug	95
1210	Property 1	Residential	4/24/2016	10:38	NR	NR	NR	NR	NR	951	2001	ng/m3	Garage	NR	NR	Breathing Zone	NR	Following removal of items	NR
1210	Property 1	Residential	4/24/2016	10:40	NR	NR	NR	NR	NR	15000	29000	ng/m3	Garage	NR	NR	Floor	NR	Corner adjacent to mud room entrance (foam	NR
1210	Property 1	Residential	4/24/2016	10:41	NR	NR	NR	NR	NR	15000	29000	ng/m3	Garage	NR	NR	Floor	NR	Underneath step into mud room	NR
1210	Property 1	Residential	4/24/2016	10:44	NR	NR	NR	NR	NR	2000	8700	ng/m3	Garage	NR	NR	Floor	NR	Bottom door frame below flashing	NR
1318	Property 1	Residential	4/24/2016	11:44	NR	NR	NR	NR	NR	850	1413	ng/m3	Mud room	NR	NR	Floor	NR	Floor vent in mud room	NR
1318	Property 1	Residential	4/24/2016	11:20	NR	NR	NR	NR	NR	25	34	ng/m3	Bedroom-Daughter	NR	NR	Breathing Zone	Furniture	Makeup table	NR
1318	Property 1	Residential	4/24/2016	11:31	NR	NR	NR	NR	NR	72	103	ng/m3	Bedroom-Daughter	NR	NR	Headspace	Poly bag clothes	Priority clothing	100
1318	Property 1	Residential	4/24/2016	11:33	NR	NR	NR	NR	NR	123	216	ng/m3	Bedroom-Daughter	NR	NR	Headspace	Poly bag clothes	Priority clothing	103
1318	Property 1	Residential	4/24/2016	11:34	NR	NR	NR	NR	NR	66	126	ng/m3	Bedroom-Daughter	NR	NR	Headspace	Poly bag clothes	Priority clothing	109
1318	Property 1	Residential	4/24/2016	11:37	NR	NR	NR	NR	NR	33	76	ng/m3	Bedroom-Daughter	NR	NR	Headspace	Poly bag shoes	Priority clothing	98
1318	Property 1	Residential	4/24/2016	11:38	NR	NR	NR	NR	NR	56	197	ng/m3	Bedroom-Daughter	NR	NR	Headspace	Poly bag clothes	Priority clothing	113
1318	Property 1	Residential	4/24/2016	12:14	NR	NR	NR	NR	NR	67	89	ng/m3	Poly bag 133	NA	NA	Headspace	Decorative	Hanging pink lanterns	94
1318	Property 1	Residential	4/24/2016	12:17	NR	NR	NR	NR	NR	98	114	ng/m3	Poly bag 134	NA	NA	Headspace	Decorative	Hanging pink lanterns	104
1318	Property 1	Residential	4/24/2016	12:15	NR	NR	NR	NR	NR	55	113	ng/m3	Poly bag 135	NA	NA	Headspace	Lighting	Pink lamp	106
1318	Property 1	Residential	4/24/2016	12:20	NR	NR	NR	NR	NR	79	430	ng/m3	Poly bag 136	NA	NA	Headspace	Clothes	Clothes from baby room	114
1318	Property 1	Residential	4/24/2016	12:22	NR	NR	NR	NR	NR	89	178	ng/m3	Poly bag 137	NA	NA	Headspace	Clothes	Clothes from baby room	119
1318	Property 1	Residential	4/24/2016	12:23	NR	NR	NR	NR	NR	156	333	ng/m3	Poly bag 138	NA	NA	Headspace	Clothes	Clothes from baby room	139
1318	Property 1	Residential	4/24/2016	12:25	NR	NR	NR	NR	NR	87	148	ng/m3	Poly bag 139	NA	NA	Headspace	Toys	Toys from son's room	92

NA- Not Applicable
NR- Not Recorded
R - Standard Deviation

Appendix G: Lumex Screening Results Summary Table
Greenleafe Drive Mercury Response Site
Baldwinsville, Onondaga County, New York

Serial Number	Property Number	Land Use	Date	Time	Screening-1	Screening-2	Screening-3	Average Screening Result	R	Minimum	Maximum	Units	Location	Floor	Floor Cover	Height	Item Type	Description	Temperature (°F)
1318	Property 1	Residential	4/24/2016	12:26	NR	NR	NR	NR	NR	363	371	ng/m3	Poly bag 140	NA	NA	Headspace	Athletics	Sports equipment from son's room	106
1318	Property 1	Residential	4/24/2016	12:33	NR	NR	NR	NR	NR	124	145	ng/m3	Poly bag 141	NA	NA	Headspace	Toys	Toys from baby's room	104
1318	Property 1	Residential	4/24/2016	12:35	NR	NR	NR	NR	NR	146	176	ng/m3	Poly bag 142	NA	NA	Headspace	Toys	Toys from baby's room	107
1318	Property 1	Residential	4/24/2016	12:50	NR	NR	NR	NR	NR	69	133	ng/m3	Poly bag 143	NA	NA	Headspace	Storage	Wooden chest	107
1318	Property 1	Residential	4/24/2016	12:53	NR	NR	NR	NR	NR	66	80	ng/m3	Poly bag 144	NA	NA	Headspace	Decorative/Toys	Miscellaneous decorations/toys from baby room	92
1318	Property 1	Residential	4/24/2016	12:55	NR	NR	NR	NR	NR	65	189	ng/m3	Poly bag 145	NA	NA	Headspace	Storage	Brown basket with toys	99
1318	Property 1	Residential	4/24/2016	12:39	NR	NR	NR	NR	NR	46	65	ng/m3	Poly bag 146	NA	NA	Headspace	Files	Papers from master bedroom closet	78
1318	Property 1	Residential	4/24/2016	12:47	NR	NR	NR	NR	NR	196	253	ng/m3	Bedroom-Baby	NR	NR	Headspace	Furniture	Box spring from baby's room	106
1318	Property 1	Residential	4/24/2016	13:35	NR	NR	NR	NR	NR	300	833	ng/m3	Poly bag 147	NA	NA	Headspace	Clothes	Priority clothing	105
1318	Property 1	Residential	4/24/2016	13:37	NR	NR	NR	NR	NR	59	84	ng/m3	Poly bag 148	NA	NA	Headspace	Linens	Towel from linen closet	108
1318	Property 1	Residential	4/24/2016	13:41	NR	NR	NR	NR	NR	41	102	ng/m3	Poly bag 149	NA	NA	Headspace	Medical	Asthma inhaler	104
1318	Property 1	Residential	4/24/2016	13:44	NR	NR	NR	NR	NR	91	101	ng/m3	Poly bag 150	NA	NA	Headspace	Clothes	Prom dresses from daughter's room	99
1318	Property 1	Residential	4/24/2016	13:58	NR	NR	NR	NR	NR	84	109	ng/m3	Poly bag 151	NA	NA	Headspace	Athletics	Lacrosse helmet from son's room	93
1318	Property 1	Residential	4/24/2016	16:39	NR	NR	NR	NR	NR	19	24	ng/m3	Poly bag 152	NA	NA	Headspace	Electronics	Clothes, laptop, flute from daughter's room	93
1318	Property 1	Residential	4/24/2016	16:43	NR	NR	NR	NR	NR	55	89	ng/m3	Poly bag 153	NA	NA	Headspace	Clothes	Clothes from daughter's room	100
1318	Property 1	Residential	4/24/2016	16:48	NR	NR	NR	NR	NR	3297	6771	ng/m3	Poly bag 154	NA	NA	Headspace	Miscellaneous	Miscellaneous books	102
1318	Property 1	Residential	4/24/2016	16:50	NR	NR	NR	NR	NR	5337	7184	ng/m3	Poly bag 155	NA	NA	Headspace	Miscellaneous	Miscellaneous garage items	94
1318	Property 1	Residential	4/24/2016	16:55	NR	NR	NR	NR	NR	3549	7164	ng/m3	Poly bag 156	NA	NA	Headspace	Miscellaneous	Miscellaneous garage items and flags	105
1318	Property 1	Residential	4/24/2016	16:59	NR	NR	NR	NR	NR	977	1791	ng/m3	Poly bag 157	NA	NA	Headspace	Miscellaneous	Miscellaneous garage items	95
1318	Property 1	Residential	4/24/2016	17:37	NR	NR	NR	NR	NR	3517	6273	ng/m3	Poly bag 158	NA	NA	Headspace	Miscellaneous	Miscellaneous garage items	94
1318	Property 1	Residential	4/24/2016	17:40	NR	NR	NR	NR	NR	1687	4267	ng/m3	Poly bag 159	NA	NA	Headspace	Miscellaneous	Miscellaneous garage items	100
1318	Property 1	Residential	4/24/2016	17:45	NR	NR	NR	NR	NR	361	529	ng/m3	Poly bag 160	NA	NA	Headspace	Miscellaneous	Miscellaneous garage items	94
1318	Property 1	Residential	4/24/2016	17:46	NR	NR	NR	NR	NR	1610	3354	ng/m3	Poly bag 161	NA	NA	Headspace	Miscellaneous	Miscellaneous garage items	91
1318	Property 1	Residential	4/24/2016	17:18	NR	NR	NR	NR	NR	600	33500	ng/m3	Garage	NR	NR	Headspace	Building Materials	Foam sealant from garage walls in jar.	75
1318	Property 1	Residential	4/24/2016	18:05	NR	NR	NR	NR	NR	298	340	ng/m3	Garage	NR	NR	Breathing Zone	NR	Following 2 rounds of heating and venting	75
1318	Property 1	Residential	4/24/2016	18:06	NR	NR	NR	NR	NR	206	666	ng/m3	Garage	NR	NR	Floor	NR	West wall cracks between floor and wall after	75
1318	Property 1	Residential	4/24/2016	18:07	NR	NR	NR	NR	NR	305	896	ng/m3	Mud room	NR	NR	Floor	NR	Floor vent in mud room after 2 rounds of	75
1318	Property 1	Residential	4/24/2016	18:11	NR	NR	NR	NR	NR	1000	3782	ng/m3	Garage	NR	NR	Floor	NR	Corner adjacent to mud room entrance (foam	75
1210	Property 1	Residential	4/25/2016	9:22	NR	NR	NR	NR	NR	1960	17810	ng/m3	Poly bag 162	NA	NA	Headspace	Clothes	Clothes from baby room	109
1210	Property 1	Residential	4/25/2016	9:24	NR	NR	NR	NR	NR	116	314	ng/m3	Poly bag 163	NA	NA	Headspace	Toys	Stuffed animal bear	111
1210	Property 1	Residential	4/25/2016	9:31	NR	NR	NR	NR	NR	129	284	ng/m3	Poly bag 164	NA	NA	Headspace	Lighting	Small white lamp	99
1210	Property 1	Residential	4/25/2016	9:34	NR	NR	NR	NR	NR	443	659	ng/m3	Poly bag 165	NA	NA	Headspace	Miscellaneous	Miscellaneous garage items, photo coat hanger	93
1210	Property 1	Residential	4/25/2016	9:39	NR	NR	NR	NR	NR	161	260	ng/m3	Poly bag 166	NA	NA	Headspace	Miscellaneous	Miscellaneous cleaning supplies and towels	101
1210	Property 1	Residential	4/25/2016	9:41	NR	NR	NR	NR	NR	141	202	ng/m3	Poly bag 167	NA	NA	Headspace	Lighting	Large white lamp 1	103
1210	Property 1	Residential	4/25/2016	9:45	NR	NR	NR	NR	NR	146	213	ng/m3	Poly bag 168	NA	NA	Headspace	Lighting	Large white lamp 2	104
1210	Property 1	Residential	4/25/2016	9:48	NR	NR	NR	NR	NR	136	160	ng/m3	Poly bag 169	NA	NA	Headspace	Decorative	Decorations from baby room	95
1210	Property 1	Residential	4/25/2016	9:52	NR	NR	NR	NR	NR	145	213	ng/m3	Poly bag 170	NA	NA	Headspace	Clothing/decorativ	Pajamas/picture frame	100
1210	Property 1	Residential	4/25/2016	9:55	NR	NR	NR	NR	NR	151	607	ng/m3	Poly bag 171	NA	NA	Headspace	Toys	Baby blanket/books	103
1210	Property 1	Residential	4/25/2016	9:58	NR	NR	NR	NR	NR	84	136	ng/m3	Poly bag 172	NA	NA	Headspace	Decorative	Wall hangings	95
1210	Property 1	Residential	4/25/2016	10:01	NR	NR	NR	NR	NR	69	107	ng/m3	Poly bag 173	NA	NA	Headspace	Toys	Books,basket,etc from baby room	102
1210	Property 1	Residential	4/25/2016	10:06	NR	NR	NR	NR	NR	311	814	ng/m3	Poly bag 174	NA	NA	Headspace	Toys	Books,video games,Legos	93
1210	Property 1	Residential	4/25/2016	10:09	NR	NR	NR	NR	NR	114	145	ng/m3	Poly bag 175	NA	NA	Headspace	Decorative	Wall hangings; U.S. wall hanging	90
1210	Property 1	Residential	4/25/2016	10:39	NR	NR	NR	NR	NR	391	492	ng/m3	Poly bag 176	NA	NA	Headspace	Miscellaneous	Miscellaneous plastic items	110
1210	Property 1	Residential	4/25/2016	10:41	NR	NR	NR	NR	NR	185	230	ng/m3	Poly bag 177	NA	NA	Headspace	Miscellaneous	Miscellaneous items including picture frames	103
1210	Property 1	Residential	4/25/2016	10:45	NR	NR	NR	NR	NR	105	163	ng/m3	Poly bag 178	NA	NA	Headspace	Shoes	Shoes from mother	94
1210	Property 1	Residential	4/25/2016	10:49	NR	NR	NR	NR	NR	237	931	ng/m3	Poly bag 179	NA	NA	Headspace	Storage	Laundry hampers	95
1210	Property 1	Residential	4/25/2016	10:51	NR	NR	NR	NR	NR	194	242	ng/m3	Poly bag 180	NA	NA	Headspace	Lighting	Green lamp	120
1210	Property 1	Residential	4/25/2016	10:53	NR	NR	NR	NR	NR	506	793	ng/m3	Poly bag 181	NA	NA	Headspace	Flooring	Area rugs	95
1210	Property 1	Residential	4/25/2016	10:55	NR	NR	NR	NR	NR	169	306	ng/m3	Poly bag 182	NA	NA	Headspace	Storage	Purple storage bin	90
1210	Property 1	Residential	4/25/2016	10:58	NR	NR	NR	NR	NR	484	541	ng/m3	Poly bag 183	NA	NA	Headspace	Storage	Small storage bins	92
1210	Property 1	Residential	4/25/2016	11:01	NR	NR	NR	NR	NR	282	799	ng/m3	Poly bag 184	NA	NA	Headspace	Miscellaneous	Miscellaneous bathroom products	120
1210	Property 1	Residential	4/25/2016	11:03	NR	NR	NR	NR	NR	157	333	ng/m3	Poly bag 185	NA	NA	Headspace	Toys	Miscellaneous baby toys	101
1210	Property 1	Residential	4/25/2016	11:05	NR	NR	NR	NR	NR	112	246	ng/m3	Poly bag 186	NA	NA	Headspace	Shoes	Miscellaneous shoes from the house	95
1318	Property 1	Residential	4/25/2016	11:56	NR	NR	NR	NR	NR	9258	25050	ng/m3	Poly bag 187	NA	NA	Headspace	Toys	Basketball, Legos, etc.	95
1318	Property 1	Residential	4/25/2016	12:01	NR	NR	NR	NR	NR	489	682	ng/m3	Poly bag 188	NA	NA	Headspace	Toys	Miscellaneous toys	93
1318	Property 1	Residential	4/25/2016	12:02	NR	NR	NR	NR	NR	387	411	ng/m3	Poly bag 189	NA	NA	Headspace	Toys	Miscellaneous toys	91
1318	Property 1	Residential	4/25/2016	12:04	NR	NR	NR	NR	NR	314	350	ng/m3	Poly bag 190	NA	NA	Headspace	Miscellaneous	Christmas lights, hat, etc.	95
1318	Property 1	Residential	4/25/2016	12:07	NR	NR	NR	NR	NR	258	842	ng/m3	Poly bag 191	NA	NA	Headspace	Miscellaneous	Poles	106
1318	Property 1	Residential	4/25/2016	12:11	NR	NR	NR	NR	NR	2584	3457	ng/m3	Poly bag 192	NA	NA	Headspace	Toys	Star Wars, miscellaneous toys	93
1318	Property 1	Residential	4/25/2016	12:13	NR	NR	NR	NR	NR	342	394	ng/m3	Poly bag 193	NA	NA	Headspace	Furniture	Cushion/seat from Daughter's room : home owner	97
1318	Property 1	Residential	4/25/2016	12:16	NR	NR	NR	NR	NR	395	436	ng/m3	Poly bag 194	NA	NA	Headspace	Storage	Bags and back packs	111
1318	Property 1	Residential	4/25/2016	12:20	NR	NR	NR	NR	NR	179	316	ng/m3	Poly bag 195	NA	NA	Headspace	Miscellaneous	Miscellaneous items including books	98
1318	Property 1	Residential	4/25/2016	12:23	NR	NR	NR	NR	NR	225	366	ng/m3	Poly bag 196	NA	NA	Headspace	Toys	Stuffed animals	91
1318	Property 1	Residential	4/25/2016	14:38	NR	NR	NR	NR	NR	450	602	ng/m3	Poly bag 197	NA	NA	Headspace	Storage	Wooden baskets	95
1318	Property 1	Residential	4/25/2016	14:42	NR	NR	NR	NR	NR	261	970	ng/m3	Poly bag 198	NA	NA	Headspace	Toys	Miscellaneous toys	95
1318	Property 1	Residential	4/25/2016	14:46	NR	NR	NR	NR	NR	280	410	ng/m3	Poly bag 199	NA	NA	Headspace	Toys	Stuffed animals	100
1318	Property 1	Residential	4/25/2016	14:48	NR	NR	NR	NR	NR	355	526	ng/m3	Poly bag 200	NA	NA	Headspace	Miscellaneous	Miscellaneous bathroom items	91
1318	Property 1	Residential	4/25/2016	15:00	NR	NR	NR	NR	NR	281	679	ng/m3	Poly bag 201	NA	NA	Headspace	Clothes	Miscellaneous clothes	102
1318	Property 1	Residential	4/25/2016	15:04	NR	NR	NR	NR	NR	190	429	ng/m3	Poly bag 202	NA	NA	Headspace	Storage/Decorative	Storage bin with Christmas decor (316 inside bin).	95
1318	Property 1	Residential	4/25/2016	15:08	NR	NR	NR	NR	NR	250	320	ng/m3	Poly bag 203	NA	NA	Headspace	Storage/Decorative	Storage bin with decorations (174 inside)	110
1318	Property 1	Residential	4/25/2016	15:12	NR	NR	NR	NR	NR	143	653	ng/m3	Poly bag 204	NA	NA	Headspace	Toys	Miscellaneous toys from baby	95
1318	Property 1	Residential	4/25/2016	15:15	NR	NR	NR	NR	NR	114	275	ng/m3	Poly bag 205	NA	NA	Headspace	Storage/Linens	Wooden baskets with towels/linens	94
1318	Property 1	Residential	4/25/2016	15:18	NR	NR	NR	NR	NR	166	353	ng/m3	Poly bag 206	NA	NA	Headspace	Clothes	Miscellaneous clothes	94
1318	Property 1	Residential	4/25/2016	15:24	NR	NR	NR	NR	NR	910	1034	ng/m3	Poly bag 207	NA	NA	Headspace	Storage/Shoes	Wooden basket with shoes	115
1318	Property 1	Residential	4/25/2016	15:28	NR	NR	NR	NR	NR	173	223	ng/m3	Poly bag 208	NA	NA	Headspace	Decorative	Miscellaneous wall hangings	105
1318	Property 1	Residential	4/25/2016	15:31	NR	NR	NR	NR	NR	124	597	ng/m3	Poly bag 209	NA	NA	Headspace	Decorative	Miscellaneous wall hangings	120
1318	Property 1	Residential	4/25/2016	15:34	NR	NR	NR	NR	NR	183	277	ng/m3	Poly bag 210	NA	NA	Headspace	Linens	Pillows and blankets	100
1318	Property 1	Residential	4/25/2016	10:35	NR	NR	NR	NR	NR	30	43	ng/m3	Staging Area- Tent	NA	NA	Breathing Zone	NR	Breathing Zone reading of the staging area inside	60
1318	Property 1	Residential	4/25/2016	15:45	NR	NR	NR	NR	NR	188	404	ng/m3	Poly bag 211	NA	NA	Headspace	Linens	Curtains from daughter's room	95
1318	Property 1	Residential	4/25/2016	15:51	NR	NR	NR	NR	NR	95	626	ng/m3	Screening-Tent	NA	NA	Headspace	NR	Empty poly bag from staging tent	95
1318	Property 1	Residential	4/25/2016	16:29	NR	NR	NR	NR	NR	266	752	ng/m3	Poly bag 212	NA	NA	Headspace	Clothes	Clothes from daughter's room	114
1318	Property 1	Residential	4/25/2016	16:33	NR	NR	NR	NR	NR	238	414	ng/m3	Poly bag 213	NA	NA	Headspace	Clothes	Clothes from daughter's room	107
1318	Property 1	Residential	4/25/2016	16:35	NR	NR	NR	NR	NR	599	1880	ng/m3	Poly bag 214	NA	NA	Headspace	Linens	Towels	91
1318	Property 1	Residential	4/25/2016	16:39	NR	NR	NR	NR	NR	85	666	ng/m3	Poly bag 215	NA	NA	Headspace	Shoes	Shoes from daughter's room	110
1318	Property 1	Residential	4/25/2016	16:46	NR	NR	NR	NR	NR	187	243	ng/m3	Poly bag 216	NA	NA	Headspace	Clothes	Clothes from daughter's room	105

NA- Not Applicable
NR- Not Recorded
R - Standard Deviation

Appendix G: Lumex Screening Results Summary Table
Greenleafe Drive Mercury Response Site
Baldwinsville, Onondaga County, New York

Serial Number	Property Number	Land Use	Date	Time	Screening-1	Screening-2	Screening-3	Average Screening Result	R	Minimum	Maximum	Units	Location	Floor	Floor Cover	Height	Item Type	Description	Temperature (˚F)
1318	Property 1	Residential	4/25/2016	16:49	NR	NR	NR	NR	NR	453	1493	ng/m3	Poly bag 217	NA	NA	Headspace	Clothes	Clothes from daughter's room	90
1318	Property 1	Residential	4/25/2016	16:54	NR	NR	NR	NR	NR	133	292	ng/m3	Poly bag 218	NA	NA	Headspace	Clothes	Shoes from daughter's room	105
1318	Property 1	Residential	4/25/2016	17:06	NR	NR	NR	NR	NR	118	187	ng/m3	Poly bag 219	NA	NA	Headspace	Shoes	Clothes from daughter's room	100
1318	Property 1	Residential	4/25/2016	17:09	NR	NR	NR	NR	NR	32	315	ng/m3	Poly bag 220	NA	NA	Headspace	Clothes	Clothes from daughter's room	92
1318	Property 1	Residential	4/25/2016	17:11	NR	NR	NR	NR	NR	132	208	ng/m3	Poly bag 221	NA	NA	Headspace	Clothes	Clothes from daughter's room	104
1318	Property 1	Residential	4/25/2016	17:14	NR	NR	NR	NR	NR	199	423	ng/m3	Poly bag 222	NA	NA	Headspace	Clothes	Robe/blanket	90
1318	Property 1	Residential	4/25/2016	17:19	NR	NR	NR	NR	NR	182	317	ng/m3	Poly bag 223	NA	NA	Headspace	Linens	Bedding and sheets	95
1318	Property 1	Residential	4/25/2016	17:23	NR	NR	NR	NR	NR	230	1778	ng/m3	Poly bag 224	NA	NA	Headspace	Clothes	Clothes from daughter's room	105
1318	Property 1	Residential	4/25/2016	17:26	NR	NR	NR	NR	NR	293	513	ng/m3	Poly bag 225	NA	NA	Headspace	Linens	Bedding from daughter's room	94
1318	Property 1	Residential	4/25/2016	17:30	NR	NR	NR	NR	NR	80	320	ng/m3	Screening-Tent	NA	NA	Headspace	NR	Empty poly bag from ERs' truck	NR
1318	Property 1	Residential	4/25/2016	17:33	NR	NR	NR	NR	NR	500	978	ng/m3	Garage	NR	NR	Breathing Zone	NR	Garage breathing zone	94
1318	Property 1	Residential	4/25/2016	17:35	NR	NR	NR	NR	NR	587	740	ng/m3	Mud Room	NR	NR	Breathing Zone	NR	Furnace Duct in mud room	92
1318	Property 1	Residential	4/25/2016	17:37	NR	NR	NR	NR	NR	481	1175	ng/m3	Garage	NR	NR	Floor	NR	Cracks along west wall in between floor and wall	80
1318	Property 1	Residential	4/25/2016	17:39	NR	NR	NR	NR	NR	800	1259	ng/m3	Garage	NR	NR	Floor	NR	Corner adjacent to mud room entrance (foam)	80
1318	Property 1	Residential	4/25/2016	18:04	NR	NR	NR	NR	NR	132	140	ng/m3	Poly bag 226	NA	NA	Headspace	Toys	Miscellaneous toys	95
1318	Property 1	Residential	4/25/2016	18:06	NR	NR	NR	NR	NR	2071	6124	ng/m3	Poly bag 227	NA	NA	Headspace	Toys	Child chair/sofa	106
1318	Property 1	Residential	4/25/2016	18:08	NR	NR	NR	NR	NR	119	178	ng/m3	Poly bag 228	NA	NA	Headspace	Toys	Miscellaneous toys	106
1318	Property 1	Residential	4/25/2016	18:12	NR	NR	NR	NR	NR	172	334	ng/m3	Poly bag 229	NA	NA	Headspace	Toys	Bean bag chair	137
1318	Property 1	Residential	4/25/2016	18:14	NR	NR	NR	NR	NR	187	426	ng/m3	Poly bag 230	NA	NA	Headspace	Toys	Stuffed animals and toys	104
1318	Property 1	Residential	4/25/2016	18:18	NR	NR	NR	NR	NR	106	176	ng/m3	Poly bag 231	NA	NA	Headspace	Toys	Miscellaneous toys	104
1318	Property 1	Residential	4/25/2016	18:21	NR	NR	NR	NR	NR	150	177	ng/m3	Poly bag 232	NA	NA	Headspace	Toys	Books and coloring books	95
1318	Property 1	Residential	4/25/2016	18:25	NR	NR	NR	NR	NR	165	272	ng/m3	Poly bag 233	NA	NA	Headspace	Furniture	Folding chair	100
1318	Property 1	Residential	4/25/2016	18:28	NR	NR	NR	NR	NR	174	310	ng/m3	Poly bag 235	NA	NA	Headspace	Toys	Doll/baby clothes	97
1282	Property 1	Residential	4/26/2016	13:24	NR	NR	NR	NR	NR	1088	1201	ng/m3	Garage	NR	NR	Breathing Zone	NR	temperature	56
1282	Property 1	Residential	4/26/2016	13:26	NR	NR	NR	NR	NR	1024	1098	ng/m3	Garage	NR	NR	Floor	NR	Vent in mud room	56
1282	Property 1	Residential	4/26/2016	13:27	NR	NR	NR	NR	NR	1141	1421	ng/m3	Garage	NR	NR	Floor/wall	NR	Corner adjacent to mud room entrance (foam)	56
1282	Property 1	Residential	4/26/2016	13:28	NR	NR	NR	NR	NR	748	2857	ng/m3	Garage	NR	NR	Floor/wall	NR	Cracks along west wall between floor and wall	56
1282	Property 1	Residential	4/26/2016	13:40	NR	NR	NR	NR	NR	712	1414	ng/m3	Basement	NR	NR	Headspace	Flooring	Oriental area rug from basement (no heat applied)	40
1282	Property 1	Residential	4/26/2016	13:46	NR	NR	NR	NR	NR	163	332	ng/m3	Poly bag 234	NA	NA	Headspace	Miscellaneous	Miscellaneous items including fake flowers	100
1282	Property 1	Residential	4/26/2016	13:54	NR	NR	NR	NR	NR	182	249	ng/m3	Poly bag 236	NA	NA	Headspace	Appliance	Heater from the basement	95
1282	Property 1	Residential	4/26/2016	13:57	NR	NR	NR	NR	NR	882	1071	ng/m3	Poly bag 237	NA	NA	Headspace	Miscellaneous	Miscellaneous garage items	93
1282	Property 1	Residential	4/26/2016	14:02	NR	NR	NR	NR	NR	208	257	ng/m3	Poly bag 238	NA	NA	Headspace	Decorative	Large picture frame	95
1282	Property 1	Residential	4/26/2016	14:15	NR	NR	NR	NR	NR	53	134	ng/m3	Poly bag 239	NA	NA	Headspace	Decorative	Window blinds	95
1282	Property 1	Residential	4/26/2016	14:19	NR	NR	NR	NR	NR	14	56	ng/m3	Poly bag 240	NA	NA	Headspace	Decorative	Rectangular mirror	95
1282	Property 1	Residential	4/26/2016	17:27	NR	NR	NR	NR	NR	1686	2116	ng/m3	Office	NR	NR	Headspace	Flooring	Small area rug 1	95
1282	Property 1	Residential	4/26/2016	17:34	NR	NR	NR	NR	NR	3007	15460	ng/m3	Office	NR	NR	Head space	Flooring	Small area rug 2	114
1282	Property 3	Residential	4/26/2016	14:34	NR	NR	NR	NR	NR	363	388	ng/m3	Kitchen	NR	NR	Breathing Zone	NR	Breathing zone in kitchen	67
1282	Property 3	Residential	4/26/2016	14:35	NR	NR	NR	NR	NR	305	707	ng/m3	Living Room	NR	NR	Floor	Rug	Edge of carpet and hardwood floor	67
1282	Property 3	Residential	4/26/2016	14:42	NR	NR	NR	NR	NR	412	1062	ng/m3	Stairwell-Downstairs	NR	NR	Floor	Carpet	Landing of stairs	67
1282	Property 3	Residential	4/26/2016	14:43	NR	NR	NR	NR	NR	979	5208	ng/m3	Bedroom-Son	NR	NR	Floor	Carpet	Former foot print of the hamper	67
1282	Property 3	Residential	4/26/2016	17:03	NR	NR	NR	NR	NR	324	525	ng/m3	Poly bag 1A	NA	NR	Headspace	Clothes	Wet clothes from washer	95
1282	Property 3	Residential	4/26/2016	17:06	NR	NR	NR	NR	NR	198	1285	ng/m3	Poly bag 2A	NA	NR	Headspace	Clothes	Wet clothes from washer	95
1282	Property 3	Residential	4/26/2016	17:09	NR	NR	NR	NR	NR	296	1704	ng/m3	Poly bag 3A	NA	NR	Headspace	Blankets	Blankets from living room	96
1282	Property 3	Residential	4/26/2016	17:13	NR	NR	NR	NR	NR	41	87	ng/m3	Poly bag 4A	NA	NR	Headspace	Storage	Laundry hamper	95
1282	Property 3	Residential	4/26/2016	15:16	NR	NR	NR	NR	NR	193	630	ng/m3	Garage	NR	NR	Floor	Carpet	Carpet on garage stairs	NR
1282	Property 3	Residential	4/26/2016	15:17	NR	NR	NR	NR	NR	664	993	ng/m3	Poly bag 5A	NA	NR	Headspace	Blanket	Fleece blanket	110
1282	Property 3	Residential	4/26/2016	15:21	NR	NR	NR	NR	NR	179	383	ng/m3	Poly bag 6A	NA	NR	Headspace	Clothes	Miscellaneous clothes	101
1282	Property 2	Residential	4/26/2016	15:30	NR	NR	NR	NR	NR	35	3999	ng/m3	Front Yard	NA	NR	Floor	Sidewalk	Front door walk-way	NR
1282	Property 2	Residential	4/26/2016	15:36	NR	NR	NR	NR	NR	306	1002	ng/m3	Front Yard	NA	NR	Floor	Driveway	Cracks in between driveway and garage	NR
1282	Property 2	Residential	4/26/2016	15:40	NR	NR	NR	NR	NR	154	766	ng/m3	Front Yard	NA	NR	Floor	Driveway	Dip in driveway near gutter	NR
1282	Property 2	Residential	4/26/2016	16:02	NR	NR	NR	NR	NR	2000	13444	ng/m3	Hallway-Downstairs	NR	NR	Floor	Rug	Throw rug by garage door	NR
1282	Property 2	Residential	4/26/2016	16:03	NR	NR	NR	NR	NR	1221	1235	ng/m3	Kitchen	NR	NR	Breathing Zone	NR	Kitchen breathing zone	NR
1282	Property 2	Residential	4/26/2016	16:04	NR	NR	NR	NR	NR	1640	2105	ng/m3	Kitchen	NR	NR	Floor	Rug	Throw rug dear back porch entrance	NR
1282	Property 2	Residential	4/26/2016	16:05	NR	NR	NR	NR	NR	1226	4166	ng/m3	Kitchen	NR	NR	Floor	Hardwood	Floor in between bar stools and table	NR
1282	Property 2	Residential	4/26/2016	16:06	NR	NR	NR	NR	NR	2000	2591	ng/m3	Kitchen	NR	NR	Floor	Hardwood	Floor next to oven	NR
1282	Property 2	Residential	4/26/2016	16:09	NR	NR	NR	NR	NR	1522	3981	ng/m3	Living Room	NR	NR	Floor	Hardwood	Floor in between kitchen and living room	NR
1282	Property 2	Residential	4/26/2016	16:10	NR	NR	NR	NR	NR	1310	1340	ng/m3	Living Room	NR	NR	Breathing Zone	NR	Living Room breathing zone	NR
1282	Property 2	Residential	4/26/2016	16:11	NR	NR	NR	NR	NR	2000	3631	ng/m3	Hallway-Downstairs	NR	NR	Floor	Hardwood	Near hallway bathroom door	NR
1282	Property 2	Residential	4/26/2016	16:12	NR	NR	NR	NR	NR	1588	2621	ng/m3	Bathroom-Hallway Downstairs	NR	NR	Headspace	Sink	Bathroom sink	NR
1282	Property 2	Residential	4/26/2016	16:14	NR	NR	NR	NR	NR	1671	4198	ng/m3	Bathroom-Hallway Downstairs	NR	NR	Floor	Tile	Bathroom floor	NR
1282	Property 2	Residential	4/26/2016	16:15	NR	NR	NR	NR	NR	1800	3394	ng/m3	Living Room	NR	NR	Floor	Hardwood	Floor near dog bed and table	NR
1282	Property 2	Residential	4/26/2016	16:18	NR	NR	NR	NR	NR	1739	4699	ng/m3	Stairwell-Downstairs	NR	NR	Floor	Carpet	Stair landing	NR
1282	Property 2	Residential	4/26/2016	16:21	NR	NR	NR	NR	NR	1700	2750	ng/m3	Stairwell	NR	NR	Floor	Carpet	4th step from bottom	NR
1282	Property 2	Residential	4/26/2016	16:22	NR	NR	NR	NR	NR	1500	2807	ng/m3	Hallway-Upstairs	NR	NR	Floor	Carpet	Hallway carpet near top of stairs	NR
1282	Property 2	Residential	4/26/2016	16:23	NR	NR	NR	NR	NR	1536	1632	ng/m3	Hallway-Upstairs	NR	NR	Breathing Zone	NR	Breathing zone in hallway	NR
1282	Property 2	Residential	4/26/2016	16:24	NR	NR	NR	NR	NR	1937	4121	ng/m3	Hallway-Upstairs	NR	NR	Floor	Carpet	In front of son's room	NR
1282	Property 2	Residential	4/26/2016	16:26	NR	NR	NR	NR	NR	1390	2305	ng/m3	Bedroom-Son	NR	NR	Floor	Carpet	Carpet in son's room	NR
1282	Property 2	Residential	4/26/2016	16:28	NR	NR	NR	NR	NR	1399	1439	ng/m3	Bedroom-Master	NR	NR	Breathing Zone	NR	Breathing zone in master bedroom	NR
1282	Property 2	Residential	4/26/2016	16:30	NR	NR	NR	NR	NR	850	1010	ng/m3	Bedroom-Guest 1	NR	NR	Breathing Zone	NR	Breathing zone in guest room 1	NR
1282	Property 2	Residential	4/26/2016	16:31	NR	NR	NR	NR	NR	1513	1520	ng/m3	Bedroom-Guest 2	NR	NR	Breathing Zone	NR	Breathing zone in guest room 2 with red comforter	NR
1282	Property 1	Residential	4/26/2016	17:53	NR	NR	NR	NR	NR	116	156	ng/m3	Poly bag 241	NA	NA	Headspace	Shoes	Shoes from daughter's room-separated and re-tested	106
1282	Property 1	Residential	4/26/2016	17:54	NR	NR	NR	NR	NR	95	198	ng/m3	Poly bag 242	NA	NA	Headspace	Shoes	Shoes from daughter's room-separated and re-tested	92
1282	Property 1	Residential	4/26/2016	17:59	NR	NR	NR	NR	NR	66	113	ng/m3	Poly bag 243	NA	NA	Headspace	Shoes	Shoes from daughter's room-separated and re-tested	104
1282	Property 1	Residential	4/26/2016	18:02	NR	NR	NR	NR	NR	69	99	ng/m3	Poly bag 244	NA	NA	Headspace	Shoes	Shoes from daughter's room-separated and re-tested	113
1282	Property 1	Residential	4/26/2016	18:04	NR	NR	NR	NR	NR	69	126	ng/m3	Poly bag 245	NA	NA	Headspace	Shoes	Shoes from daughter's room-separated and re-tested	102
1282	Property 1	Residential	4/26/2016	18:07	NR	NR	NR	NR	NR	54	63	ng/m3	Poly bag 246	NA	NA	Headspace	Shoes	Shoes from daughter's room-separated and re-tested	95
1282	Property 1	Residential	4/26/2016	18:10	NR	NR	NR	NR	NR	52	72	ng/m3	Poly bag 247	NA	NA	Headspace	Shoes	Shoes from daughter's room-separated and re-tested	98
1282	Property 1	Residential	4/26/2016	18:14	NR	NR	NR	NR	NR	53	83	ng/m3	Poly bag 248	NA	NA	Headspace	Shoes	Shoebox from daughter's room-separated and re-	115
1282	Property 1	Residential	4/26/2016	18:18	NR	NR	NR	NR	NR	32	67	ng/m3	Poly bag 249	NA	NA	Headspace	Bags	Bags from daughter's room-separated and re-tested	95
1282	Property 1	Residential	4/26/2016	18:21	NR	NR	NR	NR	NR	57	156	ng/m3	Poly bag 250	NA	NA	Headspace	Bags	Bags from daughter's room-separated and re-tested	115
1282	Property 1	Residential	4/26/2016	18:25	NR	NR	NR	NR	NR	36	104	ng/m3	Poly bag 251	NA	NA	Headspace	Bags	Bags from daughter's room-separated and re-tested	112
1282	Property 1	Residential	4/27/2016	9:23	NR	NR	NR	NR	NR	309	357	ng/m3	Garage	NR	NR	Breathing Zone	NR	After heating and venting	97
1282	Property 1	Residential	4/27/2016	9:24	NR	NR	NR	NR	NR	52	81	ng/m3	Mud Room	NR	NR	Floor	NR	Vent in mud room	97
1282	Property 1	Residential	4/27/2016	9:25	NR	NR	NR	NR	NR	958	1315	ng/m3	Garage	NR	NR	Floor/wall	NR	Corner adjacent to mud room entrance	97
1282	Property 1	Residential	4/27/2016	9:27	NR	NR	NR	NR	NR	2000	6527	ng/m3	Garage	NR	NR	Floor/wall	NR	Cracks along west wall between wall and floor	97

NA- Not Applicable
NR- Not Recorded
R - Standard Deviation

Appendix G: Lumex Screening Results Summary Table
Greenleafe Drive Mercury Response Site
Baldwinsville, Onondaga County, New York

Serial Number	Property Number	Land Use	Date	Time	Screeining-1	Screeining-2	Screeining-3	Average Screening Result	R	Minimum	Maximum	Units	Location	Floor	Floor Cover	Height	Item Type	Description	Temperature (˚F)
1282	Property 1	Residential	4/27/2016	9:27	NR	NR	NR	NR	NR	653	1191	ng/m3	Garage	NR	NR	Floor	NR	Steps into mud room	97
1282	Property 1	Residential	4/27/2016	9:32	NR	NR	NR	NR	NR	45	107	ng/m3	Basement	NR	NR	Breathing Zone	NR	Basement breathing zone-middle of room	60
1282	Property 1	Residential	4/27/2016	9:34	NR	NR	NR	NR	NR	57	826	ng/m3	Basement	NR	NR	Floor	NR	Cracks in floor in between concrete	60
1282	Property 1	Residential	4/27/2016	9:38	NR	NR	NR	NR	NR	250	2488	ng/m3	Basement	NR	NR	Floor	NR	Cracks along south wall and concrete	60
1282	Property 1	Residential	4/27/2016	9:41	NR	NR	NR	NR	NR	200	1058	ng/m3	Basement	NR	NR	Floor	NR	Cracks along west wall and concrete	60
1282	Property 1	Residential	4/27/2016	9:56	NR	NR	NR	NR	NR	136	276	ng/m3	Poly bag 252	NA	NA	Headspace	Decorative	Star Wars wall hanging	125
1282	Property 1	Residential	4/27/2016	9:59	NR	NR	NR	NR	NR	79	200	ng/m3	Poly bag 253	NA	NA	Headspace	Decorative	Picture in large frame	97
1282	Property 1	Residential	4/27/2016	10:00	NR	NR	NR	NR	NR	143	262	ng/m3	Poly bag 254	NA	NA	Headspace	Decorative	Miscellaneous wall decorations	140
1282	Property 1	Residential	4/27/2016	10:03	NR	NR	NR	NR	NR	80	124	ng/m3	Poly bag 255	NA	NA	Headspace	Decorative	Canvas paintings	120
1282	Property 1	Residential	4/27/2016	10:05	NR	NR	NR	NR	NR	336	660	ng/m3	Poly bag 256	NA	NA	Headspace	Decorative	Pictures and frames	120
1282	Property 1	Residential	4/27/2016	10:07	NR	NR	NR	NR	NR	93	150	ng/m3	Poly bag 257	NA	NA	Headspace	Decorative	Poster and picture frames	105
1282	Property 1	Residential	4/27/2016	10:09	NR	NR	NR	NR	NR	75	90	ng/m3	Poly bag 258	NA	NA	Headspace	Shoes	Wooden snow shoes	90
1282	Property 1	Residential	4/27/2016	10:10	NR	NR	NR	NR	NR	72	130	ng/m3	Poly bag 259	NA	NA	Headspace	Miscellaneous	Electronics and socks	95
1282	Property 1	Residential	4/27/2016	10:13	NR	NR	NR	NR	NR	88	172	ng/m3	Poly bag 260	NA	NA	Headspace	Decorative	Picture frames	110
1282	Property 1	Residential	4/27/2016	10:19	NR	NR	NR	NR	NR	109	177	ng/m3	Poly bag 261	NA	NA	Headspace	Toys	Son's toys	110
1282	Property 1	Residential	4/27/2016	10:23	NR	NR	NR	NR	NR	156	398	ng/m3	Poly bag 262	NA	NA	Headspace	Toys	Miscellaneous toys	125
1282	Property 1	Residential	4/27/2016	10:43	NR	NR	NR	NR	NR	241	369	ng/m3	Poly bag 263	NA	NA	Headspace	Electronics	iHome and other electronics	135
1282	Property 1	Residential	4/27/2016	10:45	NR	NR	NR	NR	NR	183	233	ng/m3	Poly bag 264	NA	NA	Headspace	Bedding	Comforter	125
1282	Property 1	Residential	4/27/2016	10:47	NR	NR	NR	NR	NR	343	898	ng/m3	Poly bag 265	NA	NA	Headspace	Bedding	Pillows from bed and stuffed animals	115
1282	Property 1	Residential	4/27/2016	10:50	NR	NR	NR	NR	NR	150	185	ng/m3	Poly bag 266	NA	NA	Headspace	Toys	Stuffed animals	105
1282	Property 1	Residential	4/27/2016	10:52	NR	NR	NR	NR	NR	1760	2765	ng/m3	Poly bag 267	NA	NA	Headspace	Miscellaneous	Bag of old rags	110
1282	Property 1	Residential	4/27/2016	10:53	NR	NR	NR	NR	NR	78	144	ng/m3	Poly bag 268	NA	NA	Headspace	Toys	Miscellaneous Barbie and closet hangers	105
1282	Property 1	Residential	4/27/2016	10:55	NR	NR	NR	NR	NR	56	150	ng/m3	Poly bag 269	NA	NA	Headspace	Lighting	2 lamps	100
1282	Property 1	Residential	4/27/2016	10:57	NR	NR	NR	NR	NR	97	113	ng/m3	Poly bag 270	NA	NA	Headspace	Storage	Closet hangers	90
1282	Property 1	Residential	4/27/2016	10:59	NR	NR	NR	NR	NR	107	153	ng/m3	Poly bag 271	NA	NA	Headspace	Decorative	Picture frames and papers	105
1282	Property 1	Residential	4/27/2016	11:02	NR	NR	NR	NR	NR	81	130	ng/m3	Poly bag 272	NA	NA	Headspace	Miscellaneous	Miscellaneous decorations	122
1282	Property 1	Residential	4/27/2016	11:10	NR	NR	NR	NR	NR	15	88	ng/m3	Bedroom-Daughter	NR	NR	Headspace	Furniture	Box spring from bed in daughter's room	135
1282	Property 1	Residential	4/27/2016	11:21	NR	NR	NR	NR	NR	56	89	ng/m3	Bedroom- Son	NR	NR	Headspace	Furniture	Box spring from bed in son's room	105
1282	Property 1	Residential	4/27/2016	11:27	NR	NR	NR	NR	NR	57	76	ng/m3	Bedroom-Baby	NR	NR	Headspace	Furniture	White chair	100
1282	Property 1	Residential	4/27/2016	11:31	NR	NR	NR	NR	NR	66	92	ng/m3	Bedroom-Baby	NR	NR	Headspace	Toys	Rocking horse	145
1282	Property 1	Residential	4/27/2016	11:41	NR	NR	NR	NR	NR	96	216	ng/m3	Bedroom-Son	NR	NR	Headspace	Decorative	Football wall hanging	105
1282	Property 1	Residential	4/27/2016	11:36	NR	NR	NR	NR	NR	87	107	ng/m3	Bedroom-Baby	NR	NR	Headspace	Furniture	Mattress	100
1282	Property 1	Residential	4/27/2016	12:08	NR	NR	NR	NR	NR	52	78	ng/m3	Basement	NR	NR	Breathing Zone	NR	After heating once	90
1282	Property 1	Residential	4/27/2016	12:10	NR	NR	NR	NR	NR	76	112	ng/m3	Basement	NR	NR	Floor	NR	Cracks along south wall and concrete after heating	90
1282	Property 1	Residential	4/27/2016	12:11	NR	NR	NR	NR	NR	50	80	ng/m3	Basement	NR	NR	Floor	NR	Cracks along west wall between wall and floor	90
1282	Property 1	Residential	4/27/2016	12:13	NR	NR	NR	NR	NR	54	86	ng/m3	Basement	NR	NR	Floor	NR	Cracks in floor in between concrete	80
1282	Property 1	Residential	4/27/2016	13:23	NR	NR	NR	NR	NR	635	1652	ng/m3	Poly bag 273	NA	NA	Headspace	Clothes	Boys clothes	115
1282	Property 1	Residential	4/27/2016	13:21	NR	NR	NR	NR	NR	216	324	ng/m3	Poly bag 274	NA	NA	Headspace	Furniture	Couch cushions	115
1282	Property 1	Residential	4/27/2016	13:25	NR	NR	NR	NR	NR	52	67	ng/m3	Poly bag 275	NA	NA	Headspace	Miscellaneous	Lacrosse stick and chair	107
1282	Property 1	Residential	4/27/2016	13:27	NR	NR	NR	NR	NR	97	138	ng/m3	Poly bag 276	NA	NA	Headspace	Furniture	Metal shelves	120
1282	Property 1	Residential	4/27/2016	13:28	NR	NR	NR	NR	NR	128	180	ng/m3	Poly bag 277	NA	NA	Headspace	Electronics	Xbox one box	114
1282	Property 1	Residential	4/27/2016	13:32	NR	NR	NR	NR	NR	191	215	ng/m3	Poly bag 278	NA	NA	Headspace	Miscellaneous	Miscellaneous stuffed animals	95
1282	Property 1	Residential	4/27/2016	13:39	NR	NR	NR	NR	NR	131	153	ng/m3	Poly bag 279	NA	NA	Headspace	Miscellaneous	Happy Birthday bag	125
1282	Property 1	Residential	4/27/2016	13:40	NR	NR	NR	NR	NR	336	511	ng/m3	Poly bag 280	NA	NA	Headspace	Decorative	Pictures and picture frames	105
1282	Property 1	Residential	4/27/2016	13:42	NR	NR	NR	NR	NR	77	137	ng/m3	Poly bag 281	NA	NA	Headspace	Bedding	Blankets	116
1282	Property 1	Residential	4/27/2016	13:44	NR	NR	NR	NR	NR	981	2411	ng/m3	Poly bag 282	NA	NA	Headspace	Decorative	Football pictures in frames	110
1282	Property 1	Residential	4/27/2016	13:58	NR	NR	NR	NR	NR	212	286	ng/m3	Poly bag 283	NA	NA	Headspace	Toys	Plastic bin with Legos	105
1282	Property 1	Residential	4/27/2016	13:46	NR	NR	NR	NR	NR	93	132	ng/m3	Poly bag 284	NA	NA	Headspace	Decorative	Miscellaneous home decorations	105
1282	Property 1	Residential	4/27/2016	13:51	NR	NR	NR	NR	NR	79	88	ng/m3	Poly bag 285	NA	NA	Headspace	Clothes	Clothes with hangers	110
1282	Property 1	Residential	4/27/2016	13:57	NR	NR	NR	NR	NR	133	145	ng/m3	Poly bag 286	NA	NA	Headspace	Decorative	Large picture frame	135
1282	Property 1	Residential	4/27/2016	13:53	NR	NR	NR	NR	NR	136	319	ng/m3	Poly bag 287	NA	NA	Headspace	Clothes	Clothes and hangers	125
1282	Property 1	Residential	4/27/2016	14:00	NR	NR	NR	NR	NR	97	376	ng/m3	Poly bag 288	NA	NA	Headspace	Clothes	Miscellaneous clothes	115
1282	Property 1	Residential	4/27/2016	14:02	NR	NR	NR	NR	NR	130	192	ng/m3	Poly bag 289	NA	NA	Headspace	Clothes	Miscellaneous clothes	140
1282	Property 1	Residential	4/27/2016	14:45	NR	NR	NR	NR	NR	4613	6185	ng/m3	Living Room	NR	NR	Headspace	Area rug	White area rug	120
1282	Property 1	Residential	4/27/2016	14:49	NR	NR	NR	NR	NR	128	180	ng/m3	Basement	NR	NR	Headspace	Toys	Slide	130
1282	Property 1	Residential	4/27/2016	14:54	NR	NR	NR	NR	NR	316	383	ng/m3	Basement	NR	NR	Headspace	Toys	Stroller	130
1282	Property 1	Residential	4/27/2016	15:05	NR	NR	NR	NR	NR	1002	1068	ng/m3	Poly bag 290	NA	NA	Headspace	Furniture	Wooden chairs	115
1282	Property 1	Residential	4/27/2016	15:02	NR	NR	NR	NR	NR	179	208	ng/m3	Poly bag 291	NA	NA	Headspace	Toys	Miscellaneous toys	105
1282	Property 1	Residential	4/27/2016	15:11	NR	NR	NR	NR	NR	246	367	ng/m3	Living Room	NR	NR	Headspace	Furniture	White chair where he sat	120
1282	Property 1	Residential	4/27/2016	15:19	NR	NR	NR	NR	NR	92	107	ng/m3	Unknown	NR	NR	Headspace	Furniture	Table with blue top	100
1282	Property 1	Residential	4/27/2016	16:19	NR	NR	NR	NR	NR	94	128	ng/m3	Bedroom-Son	NR	NR	Headspace	Electronics	TV	85
1282	Property 1	Residential	4/27/2016	16:01	NR	NR	NR	NR	NR	180	764	ng/m3	Living Room	NR	NR	Headspace	Furniture	White sofa	120
1282	Property 1	Residential	4/27/2016	17:33	NR	NR	NR	NR	NR	56	89	ng/m3	Bedroom-Daughter	NR	NR	Breathing Zone	NR	Breathing zone in middle of room	80
1282	Property 1	Residential	4/27/2016	17:36	NR	NR	NR	NR	NR	52	71	ng/m3	Bedroom-Daughter	NR	NR	Floor	NR	Closet floor carpet piece	NR
1282	Property 1	Residential	4/27/2016	17:37	NR	NR	NR	NR	NR	52	85	ng/m3	Bedroom-Daughter	NR	NR	Floor	NR	Closet floor cracks between wall and floor	NR
1282	Property 1	Residential	4/27/2016	17:39	NR	NR	NR	NR	NR	50	62	ng/m3	Bedroom-Daughter	NR	NR	Floor	NR	Cracks between wall and floor near door (carpet	NR
1282	Property 1	Residential	4/27/2016	17:40	NR	NR	NR	NR	NR	45	60	ng/m3	Bedroom-Daughter	NR	NR	Floor	NR	Cracks between wall and floor (wall with	NR
1282	Property 1	Residential	4/27/2016	17:43	NR	NR	NR	NR	NR	32	57	ng/m3	Bedroom-Master	NR	NR	Breathing Zone	NR	Middle of room	NR
1282	Property 1	Residential	4/27/2016	17:48	NR	NR	NR	NR	NR	40	73	ng/m3	Bedroom-Master	NR	NR	Floor	NR	Cracks between wall and floor (peak in closet)	NR
1282	Property 1	Residential	4/27/2016	17:49	NR	NR	NR	NR	NR	80	111	ng/m3	Hallway-Upstairs	NR	NR	Floor	NR	Perimeter throughout hallway (peak near banister	NR
1282	Property 1	Residential	4/27/2016	17:50	NR	NR	NR	NR	NR	56	98	ng/m3	Hallway-Upstairs	NR	NR	Floor	NR	Perimeter throughout hallway (peak left of	NR
1282	Property 1	Residential	4/27/2016	17:52	NR	NR	NR	NR	NR	60	65	ng/m3	Hallway-Upstairs	NR	NR	Breathing Zone	NR	Middle of hallway by staircase	NR
1282	Property 1	Residential	4/27/2016	17:52	NR	NR	NR	NR	NR	58	63	ng/m3	Bedroom-Baby	NR	NR	Breathing Zone	NR	Near door entrance	NR
1282	Property 1	Residential	4/27/2016	17:54	NR	NR	NR	NR	NR	30	80	ng/m3	Bedroom-Baby	NR	NR	Floor	NR	Perimeter of room (peak behind door)	NR
1282	Property 1	Residential	4/27/2016	17:56	NR	NR	NR	NR	NR	30	35	ng/m3	Bedroom- Son	NR	NR	Breathing Zone	NR	Near door entrance	NR
1282	Property 1	Residential	4/27/2016	17:57	NR	NR	NR	NR	NR	30	42	ng/m3	Bedroom- Son	NR	NR	Floor	NR	Perimeter of room (peak	NR
1282	Property 1	Residential	4/27/2016	18:03	NR	NR	NR	NR	NR	35	43	ng/m3	Basement	NR	NR	Breathing Zone	NR	After venting	NR
1282	Property 1	Residential	4/27/2016	18:08	NR	NR	NR	NR	NR	60	104	ng/m3	Upstairs-Stairwell	NR	NR	Floor	NR	Stairs going down to foyer (peak 5th step from	NR
1282	Property 1	Residential	4/27/2016	18:11	NR	NR	NR	NR	NR	58	63	ng/m3	Office	NR	NR	Breathing Zone	NR	NR	NR
1282	Property 1	Residential	4/27/2016	18:12	NR	NR	NR	NR	NR	35	52	ng/m3	Office	NR	NR	Floor	NR	Peak in corner near front door	NR
1282	Property 1	Residential	4/27/2016	18:12	NR	NR	NR	NR	NR	44	49	ng/m3	Kitchen	NR	NR	Breathing Zone	NR	Near oven	NR
1282	Property 1	Residential	4/27/2016	18:13	NR	NR	NR	NR	NR	60	123	ng/m3	Kitchen	NR	NR	Floor	NR	Under dishwasher	NR
1282	Property 1	Residential	4/27/2016	18:15	NR	NR	NR	NR	NR	48	50	ng/m3	Living Room	NR	NR	Breathing Zone	NR	Middle of room	NR
1282	Property 1	Residential	4/27/2016	18:16	NR	NR	NR	NR	NR	47	65	ng/m3	Living Room	NR	NR	Floor	NR	Peak left of fireplace; min right of entrance to room	NR
1282	Property 1	Residential	4/27/2016	18:17	NR	NR	NR	NR	NR	48	51	ng/m3	Dining Room	NR	NR	Breathing Zone	NR	Middle of room	NR

NA- Not Applicable
NR- Not Recorded
R - Standard Deviation

Appendix G: Lumex Screening Results Summary Table
Greenleafe Drive Mercury Response Site
Baldwinsville, Onondaga County, New York

Serial Number	Property Number	Land Use	Date	Time	Screening-1	Screening-2	Screening-3	Average Screening Result	R	Minimum	Maximum	Units	Location	Floor	Floor Cover	Height	Item Type	Description	Temperature (°F)
1282	Property 1	Residential	4/27/2016	18:18	NR	NR	NR	NR	NR	32	52	ng/m3	Dining Room	NR	NR	Floor	NR	Peak wall by sink; min near left window	NR
1282	Property 1	Residential	4/28/2016	9:25	NR	NR	NR	NR	NR	76	86	ng/m3	Living Room	NR	NR	Breathing Zone	NR	NR	88
1282	Property 1	Residential	4/28/2016	9:26	NR	NR	NR	NR	NR	75	79	ng/m3	Dining Room	NR	NR	Breathing Zone	NR	NR	88
1282	Property 1	Residential	4/28/2016	9:27	NR	NR	NR	NR	NR	67	91	ng/m3	Kitchen	NR	NR	Floor	NR	Under dishwasher	88
1282	Property 1	Residential	4/28/2016	9:28	NR	NR	NR	NR	NR	72	82	ng/m3	Kitchen	NR	NR	Floor	NR	Under refrigerator	88
1282	Property 1	Residential	4/28/2016	9:28	NR	NR	NR	NR	NR	59	75	ng/m3	Kitchen	NR	NR	Breathing Zone	NR	NR	88
1282	Property 1	Residential	4/28/2016	9:29	NR	NR	NR	NR	NR	90	273	ng/m3	Bathroom-Downstairs	NR	NR	Headspace	NR	Bathroom sink drain	88
1282	Property 1	Residential	4/28/2016	9:30	NR	NR	NR	NR	NR	58	72	ng/m3	Office	NR	NR	Breathing Zone	NR	NR	88
1282	Property 1	Residential	4/28/2016	9:31	NR	NR	NR	NR	NR	150	227	ng/m3	Bathroom-Downstairs	NR	NR	Floor	NR	Frame in between wall and floor near sink	88
1282	Property 1	Residential	4/28/2016	9:32	NR	NR	NR	NR	NR	91	138	ng/m3	Stairwell	NR	NR	Floor	NR	Crack under first step	80
1282	Property 1	Residential	4/28/2016	9:33	NR	NR	NR	NR	NR	70	78	ng/m3	Stairwell	NR	NR	Floor	NR	Stairs going down to foyer (peak 5th step from	80
1282	Property 1	Residential	4/28/2016	9:34	NR	NR	NR	NR	NR	81	103	ng/m3	Hallway-Upstairs	NR	NR	Breathing Zone	NR	Middle of hallway near bathroom	90
1282	Property 1	Residential	4/28/2016	9:34	NR	NR	NR	NR	NR	100	148	ng/m3	Bathroom-Upstairs	NR	NR	Headspace	NR	Bathroom sink drain	90
1282	Property 1	Residential	4/28/2016	9:35	NR	NR	NR	NR	NR	1500	11700	ng/m3	Bathroom-Upstairs	NR	NR	Headspace	NR	Bathroom tub drain (yellow tape lifted up)	90
1282	Property 1	Residential	4/28/2016	9:37	NR	NR	NR	NR	NR	92	104	ng/m3	Bathroom-Upstairs	NR	NR	Breathing Zone	NR	Bathroom breathing Zone	90
1282	Property 1	Residential	4/28/2016	9:38	NR	NR	NR	NR	NR	105	394	ng/m3	Bathroom-Upstairs	NR	NR	Floor	NR	Bathroom floor under sink	90
1282	Property 1	Residential	4/28/2016	9:40	NR	NR	NR	NR	NR	64	78	ng/m3	Bedroom-Daughter	NR	NR	Breathing Zone	NR	NR	90
1282	Property 1	Residential	4/28/2016	9:41	NR	NR	NR	NR	NR	58	62	ng/m3	Bedroom-Master	NR	NR	Breathing Zone	NR	NR	90
1282	Property 1	Residential	4/28/2016	9:41	NR	NR	NR	NR	NR	66	84	ng/m3	Bathroom-Master	NR	NR	Floor	NR	Under sink	90
1282	Property 1	Residential	4/28/2016	9:42	NR	NR	NR	NR	NR	59	65	ng/m3	Bathroom-Master	NR	NR	Headspace	NR	Far sink from door	90
1282	Property 1	Residential	4/28/2016	9:42	NR	NR	NR	NR	NR	59	72	ng/m3	Bathroom-Master	NR	NR	Headspace	NR	Closer sink to door	90
1282	Property 1	Residential	4/28/2016	9:43	NR	NR	NR	NR	NR	54	57	ng/m3	Bathroom-Master	NR	NR	Headspace	NR	Bath tub drain	90
1282	Property 1	Residential	4/28/2016	9:44	NR	NR	NR	NR	NR	54	61	ng/m3	Bathroom-Master	NR	NR	Headspace	NR	Shower drain	90
1282	Property 1	Residential	4/28/2016	9:44	NR	NR	NR	NR	NR	58	63	ng/m3	Bedroom-Master	NR	NR	Breathing Zone	NR	NR	90
1282	Property 1	Residential	4/28/2016	9:45	NR	NR	NR	NR	NR	47	63	ng/m3	Bedroom-Son	NR	NR	Breathing Zone	NR	Middle of room	90
1282	Property 1	Residential	4/28/2016	9:46	NR	NR	NR	NR	NR	48	61	ng/m3	Bedroom-Son	NR	NR	Breathing Zone	NR	Closet	90
1282	Property 1	Residential	4/28/2016	9:46	NR	NR	NR	NR	NR	58	87	ng/m3	Bedroom-Baby	NR	NR	Breathing Zone	NR	NR	90
1282	Property 1	Residential	4/28/2016	11:39	NR	NR	NR	NR	NR	277	405	ng/m3	Poly bag 292	NA	NA	Headspace	Storage	Wooden basket and pillow	95
1282	Property 1	Residential	4/28/2016	11:36	NR	NR	NR	NR	NR	121	172	ng/m3	Poly bag 293	NA	NA	Headspace	Electronics	X box games and system	105
1282	Property 1	Residential	4/28/2016	13:49	NR	NR	NR	NR	NR	106	165	ng/m3	Poly bag 294	NA	NA	Headspace	Toys	Makeup station from baby room	100
1282	Property 1	Residential	4/28/2016	13:48	NR	NR	NR	NR	NR	69	106	ng/m3	Poly bag 295	NA	NA	Headspace	Decorative	Blinds	105
1282	Property 1	Residential	4/28/2016	11:33	NR	NR	NR	NR	NR	311	425	ng/m3	Poly bag 296	NA	NA	Headspace	Towels	Towels and curtain rods	110
1282	Property 1	Residential	4/28/2016	11:28	NR	NR	NR	NR	NR	600	2200	ng/m3	Poly bag 297	NA	NA	Headspace	Blankets	Fleece blankets from family room	110
1282	Property 1	Residential	4/28/2016	10:06	NR	NR	NR	NR	NR	58	65	ng/m3	Bedroom-Baby	NR	NR	Headspace	Furniture	Dresser	90
1282	Property 1	Residential	4/28/2016	10:10	NR	NR	NR	NR	NR	74	58	ng/m3	Bedroom-Baby	NR	NR	Headspace	Furniture	Bed frame	90
1282	Property 1	Residential	4/28/2016	10:14	NR	NR	NR	NR	NR	57	71	ng/m3	Bedroom-Baby	NR	NR	Headspace	Furniture	Large dresser	90
1282	Property 1	Residential	4/28/2016	10:20	NR	NR	NR	NR	NR	500	819	ng/m3	Bedroom-Son	NR	NR	Headspace	Furniture	Dresser (outside)	90
1282	Property 1	Residential	4/28/2016	10:22	NR	NR	NR	NR	NR	500	738	ng/m3	Bedroom-Son	NR	NR	Headspace	Furniture	Dresser (inside)	90
1282	Property 1	Residential	4/28/2016	10:31	NR	NR	NR	NR	NR	65	80	ng/m3	Bedroom-Master	NR	NR	Headspace	Furniture	Husband dresser	90
1282	Property 1	Residential	4/28/2016	11:41	NR	NR	NR	NR	NR	79	98	ng/m3	Living Room	NR	NR	Headspace	Electronics	TV	78
1282	Property 1	Residential	4/28/2016	11:52	NR	NR	NR	NR	NR	90	122	ng/m3	Bedroom-Master	NR	NR	Headspace	Electronics	TV	95
1282	Property 1	Residential	4/28/2016	11:58	NR	NR	NR	NR	NR	85	156	ng/m3	Dining Room	NR	NR	Headspace	Furniture	Table	110
1282	Property 1	Residential	4/28/2016	12:08	NR	NR	NR	NR	NR	2500	8570	ng/m3	Basement	NR	NR	Headspace	Rug	Oriental area rug (after heat)	110
1282	Property 1	Residential	4/28/2016	12:02	NR	NR	NR	NR	NR	53	67	ng/m3	Office	NR	NR	Headspace	Furniture	Dark brown shelf/dresser 1	100
1282	Property 1	Residential	4/28/2016	12:06	NR	NR	NR	NR	NR	56	68	ng/m3	Office	NR	NR	Headspace	Furniture	Dark brown shelf/dresser 2	100
1282	Property 1	Residential	4/28/2016	13:51	NR	NR	NR	NR	NR	63	120	ng/m3	Poly bag 298	NA	NA	Headspace	Furniture	White cabinet	110
1282	Property 1	Residential	4/28/2016	13:56	NR	NR	NR	NR	NR	70	82	ng/m3	Poly bag 299	NA	NA	Headspace	Furniture	Chair from dining room table	107
1282	Property 1	Residential	4/28/2016	14:00	NR	NR	NR	NR	NR	358	380	ng/m3	Poly bag 300	NA	NA	Headspace	Furniture	Chair from dining room table	110
1282	Property 1	Residential	4/28/2016	14:03	NR	NR	NR	NR	NR	71	97	ng/m3	Poly bag 301	NA	NA	Headspace	Miscellaneous	Ironing board	110
1282	Property 1	Residential	4/28/2016	16:57	NR	NR	NR	NR	NR	44	51	ng/m3	Poly bag 302	NA	NA	Headspace	Furniture	Leather sofa seat	106
1282	Property 1	Residential	4/28/2016	17:01	NR	NR	NR	NR	NR	49	77	ng/m3	Poly bag 303	NA	NA	Headspace	Furniture	Leather sofa	93
1282	Property 1	Residential	4/28/2016	17:11	NR	NR	NR	NR	NR	42	58	ng/m3	Poly bag 304	NA	NA	Headspace	Furniture	Chair from dining room	100
1282	Property 1	Residential	4/28/2016	17:08	NR	NR	NR	NR	NR	23	29	ng/m3	Poly bag 305	NA	NA	Headspace	Furniture	Brown wicker chair	104
1282	Property 1	Residential	4/28/2016	17:16	NR	NR	NR	NR	NR	22	24	ng/m3	Poly bag 306	NA	NA	Headspace	Decorative	Large picture frame	91
1282	Property 1	Residential	4/28/2016	17:13	NR	NR	NR	NR	NR	85	105	ng/m3	Poly bag 307	NA	NA	Headspace	Decorative	Mirror	95
1282	Property 1	Residential	4/28/2016	17:18	NR	NR	NR	NR	NR	55	68	ng/m3	Poly bag 308	NA	NA	Headspace	Decorative	Painting	90
1282	Property 1	Residential	4/28/2016	17:19	NR	NR	NR	NR	NR	167	232	ng/m3	Poly bag 309	NA	NA	Headspace	Miscellaneous	Wall hangings, lunch box, etc.	92
1282	Property 1	Residential	4/28/2016	17:25	NR	NR	NR	NR	NR	51	54	ng/m3	Poly bag 310	NA	NA	Headspace	Furniture	Dining Room chair	94
1282	Property 1	Residential	4/28/2016	17:26	NR	NR	NR	NR	NR	31	38	ng/m3	Poly bag 311	NA	NA	Headspace	Furniture	Dining Room chair	101
1282	Property 1	Residential	4/28/2016	17:28	NR	NR	NR	NR	NR	34	36	ng/m3	Poly bag 312	NA	NA	Headspace	Furniture	Desk/table from office	110
1282	Property 1	Residential	4/29/2016	8:45	NR	NR	NR	NR	NR	170	174	ng/m3	Dining Room	NR	NR	Breathing Zone	NR	NR	95
1282	Property 1	Residential	4/29/2016	8:46	NR	NR	NR	NR	NR	50	56	ng/m3	Dining Room	NR	NR	Floor	NR	Middle of floor	95
1282	Property 1	Residential	4/29/2016	8:47	NR	NR	NR	NR	NR	150	177	ng/m3	Living Room	NR	NR	Breathing Zone	NR	NR	95
1282	Property 1	Residential	4/29/2016	9:47	NR	NR	NR	NR	NR	102	145	ng/m3	Kitchen	NR	NR	Breathing Zone	NR	NR	95
1282	Property 1	Residential	4/29/2016	8:48	NR	NR	NR	NR	NR	115	132	ng/m3	Kitchen	NR	NR	Floor	NR	Under dishwasher	95
1282	Property 1	Residential	4/29/2016	8:48	NR	NR	NR	NR	NR	148	161	ng/m3	Kitchen	NR	NR	Floor	NR	Under refrigerator	95
1282	Property 1	Residential	4/29/2016	8:49	NR	NR	NR	NR	NR	132	141	ng/m3	Office	NR	NR	Breathing Zone	NR	NR	95
1282	Property 1	Residential	4/29/2016	8:49	NR	NR	NR	NR	NR	NR	576	ng/m3	Bathroom-Downstairs	NR	NR	Headspace	NR	Sink drain	95
1282	Property 1	Residential	4/29/2016	8:50	NR	NR	NR	NR	NR	NR	169	ng/m3	Bathroom-Downstairs	NR	NR	Breathing Zone	NR	NR	95
1282	Property 1	Residential	4/29/2016	8:51	NR	NR	NR	NR	NR	560	604	ng/m3	Bathroom-Downstairs	NR	NR	Floor	NR	Under sink	95
1282	Property 1	Residential	4/29/2016	8:52	NR	NR	NR	NR	NR	198	234	ng/m3	Stairwell	NR	NR	Breathing Zone	NR	Steps going upstairs	95
1282	Property 1	Residential	4/29/2016	8:53	NR	NR	NR	NR	NR	NR	186	ng/m3	Stairwell	NR	NR	Breathing Zone	NR	NR	95
1282	Property 1	Residential	4/29/2016	8:55	NR	NR	NR	NR	NR	202	206	ng/m3	Hallway-Upstairs	NR	NR	Breathing Zone	NR	Top of stairs near bathroom	100
1282	Property 1	Residential	4/29/2016	8:56	NR	NR	NR	NR	NR	NR	179	ng/m3	Bedroom-Son	NR	NR	Breathing Zone	NR	NR	100
1282	Property 1	Residential	4/29/2016	8:57	NR	NR	NR	NR	NR	NR	225	ng/m3	Bedroom-Son	NR	NR	Floor	NR	NR	100
1282	Property 1	Residential	4/29/2016	8:57	NR	NR	NR	NR	NR	402	560	ng/m3	Bedroom-Son	NR	NR	Headspace	NR	Dresser in room	100
1282	Property 1	Residential	4/29/2016	8:59	NR	NR	NR	NR	NR	NR	243	ng/m3	Bedroom-Baby	NR	NR	Breathing Zone	NR	NR	100
1282	Property 1	Residential	4/29/2016	9:00	NR	NR	NR	NR	NR	NR	257	ng/m3	Bedroom-Baby	NR	NR	Headspace	NR	Dresser in room	100
1282	Property 1	Residential	4/29/2016	9:00	NR	NR	NR	NR	NR	NR	368	ng/m3	Bathroom-Upstairs	NR	NR	Breathing Zone	NR	NR	100
1282	Property 1	Residential	4/29/2016	9:02	NR	NR	NR	NR	NR	NR	313	ng/m3	Bedroom-Daughter	NR	NR	Breathing Zone	NR	NR	100
1282	Property 1	Residential	4/29/2016	9:03	NR	NR	NR	NR	NR	NR	341	ng/m3	Bedroom-Daughter	NR	NR	Floor	NR	NR	100
1282	Property 1	Residential	4/29/2016	9:03	NR	NR	NR	NR	NR	NR	376	ng/m3	Bedroom-Master	NR	NR	Breathing Zone	NR	NR	100
1282	Property 1	Residential	4/29/2016	9:04	NR	NR	NR	NR	NR	NR	363	ng/m3	Bedroom-Master	NR	NR	Breathing Zone	NR	Closet	100
1282	Property 1	Residential	4/29/2016	9:05	NR	NR	NR	NR	NR	NR	363	ng/m3	Bedroom-Master	NR	NR	Breathing Zone	NR	Bathroom	100
1282	Property 1	Residential	4/29/2016	9:06	NR	NR	NR	NR	NR	545	585	ng/m3	Stairwell-Basement	NR	NR	Breathing Zone	NR	Staircase going down	90

NA- Not Applicable
NR- Not Recorded
R - Standard Deviation

Appendix G: Lumex Screening Results Summary Table
Greenleafe Drive Mercury Response Site
Baldwinsville, Onondaga County, New York

Serial Number	Property Number	Land Use	Date	Time	Screeining-1	Screeining-2	Screeining-3	Average Screening Result	R	Minimum	Maximum	Units	Location	Floor	Floor Cover	Height	Item Type	Description	Temperature (°F)
1282	Property 1	Residential	4/29/2016	9:07	NR	NR	NR	NR	NR	640	643	ng/m3	Basement	NR	NR	Breathing Zone	NR	NR	90
1282	Property 1	Residential	4/29/2016	9:07	NR	NR	NR	NR	NR	632	692	ng/m3	Basement	NR	NR	Floor	NR	NR	90
1282	Property 1	Residential	4/29/2016	9:15	NR	NR	NR	NR	NR	575	2998	ng/m3	Garage	NR	NR	Floor	NR	Cracks near door entrance	77
1282	Property 1	Residential	4/29/2016	9:19	NR	NR	NR	NR	NR	3000	15460	ng/m3	Garage	NR	NR	Floor	NR	Crack along entire wall by yellow heater	77
1282	Property 1	Residential	4/29/2016	9:16	NR	NR	NR	NR	NR	3000	18130	ng/m3	Garage	NR	NR	Floor	NR	Crack by yellow heater	77
1282	Property 1	Residential	4/29/2016	9:17	NR	NR	NR	NR	NR	5197	6610	ng/m3	Garage	NR	NR	Floor	NR	Steps	77
1282	Property 1	Residential	4/29/2016	9:18	NR	NR	NR	NR	NR	NR	4021	ng/m3	Garage	NR	NR	Wall/Floor	NR	Foam area along wall	77
1282	Property 1	Residential	4/29/2016	9:20	NR	NR	NR	NR	NR	NR	3870	ng/m3	Mud Room	NR	NR	Floor	NR	Vent	77
1282	Property 1	Residential	4/29/2016	9:21	NR	NR	NR	NR	NR	NR	3175	ng/m3	Mud Room	NR	NR	Breathing Zone	NR	NR	77
1282	Property 1	Residential	4/29/2016	9:22	NR	NR	NR	NR	NR	NR	4620	ng/m3	Mud Room	NR	NR	Floor	NR	NR	77
1210	Property 1	Residential	4/29/2016	10:34	NR	NR	NR	NR	NR	NR	>50000	ng/m3	Garage	NR	NR	Floor	NR	Crack by yellow heater (with heat fan applied)	73
1282	Property 1	Residential	4/29/2016	10:40	NR	NR	NR	NR	NR	NR	>50000	ng/m3	Garage	NR	NR	Floor	NR	Crack by yellow heater (with heat fan applied)	73
1210	Property 1	Residential	4/29/2016	10:36	NR	NR	NR	NR	NR	NR	967	ng/m3	Garage	NR	NR	Breathing Zone	NR	NR	73
1210	Property 1	Residential	4/29/2016	10:40	NR	NR	NR	NR	NR	NR	250	ng/m3	Garage	NR	NR	Floor	NR	Cracks near door entrance	73
1210	Property 1	Residential	4/29/2016	10:42	NR	NR	NR	NR	NR	NR	5400	ng/m3	Garage	NR	NR	Floor	NR	Seam underneath stairs	73
1210	Property 1	Residential	4/29/2016	10:47	NR	NR	NR	NR	NR	2100	2057	ng/m3	Mud Room	NR	NR	Floor	NR	Vent	80
1210	Property 1	Residential	4/29/2016	10:49	NR	NR	NR	NR	NR	NR	1800	ng/m3	Mud Room	NR	NR	Breathing Zone	NR	NR	80
1210	Property 1	Residential	4/29/2016	11:37	NR	NR	NR	NR	NR	219	270	ng/m3	Poly bag 313	NA	NA	Headspace	Miscellaneous	Military American flag	115
1210	Property 1	Residential	4/29/2016	11:38	NR	NR	NR	NR	NR	333	432	ng/m3	Poly bag 314	NA	NA	Headspace	Miscellaneous	Military memorabilia	102
1210	Property 1	Residential	4/29/2016	11:40	NR	NR	NR	NR	NR	304	363	ng/m3	Poly bag 315	NA	NA	Headspace	Decorative	Large clock	94
1210	Property 1	Residential	4/29/2016	11:04	NR	NR	NR	NR	NR	179	240	ng/m3	Poly bag 316	NA	NA	Headspace	Miscellaneous	TV mount	95
1210	Property 1	Residential	4/29/2016	11:45	NR	NR	NR	NR	NR	180	247	ng/m3	Poly bag 317	NA	NA	Headspace	Decorative	Lamp	97
1210	Property 1	Residential	4/29/2016	11:47	NR	NR	NR	NR	NR	127	296	ng/m3	Poly bag 318	NA	NA	Headspace	Furniture	White dresser	104
1210	Property 1	Residential	4/29/2016	11:51	NR	NR	NR	NR	NR	158	297	ng/m3	Poly bag 319	NA	NA	Headspace	Miscellaneous	Kitchen items	101
1210	Property 1	Residential	4/29/2016	11:55	NR	NR	NR	NR	NR	329	387	ng/m3	Poly bag 320	NA	NA	Headspace	Miscellaneous	Miscellaneous kitchen items	102
1210	Property 1	Residential	4/29/2016	11:59	NR	NR	NR	NR	NR	267	282	ng/m3	Poly bag 321	NA	NA	Headspace	Toys	Star Wars toy	105
1210	Property 1	Residential	4/29/2016	12:02	NR	NR	NR	NR	NR	130	149	ng/m3	Poly bag 322	NA	NA	Headspace	Lighting	Lamp	96
1210	Property 1	Residential	4/29/2016	12:03	NR	NR	NR	NR	NR	144	171	ng/m3	Poly bag 323	NA	NA	Headspace	Furniture	Shelving	93
1210	Property 1	Residential	4/29/2016	12:08	NR	NR	NR	NR	NR	561	785	ng/m3	Poly bag 324	NA	NA	Headspace	Furniture	Mattress from son's room	110
1210	Property 1	Residential	4/29/2016	12:13	NR	NR	NR	NR	NR	185	204	ng/m3	Poly bag 325	NA	NA	Headspace	Furniture	Mattress from master	95
1210	Property 1	Residential	4/29/2016	13:41	NR	NR	NR	NR	NR	279	391	ng/m3	Poly bag 326	NA	NA	Headspace	Miscellaneous	Basket with cleaning supplies	94
1210	Property 1	Residential	4/29/2016	13:49	NR	NR	NR	NR	NR	767	949	ng/m3	Poly bag 327	NA	NA	Headspace	Miscellaneous	Cleaning supplies	111
1210	Property 1	Residential	4/29/2016	13:50	NR	NR	NR	NR	NR	24	48	ng/m3	Poly bag 328	NA	NA	Headspace	Furniture	Mattress from Daughter's room	104
1210	Property 1	Residential	4/29/2016	13:55	NR	NR	NR	NR	NR	30000	>50000	ng/m3	Poly bag 329	NA	NA	Headspace	Decorative	Miscellaneous turtle	100
1210	Property 1	Residential	4/29/2016	14:01	NR	NR	NR	NR	NR	67	300	ng/m3	Poly bag 330	NA	NA	Headspace	Miscellaneous	Cleaning supplies	90
1210	Property 1	Residential	4/29/2016	14:20	NR	NR	NR	NR	NR	77	111	ng/m3	Poly bag 331	NA	NA	Headspace	Furniture	Dresser	110
1210	Property 1	Residential	4/29/2016	14:33	NR	NR	NR	NR	NR	54	78	ng/m3	Poly bag 332	NA	NA	Headspace	Furniture	Sofa chair	110
1210	Property 1	Residential	4/29/2016	14:36	NR	NR	NR	NR	NR	150	165	ng/m3	Poly bag 333	NA	NA	Headspace	Furniture	Sofa couch	124
1210	Property 1	Residential	4/29/2016	15:12	NR	NR	NR	NR	NR	187	201	ng/m3	Poly bag 334	NA	NA	Headspace	Miscellaneous	Towels and other items	111
1210	Property 1	Residential	4/29/2016	14:49	NR	NR	NR	NR	NR	260	428	ng/m3	Poly bag 335	NA	NA	Headspace	Clothes	Boys clothes and Halloween costumes	102
1210	Property 1	Residential	4/29/2016	15:17	NR	NR	NR	NR	NR	144	155	ng/m3	Poly bag 336	NA	NA	Headspace	Pillow	Decorative pillow	102
1210	Property 1	Residential	4/29/2016	15:22	NR	NR	NR	NR	NR	171	182	ng/m3	Poly bag 337	NA	NA	Headspace	Food	Kitchen spices	100
1210	Property 1	Residential	4/29/2016	15:27	NR	NR	NR	NR	NR	82	111	ng/m3	Poly bag 338	NA	NA	Headspace	Decorative	Star decoration	106
1210	Property 1	Residential	4/29/2016	15:33	NR	NR	NR	NR	NR	25	46	ng/m3	Poly bag 339	NA	NA	Headspace	Food	Kitchen supplies and food	90
1210	Property 1	Residential	4/29/2016	15:30	NR	NR	NR	NR	NR	40	49	ng/m3	Poly bag 340	NA	NA	Headspace	Storage	Miscellaneous baskets	94
1210	Property 1	Residential	4/29/2016	15:31	NR	NR	NR	NR	NR	58	85	ng/m3	Poly bag 341	NA	NA	Headspace	Decorative	Blue wall hanging	95
1210	Property 1	Residential	4/29/2016	16:14	NR	NR	NR	NR	NR	34	42	ng/m3	Box 1	NA	NA	Headspace	Kitchen	Plates and bowls	90
1210	Property 1	Residential	4/29/2016	16:17	NR	NR	NR	NR	NR	33	45	ng/m3	Box 2	NA	NA	Headspace	Kitchen	Miscellaneous	93
1210	Property 1	Residential	4/29/2016	16:10	NR	NR	NR	NR	NR	30	42	ng/m3	Box 3	NA	NA	Headspace	Kitchen	China	85
1210	Property 1	Residential	4/29/2016	16:18	NR	NR	NR	NR	NR	87	136	ng/m3	Box 4	NA	NA	Headspace	Decorative	Candles	111
1210	Property 1	Residential	4/29/2016	16:21	NR	NR	NR	NR	NR	103	128	ng/m3	Box 5	NA	NA	Headspace	Decorative	Candles	92
1282	Property 1	Residential	4/29/2016	16:30	NR	NR	NR	NR	NR	171	216	ng/m3	Box 6	NA	NA	Headspace	Kitchen	Glassware	95
1282	Property 1	Residential	4/29/2016	16:32	NR	NR	NR	NR	NR	39	44	ng/m3	Box 7	NA	NA	Headspace	Kitchen	Glassware	101
1282	Property 1	Residential	4/29/2016	16:34	NR	NR	NR	NR	NR	29	36	ng/m3	Box 8	NA	NA	Headspace	Kitchen	Miscellaneous	92
1282	Property 1	Residential	4/29/2016	16:37	NR	NR	NR	NR	NR	43	49	ng/m3	Box 9	NA	NA	Headspace	Kitchen	Fragile items	93
1282	Property 1	Residential	4/29/2016	16:38	NR	NR	NR	NR	NR	57	65	ng/m3	Box 10	NA	NA	Headspace	Kitchen	Glassware	90
1282	Property 1	Residential	4/29/2016	16:55	NR	NR	NR	NR	NR	25	31	ng/m3	Box 11	NA	NA	Headspace	Miscellaneous	Candles	98
1282	Property 1	Residential	4/29/2016	16:58	NR	NR	NR	NR	NR	15	22	ng/m3	Box 12	NA	NA	Headspace	Miscellaneous	Candles	105
1282	Property 1	Residential	4/29/2016	17:04	NR	NR	NR	NR	NR	40	55	ng/m3	Box 13	NA	NA	Headspace	Kitchen	Glassware	102
1282	Property 1	Residential	4/29/2016	17:08	NR	NR	NR	NR	NR	102	118	ng/m3	Box 14	NA	NA	Headspace	Kitchen	Glassware	99
1282	Property 1	Residential	4/29/2016	17:15	NR	NR	NR	NR	NR	65	81	ng/m3	Box 15	NA	NA	Headspace	Kitchen	Plates	100
1282	Property 1	Residential	4/29/2016	17:28	NR	NR	NR	NR	NR	33	38	ng/m3	Box 16	NA	NA	Headspace	Kitchen	Plates	108
1282	Property 1	Residential	4/29/2016	17:32	NR	NR	NR	NR	NR	45	61	ng/m3	Box 17	NA	NA	Headspace	Kitchen	Plates	105
1282	Property 1	Residential	4/29/2016	17:35	NR	NR	NR	NR	NR	84	89	ng/m3	Box 18	NA	NA	Headspace	Dining room	Plates	107
1282	Property 1	Residential	4/29/2016	17:38	NR	NR	NR	NR	NR	62	74	ng/m3	Box 19	NA	NA	Headspace	Kitchen	Glassware	98
1282	Property 1	Residential	4/29/2016	17:47	NR	NR	NR	NR	NR	58	72	ng/m3	Poly bag 342	NA	NA	Headspace	Miscellaneous	Chalk board	106
1282	Property 1	Residential	4/29/2016	17:49	NR	NR	NR	NR	NR	124	146	ng/m3	Poly bag 343	NA	NA	Headspace	Toy	Hello kitty	97
1210	Property 1	Residential	4/29/2016	16:04	NR	NR	NR	NR	NR	91	1914	ng/m3	Garage	NR	NR	Headspace	Building Material	Right wall	90
1210	Property 1	Residential	4/29/2016	16:06	NR	NR	NR	NR	NR	58	545	ng/m3	Garage	NR	NR	Headspace	Building Material	Right wall new sheet rock	90
1210	Property 1	Residential	4/29/2016	16:10	NR	NR	NR	NR	NR	154	4599	ng/m3	Garage	NR	NR	Headspace	Building Material	Above crack	90
1210	Property 1	Residential	4/29/2016	15:55	NR	NR	NR	NR	NR	606	8870	ng/m3	Garage	NR	NR	Headspace	Building Material	Wall along house 1	90
1210	Property 1	Residential	4/29/2016	15:58	NR	NR	NR	NR	NR	725	9100	ng/m3	Garage	NR	NR	Headspace	Building Material	Wall along house 2	90
1282	Property 1	Residential	4/29/2016	17:19	NR	NR	NR	NR	NR	105	138	ng/m3	Office	NR	NR	Headspace	Furniture	Table from office	95
1282	Property 1	Residential	4/29/2016	17:52	NR	NR	NR	NR	NR	133	145	ng/m3	Poly bag 344	NA	NA	Headspace	Miscellaneous	Fall and Halloween decor	110
1282	Property 1	Residential	4/30/2016	8:37	NR	NR	NR	NR	NR	41	46	ng/m3	Poly bag 345	NA	NA	Headspace	Toys	Miscellaneous toy	91
1282	Property 1	Residential	4/30/2016	8:43	NR	NR	NR	NR	NR	538	733	ng/m3	Poly bag 346	NA	NA	Headspace	Toys	Miscellaneous toys and lights	118
1282	Property 1	Residential	4/30/2016	8:44	NR	NR	NR	NR	NR	173	193	ng/m3	Poly bag 347	NA	NA	Headspace	Miscellaneous	Table clothes and miscellaneous items	102
1282	Property 1	Residential	4/30/2016	8:46	NR	NR	NR	NR	NR	228	267	ng/m3	Poly bag 348	NA	NA	Headspace	Decorative	Candles/lanterns	99
1282	Property 1	Residential	4/30/2016	8:48	NR	NR	NR	NR	NR	216	246	ng/m3	Poly bag 349	NA	NA	Headspace	Decorative	Christmas bin with decorations	104
1282	Property 1	Residential	4/30/2016	8:50	NR	NR	NR	NR	NR	250	287	ng/m3	Poly bag 350	NA	NA	Headspace	Decorative	Christmas bin with decorations	99
1282	Property 1	Residential	4/30/2016	10:10	NR	NR	NR	NR	NR	211	339	ng/m3	Poly bag 351	NA	NA	Headspace	Decorative	Fall and Thanksgiving decorations	100
1282	Property 1	Residential	4/30/2016	10:13	NR	NR	NR	NR	NR	229	256	ng/m3	Poly bag 352	NA	NA	Headspace	Toys	Star Wars, X Box, etc.	110
1282	Property 1	Residential	4/30/2016	10:15	NR	NR	NR	NR	NR	688	727	ng/m3	Poly bag 353	NA	NA	Headspace	Miscellaneous	Hangers	105
1282	Property 1	Residential	4/30/2016	10:18	NR	NR	NR	NR	NR	232	241	ng/m3	Poly bag 354	NA	NA	Headspace	Blankets	Miscellaneous blankets	110
1282	Property 1	Residential	4/30/2016	10:19	NR	NR	NR	NR	NR	215	242	ng/m3	Poly bag 355	NA	NA	Headspace	Miscellaneous	Sled	94

NA- Not Applicable
NR- Not Recorded
R - Standard Deviation

Appendix G: Lumex Screening Results Summary Table
Greenleafe Drive Mercury Response Site
Baldwinsville, Onondaga County, New York

Serial Number	Property Number	Land Use	Date	Time	Screeining-1	Screeining-2	Screeining-3	Average Screening Result	R	Minimum	Maximum	Units	Location	Floor	Floor Cover	Height	Item Type	Description	Temperature (˚F)
1282	Property 1	Residential	4/30/2016	10:21	NR	NR	NR	NR	NR	215	198	ng/m3	Poly bag 356	NA	NA	Headspace	Decorative	Mirror	110
1282	Property 1	Residential	4/30/2016	10:23	NR	NR	NR	NR	NR	682	756	ng/m3	Poly bag 357	NA	NA	Headspace	Bedding	Syracuse Pillow	125
1282	Property 1	Residential	4/30/2016	10:24	NR	NR	NR	NR	NR	283	379	ng/m3	Poly bag 358	NA	NA	Headspace	Miscellaneous	Pink ladder	115
1282	Property 1	Residential	4/30/2016	10:27	NR	NR	NR	NR	NR	229	255	ng/m3	Poly bag 359	NA	NA	Headspace	Decorative	Christmas decorations	111
1282	Property 1	Residential	4/30/2016	10:30	NR	NR	NR	NR	NR	202	232	ng/m3	Poly bag 360	NA	NA	Headspace	Kitchen	Miscellaneous kitchen supplies	100
1282	Property 1	Residential	4/30/2016	8:55	NR	NR	NR	NR	NR	130	138	ng/m3	Dining Room	NR	NR	Breathing Zone	NR	NR	95
1282	Property 1	Residential	4/30/2016	8:56	NR	NR	NR	NR	NR	137	145	ng/m3	Dining Room	NR	NR	Floor	NR	Vent on floor closest to door	95
1282	Property 1	Residential	4/30/2016	8:57	NR	NR	NR	NR	NR	NR	175	ng/m3	Living Room	NR	NR	Breathing Zone	NR	NR	95
1282	Property 1	Residential	4/30/2016	8:58	NR	NR	NR	NR	NR	NR	203	ng/m3	Living Room	NR	NR	Floor	NR	Middle of floor	95
1282	Property 1	Residential	4/30/2016	9:12	NR	NR	NR	NR	NR	NR	151	ng/m3	Kitchen	NR	NR	Breathing Zone	NR	NR	95
1282	Property 1	Residential	4/30/2016	8:59	NR	NR	NR	NR	NR	NR	216	ng/m3	Kitchen	NR	NR	Floor	NR	Under dishwasher	95
1282	Property 1	Residential	4/30/2016	9:00	NR	NR	NR	NR	NR	NR	208	ng/m3	Kitchen	NR	NR	Floor	NR	Under refrigerator	95
1282	Property 1	Residential	4/30/2016	9:12	NR	NR	NR	NR	NR	NR	163	ng/m3	Office	NR	NR	Breathing Zone	NR	NR	95
1282	Property 1	Residential	4/30/2016	9:13	NR	NR	NR	NR	NR	NR	187	ng/m3	Bathroom-Downstairs	NR	NR	Breathing Zone	NR	NR	95
1282	Property 1	Residential	4/30/2016	9:03	NR	NR	NR	NR	NR	NR	765	ng/m3	Bathroom-Downstairs	NR	NR	Headspace	NR	Sink drain	95
1282	Property 1	Residential	4/30/2016	9:14	NR	NR	NR	NR	NR	NR	153	ng/m3	Stairwell	NR	NR	Breathing Zone	NR	NR	95
1282	Property 1	Residential	4/30/2016	9:13	NR	NR	NR	NR	NR	NR	174	ng/m3	Hallway-Upstairs	NR	NR	Breathing Zone	NR	NR	95
1282	Property 1	Residential	4/30/2016	9:14	NR	NR	NR	NR	NR	NR	178	ng/m3	Bedroom-Baby	NR	NR	Breathing Zone	NR	NR	110
1282	Property 1	Residential	4/30/2016	9:23	NR	NR	NR	NR	NR	NR	184	ng/m3	Bedroom-Daughter	NR	NR	Breathing Zone	NR	NR	110
1282	Property 1	Residential	4/30/2016	9:22	NR	NR	NR	NR	NR	NR	153	ng/m3	Bedroom-Master	NR	NR	Breathing Zone	NR	NR	110
1282	Property 1	Residential	4/30/2016	9:14	NR	NR	NR	NR	NR	NR	169	ng/m3	Bedroom-Son	NR	NR	Breathing Zone	NR	NR	110
1282	Property 1	Residential	4/30/2016	9:14	NR	NR	NR	NR	NR	NR	205	ng/m3	Bathroom-Upstairs	NR	NR	Breathing Zone	NR	NR	110
1282	Property 1	Residential	4/30/2016	9:16	NR	NR	NR	NR	NR	NR	262	ng/m3	Bathroom-Master	NR	NR	Breathing Zone	NR	NR	110
1282	Property 1	Residential	4/30/2016	9:14	NR	NR	NR	NR	NR	NR	237	ng/m3	Bedroom-Daughter	NR	NR	Floor	NR	Vent	110
1282	Property 1	Residential	4/30/2016	9:16	NR	NR	NR	NR	NR	NR	241	ng/m3	Bedroom-Master	NR	NR	Breathing Zone	NR	Closet	110
1282	Property 1	Residential	4/30/2016	9:27	NR	NR	NR	NR	NR	NR	107	ng/m3	Basement	NR	NR	Breathing Zone	NR	NR	90
1282	Property 1	Residential	4/30/2016	9:21	NR	NR	NR	NR	NR	NR	143	ng/m3	Hallway-Downstairs	NR	NR	Breathing Zone	NR	NR	95
1282	Property 1	Residential	4/30/2016	9:28	NR	NR	NR	NR	NR	124	174	ng/m3	Basement	NR	NR	Floor	NR	Baseboard cracks	90
1282	Property 1	Residential	4/30/2016	9:26	NR	NR	NR	NR	NR	109	114	ng/m3	Basement-Stairwell	NR	NR	Breathing Zone	NR	NR	90
1282	Property 1	Residential	4/30/2016	9:38	NR	NR	NR	NR	NR	1128	1130	ng/m3	Garage	NR	NR	Breathing Zone	NR	NR	100
1282	Property 1	Residential	4/30/2016	9:43	NR	NR	NR	NR	NR	5000	11300	ng/m3	Garage	NR	NR	Floor	NR	Near crack	100
1282	Property 1	Residential	4/30/2016	9:42	NR	NR	NR	NR	NR	3900	11500	ng/m3	Garage	NR	NR	Floor	NR	Cracks in garage floor	100
1282	Property 1	Residential	4/30/2016	9:41	NR	NR	NR	NR	NR	NR	2354	ng/m3	Mud Room	NR	NR	Floor	NR	Vent	100
1282	Property 1	Residential	4/30/2016	9:40	NR	NR	NR	NR	NR	NR	1107	ng/m3	Mud Room	NR	NR	Breathing Zone	NR	NR	100
1282	Property 1	Residential	4/30/2016	9:40	NR	NR	NR	NR	NR	NR	1851	ng/m3	Mud Room	NR	NR	Floor	NR	NR	100
1282	Property 1	Residential	4/30/2016	10:33	NR	NR	NR	NR	NR	237	244	ng/m3	Poly bag 361	NA	NA	Headspace	Miscellaneous	Items from son	113
1282	Property 1	Residential	4/30/2016	10:37	NR	NR	NR	NR	NR	231	265	ng/m3	Poly bag 362	NA	NA	Headspace	Toys	Bear	98
1282	Property 1	Residential	4/30/2016	10:38	NR	NR	NR	NR	NR	268	398	ng/m3	Poly bag 363	NA	NA	Headspace	Bedding	Bedding from baby room	118
1210	Property 1	Residential	4/30/2016	10:43	NR	NR	NR	NR	NR	526	568	ng/m3	Poly bag 364	NA	NA	Headspace	Clothes	Fleece jacket	98
1282	Property 1	Residential	4/30/2016	10:49	NR	NR	NR	NR	NR	197	228	ng/m3	Poly bag 365	NA	NA	Headspace	Kitchen	Miscellaneous kitchen supplies	97
1282	Property 1	Residential	4/30/2016	10:52	NR	NR	NR	NR	NR	59	176	ng/m3	Poly bag 366	NA	NA	Headspace	Decorative	Wall hangings	103
1282	Property 1	Residential	4/30/2016	10:53	NR	NR	NR	NR	NR	244	259	ng/m3	Poly bag 367	NA	NA	Headspace	Decorative	Pictures and frames	110
1282	Property 1	Residential	4/30/2016	10:55	NR	NR	NR	NR	NR	709	872	ng/m3	Poly bag 368	NA	NA	Headspace	Blankets	Miscellaneous blankets	108
1282	Property 1	Residential	4/30/2016	10:57	NR	NR	NR	NR	NR	288	330	ng/m3	Poly bag 369	NA	NA	Headspace	Clothes	Clothes from son	125
1282	Property 1	Residential	4/30/2016	10:59	NR	NR	NR	NR	NR	321	367	ng/m3	Poly bag 370	NA	NA	Headspace	Clothes	Clothes from mother	113
1282	Property 1	Residential	4/30/2016	11:23	NR	NR	NR	NR	NR	158	177	ng/m3	Poly bag 371	NA	NA	Headspace	Decorative	Christmas decorations	102
1282	Property 1	Residential	4/30/2016	11:26	NR	NR	NR	NR	NR	518	580	ng/m3	Poly bag 372	NA	NA	Headspace	Toys	From son's room	97
1282	Property 1	Residential	4/30/2016	11:29	NR	NR	NR	NR	NR	188	216	ng/m3	Poly bag 373	NA	NA	Headspace	Miscellaneous	Metal bucket	113
1282	Property 1	Residential	4/30/2016	11:30	NR	NR	NR	NR	NR	221	232	ng/m3	Poly bag 374	NA	NA	Headspace	Storage	Wooden basket	103
1282	Property 1	Residential	4/30/2016	11:32	NR	NR	NR	NR	NR	175	202	ng/m3	Poly bag 375	NA	NA	Headspace	Toys	Legos	106
1282	Property 1	Residential	4/30/2016	11:33	NR	NR	NR	NR	NR	87	106	ng/m3	Poly bag 376	NA	NA	Headspace	Decorative	Picture frames	91
1282	Property 1	Residential	4/30/2016	11:35	NR	NR	NR	NR	NR	59	83	ng/m3	Poly bag 377	NA	NA	Headspace	Furniture	Wooden shelves	105
1282	Property 1	Residential	4/30/2016	11:37	NR	NR	NR	NR	NR	189	196	ng/m3	Poly bag 378	NA	NA	Headspace	Toys	Guitar and other items	98
1282	Property 1	Residential	4/30/2016	11:38	NR	NR	NR	NR	NR	77	88	ng/m3	Poly bag 379	NA	NA	Headspace	Clothes	Miscellaneous clothes	100
1282	Property 1	Residential	4/30/2016	11:39	NR	NR	NR	NR	NR	65	77	ng/m3	Poly bag 380	NA	NA	Headspace	Storage	Blue storage bin with holiday decorations	98
1282	Property 1	Residential	4/30/2016	11:42	NR	NR	NR	NR	NR	54	74	ng/m3	Poly bag 381	NA	NA	Headspace	Decorative	Picture frames	90
1282	Property 1	Residential	4/30/2016	11:43	NR	NR	NR	NR	NR	27	36	ng/m3	Poly bag 382	NA	NA	Headspace	Decorative	Candles	102
1282	Property 1	Residential	4/30/2016	11:44	NR	NR	NR	NR	NR	209	245	ng/m3	Poly bag 383	NA	NA	Headspace	Furniture	Blinds	90
1282	Property 1	Residential	4/30/2016	11:45	NR	NR	NR	NR	NR	336	458	ng/m3	Poly bag 384	NA	NA	Headspace	Storage	Kitchen supplies and tuberware	107
1282	Property 1	Residential	4/30/2016	11:46	NR	NR	NR	NR	NR	71	78	ng/m3	Poly bag 385	NA	NA	Headspace	Storage	Kitchen supplies and tuberware	100
1282	Property 1	Residential	4/30/2016	11:48	NR	NR	NR	NR	NR	96	127	ng/m3	Poly bag 386	NA	NA	Headspace	Decorative	Christmas decorations	92
1282	Property 1	Residential	4/30/2016	11:50	NR	NR	NR	NR	NR	69	76	ng/m3	Poly bag 387	NA	NA	Headspace	Storage	Storage bin with Holiday dishes	97
1282	Property 1	Residential	4/30/2016	11:57	NR	NR	NR	NR	NR	193	220	ng/m3	Poly bag 388	NA	NA	Headspace	Storage	Storage bin and kitchen pot	113
1282	Property 1	Residential	4/30/2016	12:01	NR	NR	NR	NR	NR	259	284	ng/m3	Poly bag 389	NA	NA	Headspace	Decorative	Christmas decorations	109
1282	Property 1	Residential	4/30/2016	12:03	NR	NR	NR	NR	NR	263	288	ng/m3	Poly bag 390	NA	NA	Headspace	Electronics	Movies and DVDs	90
1282	Property 1	Residential	4/30/2016	12:07	NR	NR	NR	NR	NR	65	82	ng/m3	Poly bag 391	NA	NA	Headspace	Food	Food items from kitchen	86
1282	Property 1	Residential	4/30/2016	12:08	NR	NR	NR	NR	NR	NR	11240	ng/m3	Poly bag 392	NA	NA	Headspace	Bags	Vera Bradley bag and others (separating)	102
1282	Property 1	Residential	4/30/2016	12:10	NR	NR	NR	NR	NR	175	184	ng/m3	Poly bag 393	NA	NA	Headspace	Food	Canned items	94
1282	Property 1	Residential	4/30/2016	12:11	NR	NR	NR	NR	NR	132	149	ng/m3	Poly bag 394	NA	NA	Headspace	Food	Kitchen items	112
1282	Property 1	Residential	4/30/2016	12:12	NR	NR	NR	NR	NR	63	78	ng/m3	Poly bag 395	NA	NA	Headspace	Food	Food from pantry	94
1282	Property 1	Residential	4/30/2016	12:14	NR	NR	NR	NR	NR	155	182	ng/m3	Poly bag 396	NA	NA	Headspace	Miscellaneous	Electronics and other items	98
1282	Property 1	Residential	4/30/2016	12:16	NR	NR	NR	NR	NR	862	917	ng/m3	Poly bag 397	NA	NA	Headspace	Miscellaneous	Car seat	102
1282	Property 1	Residential	4/30/2016	12:17	NR	NR	NR	NR	NR	192	210	ng/m3	Poly bag 398	NA	NA	Headspace	Storage	Bin with Christmas decorations	99
1282	Property 1	Residential	4/30/2016	12:20	NR	NR	NR	NR	NR	176	193	ng/m3	Poly bag 399	NA	NA	Headspace	Bedding	Pillows and blankets	106
1282	Property 1	Residential	4/30/2016	12:21	NR	NR	NR	NR	NR	186	205	ng/m3	Poly bag 400	NA	NA	Headspace	Miscellaneous	Random items including medicine and food	130
1210	Property 1	Residential	4/30/2016	14:46	NR	NR	NR	NR	NR	2800	3500	ng/m3	Poly bag 401	NA	NA	Headspace	Bag	Re-test	92
1282	Property 1	Residential	4/30/2016	14:48	NR	NR	NR	NR	NR	NR	>50000	ng/m3	Poly bag 402	NA	NA	Headspace	Bag	Re-test	110
1210	Property 1	Residential	4/30/2016	14:44	NR	NR	NR	NR	NR	4400	5700	ng/m3	Poly bag 403	NA	NA	Headspace	Bag	Re-test	113
1210	Property 1	Residential	4/30/2016	14:42	NR	NR	NR	NR	NR	3000	11500	ng/m3	Poly bag 404	NA	NA	Headspace	Bag	Re-test	92
1210	Property 1	Residential	4/30/2016	14:59	NR	NR	NR	NR	NR	12000	40000	ng/m3	Basement	NR	NR	Headspace	Rug	Oriental rug	100
1282	Property 1	Residential	4/30/2016	15:32	NR	NR	NR	NR	NR	543	576	ng/m3	Poly bag 405	NA	NA	Headspace	Miscellaneous	De-humidifier from basement	NR
1282	Property 1	Residential	4/30/2016	15:25	NR	NR	NR	NR	NR	190	203	ng/m3	Poly bag 406	NA	NA	Headspace	Miscellaneous	Miscellaneous items	90
1282	Property 1	Residential	4/30/2016	15:23	NR	NR	NR	NR	NR	72	95	ng/m3	Poly bag 407	NA	NA	Headspace	Storage	Bin with Christmas decorations	90
1282	Property 1	Residential	4/30/2016	15:28	NR	NR	NR	NR	NR	173	181	ng/m3	Poly bag 408	NA	NA	Headspace	Decorative	Wall hanging	124
1282	Property 1	Residential	4/30/2016	15:35	NR	NR	NR	NR	NR	94	97	ng/m3	Poly bag 409	NA	NA	Headspace	Kitchen	Kitchen Aid	90

NA- Not Applicable
NR- Not Recorded
R - Standard Deviation

Appendix G: Lumex Screening Results Summary Table
Greenleafe Drive Mercury Response Site
Baldwinsville, Onondaga County, New York

Serial Number	Property Number	Land Use	Date	Time	Screening-1	Screening-2	Screening-3	Average Screening Result	R	Minimum	Maximum	Units	Location	Floor	Floor Cover	Height	Item Type	Description	Temperature (°F)
1282	Property 1	Residential	4/30/2016	15:39	NR	NR	NR	NR	NR	92	96	ng/m3	Poly bag 410	NA	NA	Headspace	Kitchen	Pans and trays	91
1282	Property 1	Residential	4/30/2016	17:28	NR	NR	NR	NR	NR	NR	163	ng/m3	Basement-Stairwell	NR	NR	Breathing Zone	NR	NR	100
1282	Property 1	Residential	4/30/2016	17:29	NR	NR	NR	NR	NR	186	191	ng/m3	Basement	NR	NR	Breathing Zone	NR	NR	100
1282	Property 1	Residential	4/30/2016	17:30	NR	NR	NR	NR	NR	NR	201	ng/m3	Basement	NR	NR	Floor	NR	NR	100
1282	Property 1	Residential	4/30/2016	17:54	NR	NR	NR	NR	NR	NR	1809	ng/m3	Flag G 4	NA	NA	Floor	NR	Flag in garden mulch	70
1282	Property 1	Residential	4/30/2016	17:58	NR	NR	NR	NR	NR	NR	2681	ng/m3	Flag G 5	NA	NA	Floor	NR	Flag in garden mulch	NR
1282	Property 1	Residential	4/30/2016	17:59	NR	NR	NR	NR	NR	NR	730	ng/m3	Flag G 6	NA	NA	Floor	NR	Flag in garden mulch	NR
1282	Property 1	Residential	4/30/2016	18:00	NR	NR	NR	NR	NR	NR	27000	ng/m3	Flag D 3	NA	NA	Floor	NR	Edge of driveway and mulch	NR
1282	Property 1	Residential	4/30/2016	18:02	NR	NR	NR	NR	NR	NR	4254	ng/m3	Flag G 5 A	NA	NA	Floor	NR	Flag in garden mulch	NR
1282	Property 3	Residential	5/1/2016	8:17	NR	NR	NR	NR	NR	NR	93	ng/m3	Bathroom-Downstairs	NR	NR	Headspace	NR	Sink drain	63
1282	Property 3	Residential	5/1/2016	8:27	NR	NR	NR	NR	NR	19	26	ng/m3	Kitchen	NR	NR	Breathing Zone	NR	NR	60
1282	Property 3	Residential	5/1/2016	8:23	NR	NR	NR	NR	NR	28	41	ng/m3	Living Room	NR	NR	Floor	NR	Near edge of hardwood; after carpet removed	60
1282	Property 3	Residential	5/1/2016	8:24	NR	NR	NR	NR	NR	24	28	ng/m3	Living Room	NR	NR	Breathing Zone	NR	NR	60
1282	Property 3	Residential	5/1/2016	8:26	NR	NR	NR	NR	NR	24	31	ng/m3	Kitchen	NR	NR	Floor	NR	NR	60
1282	Property 3	Residential	5/1/2016	8:30	NR	NR	NR	NR	NR	23	31	ng/m3	Hallway-Downstairs	NR	NR	Breathing Zone	NR	Near door	63
1282	Property 3	Residential	5/1/2016	8:28	NR	NR	NR	NR	NR	25	31	ng/m3	Hallway-Downstairs	NR	NR	Floor	NR	NR	63
1282	Property 3	Residential	5/1/2016	8:29	NR	NR	NR	NR	NR	27	51	ng/m3	Hallway-Downstairs	NR	NR	Floor	NR	Vent near door	63
1282	Property 3	Residential	5/1/2016	8:32	NR	NR	NR	NR	NR	38	54	ng/m3	Stairwell	NR	NR	Floor	NR	After carpet removed	62
1282	Property 3	Residential	5/1/2016	8:33	NR	NR	NR	NR	NR	31	38	ng/m3	Stairwell	NR	NR	Breathing Zone	NR	NR	62
1282	Property 3	Residential	5/1/2016	8:34	NR	NR	NR	NR	NR	77	90	ng/m3	Hallway-Upstairs	NR	NR	Floor	NR	Near top of stairs; carpet removed	64
1282	Property 3	Residential	5/1/2016	8:35	NR	NR	NR	NR	NR	98	111	ng/m3	Hallway-Upstairs	NR	NR	Breathing Zone	NR	Near top of stairs	64
1282	Property 3	Residential	5/1/2016	8:36	NR	NR	NR	NR	NR	123	129	ng/m3	Bedroom 1	NR	NR	Breathing Zone	NR	Left of bathroom;	64
1282	Property 3	Residential	5/1/2016	8:38	NR	NR	NR	NR	NR	56	75	ng/m3	Bedroom 1	NR	NR	Floor	NR	Left of bathroom	64
1282	Property 3	Residential	5/1/2016	8:39	NR	NR	NR	NR	NR	143	153	ng/m3	Bedroom 2	NR	NR	Breathing Zone	NR	Son's room (origin)	63
1282	Property 3	Residential	5/1/2016	8:40	NR	NR	NR	NR	NR	191	238	ng/m3	Bedroom 2	NR	NR	Floor	NR	Son's room (origin)	63
1282	Property 3	Residential	5/1/2016	8:42	NR	NR	NR	NR	NR	153	192	ng/m3	Bedroom 3	NR	NR	Breathing Zone	NR	Left of son's room	63
1282	Property 3	Residential	5/1/2016	8:42	NR	NR	NR	NR	NR	136	164	ng/m3	Bedroom 3	NR	NR	Floor	NR	Left of son's room	63
1282	Property 3	Residential	5/1/2016	8:44	NR	NR	NR	NR	NR	158	168	ng/m3	Bedroom-Master	NR	NR	Breathing Zone	NR	NR	63
1282	Property 3	Residential	5/1/2016	8:45	NR	NR	NR	NR	NR	162	169	ng/m3	Bedroom-Master	NR	NR	Floor	NR	NR	63
1282	Property 3	Residential	5/1/2016	8:46	NR	NR	NR	NR	NR	175	183	ng/m3	Bathroom-Master	NR	NR	Breathing Zone	NR	NR	63
1282	Property 3	Residential	5/1/2016	8:47	NR	NR	NR	NR	NR	130	165	ng/m3	Bathroom-Master	NR	NR	Headspace	NR	Tub drain	63
1282	Property 3	Residential	5/1/2016	8:48	NR	NR	NR	NR	NR	168	187	ng/m3	Bedroom 4	NR	NR	Breathing Zone	NR	Right of bathroom	64
1282	Property 3	Residential	5/1/2016	8:49	NR	NR	NR	NR	NR	177	214	ng/m3	Bedroom 4	NR	NR	Floor	NR	Right of bathroom	64
1282	Property 3	Residential	5/1/2016	8:52	NR	NR	NR	NR	NR	137	141	ng/m3	Bathroom-Upstairs	NR	NR	Breathing Zone	NR	NR	63
1282	Property 3	Residential	5/1/2016	8:53	NR	NR	NR	NR	NR	105	136	ng/m3	Bathroom-Upstairs	NR	NR	Floor	NR	NR	63
1282	Property 3	Residential	5/1/2016	8:54	NR	NR	NR	NR	NR	304	765	ng/m3	Bathroom-Upstairs	NR	NR	Headspace	NR	Tub drain	63
1282	Property 3	Residential	5/1/2016	8:54	NR	NR	NR	NR	NR	132	162	ng/m3	Bathroom-Upstairs	NR	NR	Headspace	NR	Sink drain	63
1282	Property 3	Residential	5/1/2016	8:55	NR	NR	NR	NR	NR	117	133	ng/m3	Stairwell	NR	NR	Floor	NR	Landing	59
1282	Property 1	Residential	5/1/2016	9:12	NR	NR	NR	NR	NR	97	103	ng/m3	Dining Room	NR	NR	Breathing Zone	NR	NR	77
1282	Property 1	Residential	5/1/2016	9:13	NR	NR	NR	NR	NR	94	99	ng/m3	Living Room	NR	NR	Breathing Zone	NR	NR	82
1282	Property 1	Residential	5/1/2016	9:14	NR	NR	NR	NR	NR	92	97	ng/m3	Kitchen	NR	NR	Breathing Zone	NR	NR	80
1282	Property 1	Residential	5/1/2016	9:16	NR	NR	NR	NR	NR	89	94	ng/m3	Office	NR	NR	Breathing Zone	NR	NR	76
1282	Property 1	Residential	5/1/2016	9:16	NR	NR	NR	NR	NR	97	100	ng/m3	Bathroom-Downstairs	NR	NR	Breathing Zone	NR	NR	86
1282	Property 1	Residential	5/1/2016	9:17	NR	NR	NR	NR	NR	86	91	ng/m3	Basement-Stairwell	NR	NR	Breathing Zone	NR	NR	95
1282	Property 1	Residential	5/1/2016	9:18	NR	NR	NR	NR	NR	93	98	ng/m3	Basement	NR	NR	Breathing Zone	NR	NR	93
1282	Property 1	Residential	5/1/2016	9:19	NR	NR	NR	NR	NR	93	95	ng/m3	Basement	NR	NR	Floor	NR	NR	83
1282	Property 1	Residential	5/1/2016	9:49	NR	NR	NR	NR	NR	302	454	ng/m3	Poly bag 425	NA	NA	Headspace	Furniture	White ottoman	110
1282	Property 1	Residential	5/1/2016	9:53	NR	NR	NR	NR	NR	44	57	ng/m3	Poly bag 426	NA	NA	Headspace	Towels	Miscellaneous towels	95
1282	Property 1	Residential	5/1/2016	9:54	NR	NR	NR	NR	NR	36	65	ng/m3	Poly bag 427	NA	NA	Headspace	Towels	Miscellaneous towels	90
1282	Property 1	Residential	5/1/2016	9:56	NR	NR	NR	NR	NR	39	48	ng/m3	Poly bag 428	NA	NA	Headspace	Shoes	Separated from other bag	90
1282	Property 1	Residential	5/1/2016	9:57	NR	NR	NR	NR	NR	141	179	ng/m3	Poly bag 429	NA	NA	Headspace	Shoes	Separated from other bag	98
1282	Property 1	Residential	5/1/2016	9:59	NR	NR	NR	NR	NR	325	380	ng/m3	Poly bag 430	NA	NA	Headspace	Shoes	Separated from other bag	91
1282	Property 1	Residential	5/1/2016	10:00	NR	NR	NR	NR	NR	226	237	ng/m3	Poly bag 431	NA	NA	Headspace	Storage	Brown wicker basket	90
1282	Property 1	Residential	5/1/2016	10:02	NR	NR	NR	NR	NR	376	467	ng/m3	Poly bag 432	NA	NA	Headspace	Shoes	Separated from other bag	93
1282	Property 1	Residential	5/1/2016	10:04	NR	NR	NR	NR	NR	66	70	ng/m3	Poly bag 433	NA	NA	Headspace	Shoes	Separated from other bag	91
1282	Property 1	Residential	5/1/2016	10:06	NR	NR	NR	NR	NR	2463	3081	ng/m3	Poly bag 434	NA	NA	Headspace	Bags	Syracuse bag and hat	87
1282	Property 1	Residential	5/1/2016	10:07	NR	NR	NR	NR	NR	383	656	ng/m3	Poly bag 435	NA	NA	Headspace	Shoes	Separated from other bag	97
1282	Property 1	Residential	5/1/2016	10:09	NR	NR	NR	NR	NR	72	86	ng/m3	Poly bag 436	NA	NA	Headspace	Bags	Vera Bradley bag	93
1282	Property 1	Residential	5/1/2016	10:11	NR	NR	NR	NR	NR	109	121	ng/m3	Poly bag 437	NA	NA	Headspace	Shoes	Separated from other bag	92
1282	Property 1	Residential	5/1/2016	10:13	NR	NR	NR	NR	NR	689	788	ng/m3	Poly bag 438	NA	NA	Headspace	Shoes	Separated from other bag	102
1282	Property 1	Residential	5/1/2016	10:15	NR	NR	NR	NR	NR	120	157	ng/m3	Poly bag 439	NA	NA	Headspace	Storage	Bin with bathroom products	95
1282	Property 1	Residential	5/1/2016	10:17	NR	NR	NR	NR	NR	28	35	ng/m3	Poly bag 440	NA	NA	Headspace	Miscellaneous	Can of paint	96
1282	Property 1	Residential	5/1/2016	10:20	NR	NR	NR	NR	NR	33	36	ng/m3	Poly bag 441	NA	NA	Headspace	Decorative	Miscellaneous decoration	107
1282	Property 1	Residential	5/1/2016	10:21	NR	NR	NR	NR	NR	163	270	ng/m3	Poly bag 442	NA	NA	Headspace	Storage	Garbage can	94
1282	Property 1	Residential	5/1/2016	10:26	NR	NR	NR	NR	NR	18	25	ng/m3	Poly bag 443	NA	NA	Headspace	Clothes	Miscellaneous clothes	100
1282	Property 1	Residential	5/1/2016	10:30	NR	NR	NR	NR	NR	21	29	ng/m3	Poly bag 444	NA	NA	Headspace	Lighting	Black and white lamp	96
1210	Property 1	Residential	5/1/2016	11:25	NR	NR	NR	NR	NR	16	26	ng/m3	Poly bag 445	NA	NA	Headspace	Decorative	Miscellaneous decoration	109
1210	Property 1	Residential	5/1/2016	11:27	NR	NR	NR	NR	NR	79	85	ng/m3	Poly bag 446	NA	NA	Headspace	Lighting	Beige lamp	107
1210	Property 1	Residential	5/1/2016	11:29	NR	NR	NR	NR	NR	37	48	ng/m3	Poly bag 447	NA	NA	Headspace	Miscellaneous	Tea pot and other kitchen items	105
1210	Property 1	Residential	5/1/2016	11:33	NR	NR	NR	NR	NR	287	335	ng/m3	Poly bag 448	NA	NA	Headspace	Clothes	Miscellaneous clothes	102
1210	Property 1	Residential	5/1/2016	11:34	NR	NR	NR	NR	NR	39	43	ng/m3	Poly bag 449	NA	NA	Headspace	Clothes	Miscellaneous clothes	135
1210	Property 1	Residential	5/1/2016	11:35	NR	NR	NR	NR	NR	73	86	ng/m3	Poly bag 450	NA	NA	Headspace	Clothes	Miscellaneous clothes	94
1210	Property 1	Residential	5/1/2016	11:36	NR	NR	NR	NR	NR	179	288	ng/m3	Poly bag 451	NA	NA	Headspace	Clothes	Miscellaneous clothes	125
1210	Property 1	Residential	5/1/2016	11:38	NR	NR	NR	NR	NR	186	200	ng/m3	Poly bag 452	NA	NA	Headspace	Clothes	Fleece items	109
1210	Property 1	Residential	5/1/2016	11:39	NR	NR	NR	NR	NR	1081	1320	ng/m3	Poly bag 453	NA	NA	Headspace	Clothes	Miscellaneous clothes	95
1210	Property 1	Residential	5/1/2016	11:40	NR	NR	NR	NR	NR	87	92	ng/m3	Poly bag 454	NA	NA	Headspace	Miscellaneous	Green box	96
1210	Property 1	Residential	5/1/2016	11:42	NR	NR	NR	NR	NR	175	180	ng/m3	Poly bag 455	NA	NA	Headspace	Clothes	Miscellaneous clothes	92
1210	Property 1	Residential	5/1/2016	14:03	NR	NR	NR	NR	NR	156	186	ng/m3	Poly bag 456	NA	NA	Headspace	Clothes	Miscellaneous clothes including prom dress	113
1210	Property 1	Residential	5/1/2016	14:05	NR	NR	NR	NR	NR	115	121	ng/m3	Poly bag 457	NA	NA	Headspace	Storage	Brown wicker basket	104
1210	Property 1	Residential	5/1/2016	14:07	NR	NR	NR	NR	NR	294	336	ng/m3	Poly bag 458	NA	NA	Headspace	Clothes	Miscellaneous clothes	103
1210	Property 1	Residential	5/1/2016	14:09	NR	NR	NR	NR	NR	202	236	ng/m3	Poly bag 459	NA	NA	Headspace	Miscellaneous	Miscellaneous items	102
1210	Property 1	Residential	5/1/2016	14:11	NR	NR	NR	NR	NR	161	187	ng/m3	Poly bag 460	NA	NA	Headspace	Clothes	Miscellaneous clothes	104
1210	Property 3	Residential	5/1/2016	13:33	NR	NR	NR	NR	NR	28	34	ng/m3	Living Room	NR	NR	Breathing Zone	NR	NR	84
1210	Property 3	Residential	5/1/2016	13:35	NR	NR	NR	NR	NR	29	34	ng/m3	Kitchen	NR	NR	Breathing Zone	NR	NR	91
1210	Property 3	Residential	5/1/2016	13:34	NR	NR	NR	NR	NR	64	69	ng/m3	Living Room	NR	NR	Floor	NR	NR	84

NA- Not Applicable
NR- Not Recorded
R - Standard Deviation

Appendix G: Lumex Screening Results Summary Table
Greenleafe Drive Mercury Response Site
Baldwinsville, Onondaga County, New York

Serial Number	Property Number	Land Use	Date	Time	Screeining-1	Screeining-2	Screeining-3	Average Screening Result	R	Minimum	Maximum	Units	Location	Floor	Floor Cover	Height	Item Type	Description	Temperature (˚F)
1210	Property 3	Residential	5/1/2016	13:35	NR	NR	NR	NR	NR	87	92	ng/m3	Kitchen	NR	NR	Floor	NR	NR	91
1210	Property 3	Residential	5/1/2016	13:36	NR	NR	NR	NR	NR	45	49	ng/m3	Hallway-Downstairs	NR	NR	Breathing Zone	NR	NR	93
1210	Property 3	Residential	5/1/2016	13:36	NR	NR	NR	NR	NR	58	63	ng/m3	Bathroom-Downstairs	NR	NR	Breathing Zone	NR	NR	83
1210	Property 3	Residential	5/1/2016	13:37	NR	NR	NR	NR	NR	61	64	ng/m3	Stairwell-Landing	NR	NR	Breathing Zone	NR	NR	91
1210	Property 3	Residential	5/1/2016	13:38	NR	NR	NR	NR	NR	56	62	ng/m3	Bedroom 1	NR	NR	Breathing Zone	NR	Left of bathroom	93
1210	Property 3	Residential	5/1/2016	13:38	NR	NR	NR	NR	NR	57	64	ng/m3	Hallway-Upstairs	NR	NR	Breathing Zone	NR	NR	98
1210	Property 3	Residential	5/1/2016	13:39	NR	NR	NR	NR	NR	61	74	ng/m3	Bedroom 2	NR	NR	Breathing Zone	NR	Son' room (origin)	90
1210	Property 3	Residential	5/1/2016	13:42	NR	NR	NR	NR	NR	81	92	ng/m3	Bedroom 3	NR	NR	Breathing Zone	NR	Left of son's room	98
1210	Property 3	Residential	5/1/2016	13:42	NR	NR	NR	NR	NR	123	130	ng/m3	Bedroom 4	NR	NR	Breathing Zone	NR	Right of bathroom	94
1210	Property 3	Residential	5/1/2016	13:43	NR	NR	NR	NR	NR	115	121	ng/m3	Bedroom-Master	NR	NR	Breathing Zone	NR	NR	91
1210	Property 3	Residential	5/1/2016	13:44	NR	NR	NR	NR	NR	114	121	ng/m3	Bathroom-Master	NR	NR	Breathing Zone	NR	NR	87
1210	Property 3	Residential	5/1/2016	13:45	NR	NR	NR	NR	NR	127	143	ng/m3	Bathroom-Upstairs	NR	NR	Breathing Zone	NR	NR	98
1210	Property 3	Residential	5/1/2016	13:46	NR	NR	NR	NR	NR	650	691	ng/m3	Bathroom-Upstairs	NR	NR	Headspace	NR	Tub drain	98
1210	Property 1	Residential	5/1/2016	14:13	NR	NR	NR	NR	NR	53	58	ng/m3	Poly bag 461	NA	NA	Headspace	Electronics	Miscellaneous	102
1210	Property 1	Residential	5/1/2016	14:14	NR	NR	NR	NR	NR	57	62	ng/m3	Poly bag 462	NA	NA	Headspace	Decorative	Miscellaneous decoration	93
1210	Property 1	Residential	5/1/2016	14:16	NR	NR	NR	NR	NR	66	73	ng/m3	Poly bag 463	NA	NA	Headspace	Decorative	Blinds	95
1210	Property 1	Residential	5/1/2016	14:17	NR	NR	NR	NR	NR	100	104	ng/m3	Poly bag 464	NA	NA	Headspace	Storage	Bins with miscellaneous items	93
1210	Property 1	Residential	5/1/2016	14:19	NR	NR	NR	NR	NR	145	171	ng/m3	Poly bag 465	NA	NA	Headspace	Miscellaneous	Miscellaneous items including books	90
1210	Property 1	Residential	5/1/2016	14:21	NR	NR	NR	NR	NR	40	45	ng/m3	Poly bag 466	NA	NA	Headspace	Storage	Blue bin with Christmas decorations	92
1210	Property 1	Residential	5/1/2016	14:25	NR	NR	NR	NR	NR	110	115	ng/m3	Poly bag 467	NA	NA	Headspace	Storage	Bin with multiple containers	102
1282	Property 1	Residential	5/1/2016	14:57	NR	NR	NR	NR	NR	107	116	ng/m3	Poly bag 468	NA	NA	Headspace	Decorative	Picture frames	105
1282	Property 1	Residential	5/1/2016	14:58	NR	NR	NR	NR	NR	19	26	ng/m3	Poly bag 469	NA	NA	Headspace	Decorative	Camp picture	107
1282	Property 1	Residential	5/1/2016	15:00	NR	NR	NR	NR	NR	36	45	ng/m3	Poly bag 470	NA	NA	Headspace	Miscellaneous	Miscellaneous items	102
1282	Property 1	Residential	5/1/2016	15:05	NR	NR	NR	NR	NR	69	78	ng/m3	Poly bag 471	NA	NA	Headspace	Clothes	Fleece items	102
1282	Property 1	Residential	5/1/2016	15:07	NR	NR	NR	NR	NR	26	31	ng/m3	Poly bag 472	NA	NA	Headspace	Furniture	Shelving	91
1282	Property 1	Residential	5/1/2016	15:11	NR	NR	NR	NR	NR	62	69	ng/m3	Poly bag 473	NA	NA	Headspace	Miscellaneous	Paint and brush	89
1282	Property 1	Residential	5/1/2016	15:12	NR	NR	NR	NR	NR	93	97	ng/m3	Poly bag 474	NA	NA	Headspace	Decorative	Large painting	93
1282	Property 1	Residential	5/1/2016	15:13	NR	NR	NR	NR	NR	36	43	ng/m3	Poly bag 475	NA	NA	Headspace	Decorative	Pictures and wall hangings	91
1282	Property 1	Residential	5/1/2016	15:14	NR	NR	NR	NR	NR	127	135	ng/m3	Poly bag 476	NA	NA	Headspace	Furniture	Table and other items	102
1282	Property 1	Residential	5/1/2016	15:18	NR	NR	NR	NR	NR	128	134	ng/m3	Poly bag 477	NA	NA	Headspace	Lighting	Small silver lamp	102
1282	Property 1	Residential	5/1/2016	15:20	NR	NR	NR	NR	NR	136	141	ng/m3	Poly bag 478	NA	NA	Headspace	Towels	Blue and white towel	105
1282	Property 1	Residential	5/1/2016	15:22	NR	NR	NR	NR	NR	62	74	ng/m3	Poly bag 479	NA	NA	Headspace	Miscellaneous	Blanket and decor for walls	93
1282	Property 1	Residential	5/1/2016	15:24	NR	NR	NR	NR	NR	54	60	ng/m3	Poly bag 480	NA	NA	Headspace	Blankets	Baby blanket	91
1282	Property 1	Residential	5/1/2016	15:26	NR	NR	NR	NR	NR	68	90	ng/m3	Poly bag 481	NA	NA	Headspace	Storage	Storage basket with clothes	102
1282	Property 1	Residential	5/1/2016	15:28	NR	NR	NR	NR	NR	128	136	ng/m3	Poly bag 482	NA	NA	Headspace	Decorative	Last Supper wall hanging	100
1282	Property 1	Residential	5/1/2016	15:31	NR	NR	NR	NR	NR	139	145	ng/m3	Poly bag 483	NA	NA	Headspace	Clothes	Baby costumes and dresses	103
1282	Property 1	Residential	5/1/2016	15:33	NR	NR	NR	NR	NR	58	73	ng/m3	Poly bag 484	NA	NA	Headspace	Toys	Coke refrigerator and other toys	110
1282	Property 1	Residential	5/1/2016	15:34	NR	NR	NR	NR	NR	26	30	ng/m3	Poly bag 485	NA	NA	Headspace	Decorative	Giant star	120
1282	Property 1	Residential	5/1/2016	15:36	NR	NR	NR	NR	NR	26	40	ng/m3	Poly bag 486	NA	NA	Headspace	Miscellaneous	Books and record albums	91
1282	Property 1	Residential	5/1/2016	16:09	NR	NR	NR	NR	NR	88	107	ng/m3	Poly bag 487	NA	NA	Headspace	Storage	Brown wicker basket with items	100
1282	Property 1	Residential	5/1/2016	16:12	NR	NR	NR	NR	NR	32	37	ng/m3	Poly bag 488	NA	NA	Headspace	Decorative	Gold decorations	97
1282	Property 1	Residential	5/1/2016	16:14	NR	NR	NR	NR	NR	65	73	ng/m3	Poly bag 489	NA	NA	Headspace	Decorative	Lemon decoration and wall hanging	110
1282	Property 1	Residential	5/1/2016	16:18	NR	NR	NR	NR	NR	26	38	ng/m3	Poly bag 490	NA	NA	Headspace	Furniture	Coffee table	91
1282	Property 1	Residential	5/1/2016	16:23	NR	NR	NR	NR	NR	38	44	ng/m3	Poly bag 491	NA	NA	Headspace	Furniture	Rocking chair	111
1282	Property 1	Residential	5/1/2016	16:26	NR	NR	NR	NR	NR	169	185	ng/m3	Poly bag 492	NA	NA	Headspace	Furniture	Ottoman	103
1282	Property 1	Residential	5/1/2016	16:30	NR	NR	NR	NR	NR	24	30	ng/m3	Poly bag 493	NA	NA	Headspace	Toys	Dollhouse	93
1282	Property 1	Residential	5/1/2016	16:35	NR	NR	NR	NR	NR	84	90	ng/m3	Poly bag 494	NA	NA	Headspace	Furniture	Box Spring	104
1282	Property 1	Residential	5/1/2016	16:43	NR	NR	NR	NR	NR	3675	4460	ng/m3	Poly bag 495	NA	NA	Headspace	Rug	From basement	120
1282	Property 1	Residential	5/1/2016	16:40	NR	NR	NR	NR	NR	12690	14890	ng/m3	Poly bag 496	NA	NA	Headspace	Rug	Unknown room	107
1282	Property 1	Residential	5/2/2016	8:43	NR	NR	NR	NR	NR	29	37	ng/m3	Basement	NR	NR	Breathing Zone	NR	NR	80
1282	Property 1	Residential	5/2/2016	8:44	NR	NR	NR	NR	NR	36	43	ng/m3	Basement	NR	NR	Floor	NR	NR	80
1282	Property 1	Residential	5/2/2016	8:46	NR	NR	NR	NR	NR	27	34	ng/m3	Basement	NR	NR	Floor	NR	Baseboard along far left wall	80
1282	Property 1	Residential	5/2/2016	10:39	NR	NR	NR	NR	NR	26	35	ng/m3	Poly bag 497	NA	NA	Headspace	Storage	Bin with holiday decorations from garage	91
1282	Property 1	Residential	5/2/2016	10:47	NR	NR	NR	NR	NR	57	64	ng/m3	Poly bag 498	NA	NA	Headspace	Storage	Bin with holiday decorations from garage	100
1282	Property 1	Residential	5/2/2016	10:49	NR	NR	NR	NR	NR	137	145	ng/m3	Poly bag 499	NA	NA	Headspace	Athletics	Golf clubs from garage	92
1282	Property 1	Residential	5/2/2016	10:52	NR	NR	NR	NR	NR	188	197	ng/m3	Poly bag 500	NA	NA	Headspace	Miscellaneous	Cooler from garage	91
1282	Property 1	Residential	5/2/2016	10:56	NR	NR	NR	NR	NR	681	712	ng/m3	Poly bag 501	NA	NA	Headspace	Miscellaneous	Items from garage in crates	93
1282	Property 1	Residential	5/2/2016	11:02	NR	NR	NR	NR	NR	211	227	ng/m3	Poly bag 502	NA	NA	Headspace	Miscellaneous	Items from garage in a cardboard box	94
1282	Property 1	Residential	5/2/2016	11:04	NR	NR	NR	NR	NR	55	68	ng/m3	Poly bag 503	NA	NA	Headspace	Storage	Bin with miscellaneous items from garage	94
1282	Property 1	Residential	5/2/2016	11:07	NR	NR	NR	NR	NR	52	57	ng/m3	Poly bag 504	NA	NA	Headspace	Building Materials	Ceiling square from basement	98
1282	Property 1	Residential	5/2/2016	11:10	NR	NR	NR	NR	NR	79	84	ng/m3	Poly bag 505	NA	NA	Headspace	Storage	Bin with sheets from garage	105
1282	Property 1	Residential	5/2/2016	11:13	NR	NR	NR	NR	NR	197	211	ng/m3	Poly bag 506	NA	NA	Headspace	Miscellaneous	Items from garage including baseball bag	111
1282	Property 1	Residential	5/2/2016	11:15	NR	NR	NR	NR	NR	373	401	ng/m3	Poly bag 507	NA	NA	Headspace	Miscellaneous	Boogie boards from garage	95
1282	Property 1	Residential	5/2/2016	11:24	NR	NR	NR	NR	NR	256	284	ng/m3	Poly bag 508	NA	NA	Headspace	Miscellaneous	Beach umbrellas from garage	92
1282	Property 1	Residential	5/2/2016	11:29	NR	NR	NR	NR	NR	981	995	ng/m3	Poly bag 509	NA	NA	Headspace	Decorative	Christmas lights from garage	94
1282	Property 1	Residential	5/2/2016	11:34	NR	NR	NR	NR	NR	28650	36790	ng/m3	Poly bag 510	NA	NA	Headspace	Building Materials	Stairs from garage (removed)	101
1282	Property 1	Residential	5/2/2016	11:38	NR	NR	NR	NR	NR	88	114	ng/m3	Poly bag 511	NA	NA	Headspace	Miscellaneous	Cardboard boxes from garage and plastic tubs	124
1282	Property 1	Residential	5/2/2016	11:42	NR	NR	NR	NR	NR	153	161	ng/m3	Poly bag 512	NA	NA	Headspace	Athletics	Black bike from garage	92
1282	Property 1	Residential	5/2/2016	11:46	NR	NR	NR	NR	NR	291	297	ng/m3	Poly bag 513	NA	NA	Headspace	Athletics	Pink bike from garage	96
1282	Property 1	Residential	5/2/2016	11:51	NR	NR	NR	NR	NR	137	144	ng/m3	Poly bag 514	NA	NA	Headspace	Miscellaneous	Steamer from garage	91
1282	Property 1	Residential	5/2/2016	13:23	NR	NR	NR	NR	NR	63	67	ng/m3	Dining Room	NR	NR	Breathing Zone	NR	NR	92
1282	Property 1	Residential	5/2/2016	13:25	NR	NR	NR	NR	NR	62	65	ng/m3	Living Room	NR	NR	Breathing Zone	NR	NR	97
1282	Property 1	Residential	5/2/2016	13:26	NR	NR	NR	NR	NR	64	69	ng/m3	Kitchen	NR	NR	Breathing Zone	NR	NR	97
1282	Property 1	Residential	5/2/2016	13:27	NR	NR	NR	NR	NR	72	75	ng/m3	Office	NR	NR	Breathing Zone	NR	NR	95
1282	Property 1	Residential	5/2/2016	13:28	NR	NR	NR	NR	NR	72	76	ng/m3	Hallway-Downstairs	NR	NR	Breathing Zone	NR	Bottom of staircase	95
1282	Property 1	Residential	5/2/2016	13:29	NR	NR	NR	NR	NR	68	75	ng/m3	Bathroom-Downstairs	NR	NR	Breathing Zone	NR	NR	93
1282	Property 1	Residential	5/2/2016	13:30	NR	NR	NR	NR	NR	76	81	ng/m3	Staircase	NR	NR	Breathing Zone	NR	NR	95
1282	Property 1	Residential	5/2/2016	13:31	NR	NR	NR	NR	NR	79	86	ng/m3	Hallway-Upstairs	NR	NR	Breathing Zone	NR	NR	99
1282	Property 1	Residential	5/2/2016	13:39	NR	NR	NR	NR	NR	93	102	ng/m3	Bedroom-Son	NR	NR	Breathing Zone	NR	NR	97
1282	Property 1	Residential	5/2/2016	13:39	NR	NR	NR	NR	NR	89	95	ng/m3	Bedroom-Baby	NR	NR	Breathing Zone	NR	NR	98
1282	Property 1	Residential	5/2/2016	13:40	NR	NR	NR	NR	NR	113	121	ng/m3	Bathroom-Upstairs	NR	NR	Breathing Zone	NR	NR	95
1282	Property 1	Residential	5/2/2016	13:49	NR	NR	NR	NR	NR	87	91	ng/m3	Bedroom-Daughter	NR	NR	Breathing Zone	NR	NR	88
1282	Property 1	Residential	5/2/2016	13:40	NR	NR	NR	NR	NR	96	103	ng/m3	Bedroom-Master	NR	NR	Breathing Zone	NR	NR	90
1282	Property 1	Residential	5/2/2016	13:51	NR	NR	NR	NR	NR	106	113	ng/m3	Bathroom-Master	NR	NR	Breathing Zone	NR	NR	84
1282	Property 1	Residential	5/2/2016	13:55	NR	NR	NR	NR	NR	145	193	ng/m3	Bedroom-Son	NR	NR	Headspace	Furniture	Dresser	89

NA- Not Applicable
NR- Not Recorded
R - Standard Deviation

Appendix G: Lumex Screening Results Summary Table
Greenleafe Drive Mercury Response Site
Baldwinsville, Onondaga County, New York

Serial Number	Property Number	Land Use	Date	Time	Screening-1	Screening-2	Screening-3	Average Screening Result	R	Minimum	Maximum	Units	Location	Floor	Floor Cover	Height	Item Type	Description	Temperature (°F)
1282	Property 1	Residential	5/3/2016	8:59	NR	NR	NR	NR	NR	555	715	ng/m3	Garage	NR	NR	Headspace	Building Materials	Shelf 1	97
1282	Property 1	Residential	5/3/2016	8:54	NR	NR	NR	NR	NR	3534	3757	ng/m3	Poly bag 515	NA	NA	Headspace	Storage	Crates from garage	106
1282	Property 1	Residential	5/3/2016	8:57	NR	NR	NR	NR	NR	431	668	ng/m3	Poly bag 516	NA	NR	Headspace	Storage	Crate and piece of wood from garage	93
1282	Property 1	Residential	5/3/2016	9:02	NR	NR	NR	NR	NR	107	180	ng/m3	Garage	NR	NR	Headspace	Building Materials	Shelf 2	91
1282	Property 1	Residential	5/3/2016	9:05	NR	NR	NR	NR	NR	63	84	ng/m3	Garage	NR	NR	Headspace	Building Materials	Shelf 3	102
1282	Property 1	Residential	5/3/2016	9:08	NR	NR	NR	NR	NR	398	413	ng/m3	Garage	NR	NR	Headspace	Building Materials	Shelf 4	93
1282	Property 1	Residential	5/3/2016	9:11	NR	NR	NR	NR	NR	349	355	ng/m3	Garage	NR	NR	Headspace	Building Materials	Shelf 5	99
1282	Property 1	Residential	5/3/2016	9:14	NR	NR	NR	NR	NR	1121	1650	ng/m3	Garage	NR	NR	Headspace	Building Materials	Shelf 6	92
1282	Property 1	Residential	5/3/2016	9:56	NR	NR	NR	NR	NR	715	918	ng/m3	Garage	NR	NR	Headspace	Appliances	Dryer	64
1282	Property 1	Residential	5/3/2016	10:03	NR	NR	NR	NR	NR	1000	1074	ng/m3	Garage	NR	NR	Headspace	Miscellaneous	Tool box shelf	61
1282	Property 1	Residential	5/3/2016	13:41	NR	NR	NR	NR	NR	51	67	ng/m3	Box 20	NA	NA	Headspace	Blankets	Miscellaneous blankets	105
1282	Property 1	Residential	5/3/2016	14:44	NR	NR	NR	NR	NR	28	38	ng/m3	Box 21	NA	NA	Headspace	Clothes	Dress clothes	96
1282	Property 1	Residential	5/3/2016	13:38	NR	NR	NR	NR	NR	51	57	ng/m3	Box 22	NA	NA	Headspace	Clothes	Miscellaneous clothes	102
1282	Property 1	Residential	5/3/2016	13:47	NR	NR	NR	NR	NR	78	93	ng/m3	Box 23	NA	NA	Headspace	Clothes	Women's clothes	97
1282	Property 1	Residential	5/3/2016	13:52	NR	NR	NR	NR	NR	67	75	ng/m3	Box 24	NA	NA	Headspace	Clothes	Miscellaneous clothes	107
1282	Property 1	Residential	5/3/2016	13:55	NR	NR	NR	NR	NR	58	63	ng/m3	Box 25	NA	NA	Headspace	Clothes	Miscellaneous clothes	101
1282	Property 1	Residential	5/3/2016	13:58	NR	NR	NR	NR	NR	87	93	ng/m3	Box 26	NA	NA	Headspace	Clothes	Miscellaneous clothes	101
1282	Property 1	Residential	5/3/2016	13:49	NR	NR	NR	NR	NR	187	217	ng/m3	Poly bag 517	NA	NA	Headspace	Clothes	Pink baby outfit	114
1282	Property 1	Residential	5/3/2016	13:51	NR	NR	NR	NR	NR	253	288	ng/m3	Poly bag 518	NA	NA	Headspace	Purses	Vera Bradley small purse	93
1282	Property 1	Residential	5/3/2016	15:57	NR	NR	NR	NR	NR	33	45	ng/m3	Box 27	NA	NA	Headspace	Clothes	Miscellaneous clothes	110
1282	Property 1	Residential	5/3/2016	16:02	NR	NR	NR	NR	NR	23	36	ng/m3	Box 28	NA	NA	Headspace	Shoes	Miscellaneous shoes	93
1282	Property 1	Residential	5/3/2016	16:04	NR	NR	NR	NR	NR	48	55	ng/m3	Box 29	NA	NA	Headspace	Decorative	Miscellaneous decorative items for the home	97
1282	Property 1	Residential	5/3/2016	16:28	NR	NR	NR	NR	NR	21	27	ng/m3	Box 30	NA	NA	Headspace	Miscellaneous	Flag in case	101
1282	Property 1	Residential	5/3/2016	16:33	NR	NR	NR	NR	NR	23	29	ng/m3	Box 31	NA	NA	Headspace	Miscellaneous	Miscellaneous items from home	94
1282	Property 1	Residential	5/3/2016	16:35	NR	NR	NR	NR	NR	18	31	ng/m3	Box 32	NA	NA	Headspace	Toys	Stuffed animals	96
1282	Property 1	Residential	5/3/2016	16:08	NR	NR	NR	NR	NR	NR	805	ng/m3	Bathroom-Downstairs	NR	NR	Headspace	NR	Sink drain	71
1282	Property 1	Residential	5/3/2016	16:10	NR	NR	NR	NR	NR	NR	321	ng/m3	Bathroom-Upstairs	NR	NR	Headspace	NR	Sink drain	73
1282	Property 1	Residential	5/3/2016	16:12	NR	NR	NR	NR	NR	16	23	ng/m3	Bathroom-Master	NR	NR	Headspace	NR	Sink drain (close)	66
1282	Property 1	Residential	5/3/2016	16:13	NR	NR	NR	NR	NR	16	23	ng/m3	Bathroom-Master	NR	NR	Headspace	NR	Sink drain (far)	66
1282	Property 1	Residential	5/3/2016	16:14	NR	NR	NR	NR	NR	187	204	ng/m3	Bathroom-Master	NR	NR	Headspace	NR	Tub drain	63
1282	Property 1	Residential	5/3/2016	16:17	NR	NR	NR	NR	NR	49	57	ng/m3	Bathroom-Master	NR	NR	Headspace	NR	Shower drain	70
1282	Property 1	Residential	5/3/2016	16:20	NR	NR	NR	NR	NR	47	54	ng/m3	Kitchen	NR	NR	Headspace	NR	Sink drain	71
1282	Property 1	Residential	5/3/2016	18:15	NR	NR	NR	NR	NR	NR	295	ng/m3	Mud Room	NR	NR	Headspace	NR	Dryer (after cycles)	109
1282	Property 1	Residential	5/4/2016	8:53	NR	NR	NR	NR	NR	47	52	ng/m3	Poly bag 253	NA	NA	Headspace	Decorative	Re-test, picture frame	98
1282	Property 1	Residential	5/4/2016	8:55	NR	NR	NR	NR	NR	38	45	ng/m3	Poly bag 141	NA	NA	Headspace	Storage	Re-test, miscellaneous items in bins	115
1282	Property 1	Residential	5/4/2016	8:57	NR	NR	NR	NR	NR	44	48	ng/m3	Poly bag 272	NA	NA	Headspace	Decorative	Re-test, wicker basket	94
1282	Property 1	Residential	5/4/2016	9:01	NR	NR	NR	NR	NR	29	33	ng/m3	Poly bag 258	NA	NA	Headspace	Shoes	Re-test, wooden snow shoes	95
1282	Property 1	Residential	5/4/2016	10:09	NR	NR	NR	NR	NR	66	73	ng/m3	Box 33	NA	NA	Headspace	Clothes	Women's clothes	116
1282	Property 1	Residential	5/4/2016	10:03	NR	NR	NR	NR	NR	255	277	ng/m3	Mud Room	NR	NR	Headspace	Appliances	Dryer	120
1282	Property 1	Residential	5/4/2016	10:13	NR	NR	NR	NR	NR	76	88	ng/m3	Box 34	NA	NA	Headspace	Clothes	Winter clothes	96
1282	Property 1	Residential	5/4/2016	10:21	NR	NR	NR	NR	NR	82	97	ng/m3	Box 35	NA	NA	Headspace	Clothes	Miscellaneous clothes and other items	113
1282	Property 1	Residential	5/4/2016	10:24	NR	NR	NR	NR	NR	48	55	ng/m3	Box 36	NA	NA	Headspace	Decorative	Pictures and frames	100
1282	Property 1	Residential	5/4/2016	10:29	NR	NR	NR	NR	NR	74	90	ng/m3	Box 37	NA	NA	Headspace	Shoes	Miscellaneous shoes	121
1282	Property 1	Residential	5/4/2016	10:36	NR	NR	NR	NR	NR	36	47	ng/m3	Box 38	NA	NA	Headspace	Decorative	Wall hangings and pictures	103
1282	Property 1	Residential	5/4/2016	10:38	NR	NR	NR	NR	NR	230	1900	ng/m3	Box 39	NA	NA	Headspace	Purses	Handbags	112
1282	Property 1	Residential	5/4/2016	11:31	NR	NR	NR	NR	NR	75	81	ng/m3	Box 40	NA	NA	Headspace	Electronics	Son's toys and games	107
1282	Property 1	Residential	5/4/2016	10:06	NR	NR	NR	NR	NR	33	41	ng/m3	Mud Room	NR	NR	Headspace	Flooring	Vent	80
1282	Property 1	Residential	5/4/2016	11:22	NR	NR	NR	NR	NR	220	223	ng/m3	Garage (Poly bag)	NA	NA	Headspace	Paint	Kilz paint (test) VOC: 389 ppm; CO: 18-20	95
1282	Property 1	Residential	5/4/2016	11:36	NR	NR	NR	NR	NR	29	34	ng/m3	Box 41	NA	NA	Headspace	Glassware	Kitchen glasses	102
1282	Property 1	Residential	5/4/2016	11:39	NR	NR	NR	NR	NR	89	104	ng/m3	Box 42	NA	NA	Headspace	Toys	Pink tent from basement	106
1282	Property 1	Residential	5/4/2016	11:44	NR	NR	NR	NR	NR	31	46	ng/m3	Box 43	NA	NA	Headspace	Linens	Table cloth	96
1282	Property 1	Residential	5/4/2016	11:48	NR	NR	NR	NR	NR	63	68	ng/m3	Box 44	NA	NA	Headspace	Glassware	Kitchen items	107
1282	Property 1	Residential	5/4/2016	11:56	NR	NR	NR	NR	NR	73	78	ng/m3	Box 45	NA	NA	Headspace	Miscellaneous	Kitchen items	99
1282	Property 1	Residential	5/4/2016	13:31	NR	NR	NR	NR	NR	40	47	ng/m3	Box 46	NA	NA	Headspace	Miscellaneous	Canned goods and first aid kit	113
1282	Property 1	Residential	5/4/2016	13:39	NR	NR	NR	NR	NR	67	72	ng/m3	Box 47	NA	NA	Headspace	Decorative	Candles	115
1282	Property 1	Residential	5/4/2016	13:41	NR	NR	NR	NR	NR	64	70	ng/m3	Box 48	NA	NA	Headspace	Miscellaneous	Notebooks and Star Wars	113
1282	Property 1	Residential	5/4/2016	13:46	NR	NR	NR	NR	NR	36	47	ng/m3	Box 49	NA	NA	Headspace	Miscellaneous	Pictures and books from office	114
1282	Property 1	Residential	5/4/2016	13:55	NR	NR	NR	NR	NR	29	35	ng/m3	Box 50	NA	NA	Headspace	Miscellaneous	Kitchen pot and fondue set	125
1282	Property 1	Residential	5/4/2016	13:49	NR	NR	NR	NR	NR	43	49	ng/m3	Box 15	NA	NA	Headspace	Miscellaneous	Re-test, kitchen and bakeware	98
1282	Property 1	Residential	5/4/2016	13:51	NR	NR	NR	NR	NR	55	62	ng/m3	Box 13	NA	NA	Headspace	Glassware	Re-test, kitchen glassware	103
1282	Property 1	Residential	5/4/2016	14:03	NR	NR	NR	NR	NR	54	58	ng/m3	Box 51	NA	NA	Headspace	Decorative	Christmas Decorations	111
1282	Property 1	Residential	5/4/2016	14:05	NR	NR	NR	NR	NR	35	45	ng/m3	Box 52	NA	NA	Headspace	Decorative	Pictures and wall hangings; pillow	110
1282	Property 1	Residential	5/4/2016	14:10	NR	NR	NR	NR	NR	33	39	ng/m3	Box 53	NA	NA	Headspace	Miscellaneous	Items from older daughter's room	97
1282	Property 1	Residential	5/4/2016	14:34	NR	NR	NR	NR	NR	27	31	ng/m3	Box 54	NA	NA	Headspace	Decorative	Pictures	120
1282	Property 1	Residential	5/4/2016	14:39	NR	NR	NR	NR	NR	37	45	ng/m3	Box 55	NA	NA	Headspace	Decorative	Pictures and frames	112
1282	Property 1	Residential	5/4/2016	14:43	NR	NR	NR	NR	NR	36	42	ng/m3	Box 56	NA	NA	Headspace	Glassware	Wine glasses	106
1282	Property 1	Residential	5/4/2016	14:44	NR	NR	NR	NR	NR	33	38	ng/m3	Box 57	NA	NA	Headspace	Purses	Daughter's bags	111
1282	Property 1	Residential	5/4/2016	14:00	NR	NR	NR	NR	NR	44	48	ng/m3	Poly bag 164	NA	NA	Headspace	Miscellaneous	Lamp and wooden stool	102
1282	Property 1	Residential	5/4/2016	14:49	NR	NR	NR	NR	NR	26	31	ng/m3	Box 58	NA	NA	Headspace	Books	Children's books	108
1282	Property 1	Residential	5/4/2016	15:17	NR	NR	NR	NR	NR	112	174	ng/m3	Box 59	NA	NA	Headspace	Clothes	Miscellaneous clothes and other items	120
1282	Property 1	Residential	5/4/2016	15:21	NR	NR	NR	NR	NR	66	91	ng/m3	Box 60	NA	NA	Headspace	Shoes	Miscellaneous shoes	104
1282	Property 1	Residential	5/4/2016	15:27	NR	NR	NR	NR	NR	51	56	ng/m3	Box 61	NA	NA	Headspace	Decorative	Pictures	107
1282	Property 1	Residential	5/4/2016	15:13	NR	NR	NR	NR	NR	75	93	ng/m3	Poly bag 145	NA	NA	Headspace	Toys	Re-test; baby toys	103
1282	Property 1	Residential	5/4/2016	15:30	NR	NR	NR	NR	NR	75	79	ng/m3	Box 62	NA	NA	Headspace	Purses	Vera Bradley	99
1282	Property 1	Residential	5/4/2016	15:33	NR	NR	NR	NR	NR	57	63	ng/m3	Box 63	NA	NA	Headspace	Toys	Miscellaneous toys	113
1282	Property 1	Residential	5/4/2016	15:35	NR	NR	NR	NR	NR	54	80	ng/m3	Box 64	NA	NA	Headspace	Clothes	Women's clothes	120
1282	Property 1	Residential	5/4/2016	15:39	NR	NR	NR	NR	NR	91	113	ng/m3	Box 65	NA	NA	Headspace	Clothes	Miscellaneous clothes and towels	110
1282	Property 1	Residential	5/4/2016	15:43	NR	NR	NR	NR	NR	204	223	ng/m3	Box 66	NA	NA	Headspace	Clothes	Baby costumes and other clothes	125
1282	Property 1	Residential	5/4/2016	16:00	NR	NR	NR	NR	NR	73	112	ng/m3	Box 67	NA	NA	Headspace	Clothes	Important clothes	118
1282	Property 1	Residential	5/4/2016	16:03	NR	NR	NR	NR	NR	26	33	ng/m3	Box 68	NA	NA	Headspace	Decorative	Holiday decorations	120
1282	Property 1	Residential	5/4/2016	16:05	NR	NR	NR	NR	NR	26	39	ng/m3	Box 69	NA	NA	Headspace	Blankets	Blankets and pillow	110
1282	Property 1	Residential	5/4/2016	16:07	NR	NR	NR	NR	NR	31	36	ng/m3	Box 70	NA	NA	Headspace	Miscellaneous	Cleaning supplies	115
1282	Property 1	Residential	5/4/2016	16:11	NR	NR	NR	NR	NR	38	43	ng/m3	Box 71	NA	NA	Headspace	Decorative	Candles	98
1282	Property 1	Residential	5/4/2016	16:12	NR	NR	NR	NR	NR	38	42	ng/m3	Box 14	NA	NA	Headspace	Glassware	Re-test, fragile kitchen items	101
1282	Property 1	Residential	5/4/2016	16:49	NR	NR	NR	NR	NR	56	62	ng/m3	Poly bag 520	NA	NA	Headspace	Decorative	Daughter's decorations	100

NA- Not Applicable
NR- Not Recorded
R - Standard Deviation

Appendix G: Lumex Screening Results Summary Table
Greenleafe Drive Mercury Response Site
Baldwinsville, Onondaga County, New York

Serial Number	Property Number	Land Use	Date	Time	Screeining-1	Screeining-2	Screeining-3	Average Screening Result	R	Minimum	Maximum	Units	Location	Floor	Floor Cover	Height	Item Type	Description	Temperature (°F)
1282	Property 1	Residential	5/4/2016	16:54	NR	NR	NR	NR	NR	37	45	ng/m3	Poly bag 51	NA	NA	Headspace	Bedding	Re-test, pillows	100
1282	Property 1	Residential	5/4/2016	16:57	NR	NR	NR	NR	NR	39	44	ng/m3	Poly bag 275	NA	NA	Headspace	Toys	Re-test, lacrosse stick and red chair	104
1282	Property 1	Residential	5/4/2016	17:02	NR	NR	NR	NR	NR	55	62	ng/m3	Poly bag 172	NA	NA	Headspace	Decorative	Re-test, wall hangings	115
1282	Property 1	Residential	5/4/2016	17:13	NR	NR	NR	NR	NR	65	71	ng/m3	Poly bag 286	NA	NA	Headspace	Decorative	Re-test, mirror	105
1282	Property 1	Residential	5/4/2016	17:09	NR	NR	NR	NR	NR	37	41	ng/m3	Poly bag 173	NA	NA	Headspace	Toys	Re-test, wicker basket with baby toys	127
1282	Property 1	Residential	5/4/2016	17:24	NR	NR	NR	NR	NR	24	29	ng/m3	Poly bag 519	NA	NA	Headspace	Furniture	Re-test, white chair from dining room	101
1282	Property 1	Residential	5/4/2016	17:21	NR	NR	NR	NR	NR	83	88	ng/m3	Poly bag 139	NA	NA	Headspace	Toys	Re-test, Legos	101
1282	Property 1	Residential	5/5/2016	8:27	NR	NR	NR	NR	NR	67	71	ng/m3	Dining Room	NR	NR	Breathing Zone	NR	NR	91
1282	Property 1	Residential	5/5/2016	8:28	NR	NR	NR	NR	NR	67	72	ng/m3	Kitchen	NR	NR	Breathing Zone	NR	NR	92
1282	Property 1	Residential	5/5/2016	8:26	NR	NR	NR	NR	NR	70	76	ng/m3	Living Room	NR	NR	Breathing Zone	NR	NR	94
1282	Property 1	Residential	5/5/2016	8:37	NR	NR	NR	NR	NR	35	68	ng/m3	Office	NR	NR	Breathing Zone	NR	NR	89
1282	Property 1	Residential	5/5/2016	8:39	NR	NR	NR	NR	NR	77	83	ng/m3	Bathroom-Downstairs	NR	NR	Breathing Zone	NR	NR	95
1282	Property 1	Residential	5/5/2016	8:25	NR	NR	NR	NR	NR	48	70	ng/m3	Dining Room	NR	NR	Floor	NR	Bottom of door attached to patio	91
1282	Property 1	Residential	5/5/2016	8:31	NR	NR	NR	NR	NR	81	94	ng/m3	Kitchen	NR	NR	Floor	NR	Under dishwasher	89
1282	Property 1	Residential	5/5/2016	8:41	NR	NR	NR	NR	NR	98	107	ng/m3	Stairwell	NR	NR	Breathing Zone	NR	NR	90
1282	Property 1	Residential	5/5/2016	8:43	NR	NR	NR	NR	NR	85	91	ng/m3	Hallway-Upstairs	NR	NR	Breathing Zone	NR	NR	93
1282	Property 1	Residential	5/5/2016	8:40	NR	NR	NR	NR	NR	85	93	ng/m3	Hallway-Downstairs	NR	NR	Floor	NR	Bottom of doorway entrance	87
1282	Property 1	Residential	5/5/2016	8:43	NR	NR	NR	NR	NR	88	93	ng/m3	Bedroom-Son	NR	NR	Breathing Zone	NR	NR	90
1282	Property 1	Residential	5/5/2016	8:46	NR	NR	NR	NR	NR	88	95	ng/m3	Bedroom-Baby	NR	NR	Breathing Zone	NR	NR	91
1282	Property 1	Residential	5/5/2016	8:53	NR	NR	NR	NR	NR	109	113	ng/m3	Bathroom-Upstairs	NR	NR	Breathing Zone	NR	NR	91
1282	Property 1	Residential	5/5/2016	8:48	NR	NR	NR	NR	NR	110	116	ng/m3	Bedroom-Daughter	NR	NR	Breathing Zone	NR	NR	91
1282	Property 1	Residential	5/5/2016	8:49	NR	NR	NR	NR	NR	87	93	ng/m3	Bedroom-Master	NR	NR	Breathing Zone	NR	NR	91
1282	Property 1	Residential	5/5/2016	8:51	NR	NR	NR	NR	NR	93	97	ng/m3	Bathroom-Master	NR	NR	Breathing Zone	NR	NR	90
1282	Property 1	Residential	5/5/2016	8:55	NR	NR	NR	NR	NR	77	83	ng/m3	Stairwell-Basement	NR	NR	Breathing Zone	NR	NR	83
1282	Property 1	Residential	5/5/2016	8:56	NR	NR	NR	NR	NR	111	119	ng/m3	Basement	NR	NR	Breathing Zone	NR	NR	77
1282	Property 1	Residential	5/5/2016	9:39	NR	NR	NR	NR	NR	29	36	ng/m3	Box 72	NA	NA	Headspace	Glassware	Christmas plates	98
1282	Property 1	Residential	5/5/2016	9:43	NR	NR	NR	NR	NR	38	47	ng/m3	Box 73	NA	NA	Headspace	Sheets	Sheets and drapes	94
1282	Property 1	Residential	5/5/2016	9:46	NR	NR	NR	NR	NR	62	68	ng/m3	Box 74	NA	NA	Headspace	Storage	Wicker basket	101
1282	Property 1	Residential	5/5/2016	9:49	NR	NR	NR	NR	NR	37	47	ng/m3	Box 75	NA	NA	Headspace	Miscellaneous	American flag and guitar	98
1282	Property 1	Residential	5/5/2016	9:52	NR	NR	NR	NR	NR	47	51	ng/m3	Box 76	NA	NA	Headspace	Decorative	Fall decorations	106
1282	Property 1	Residential	5/5/2016	9:54	NR	NR	NR	NR	NR	60	66	ng/m3	Box 77	NA	NA	Headspace	Pillows	Decorative pillows	107
1282	Property 1	Residential	5/5/2016	10:01	NR	NR	NR	NR	NR	63	71	ng/m3	Box 78	NA	NA	Headspace	Clothes	Louis purse and clothes	112
1282	Property 1	Residential	5/5/2016	10:34	NR	NR	NR	NR	NR	69	78	ng/m3	Box 79	NA	NA	Headspace	Decorative	Halloween decorations	102
1282	Property 1	Residential	5/5/2016	10:39	NR	NR	NR	NR	NR	83	91	ng/m3	Box 80	NA	NA	Headspace	Decorative	Halloween decorations	100
1282	Property 1	Residential	5/5/2016	10:41	NR	NR	NR	NR	NR	47	65	ng/m3	Box 81	NA	NA	Headspace	Purses	Handbags and backpacks	91
1282	Property 1	Residential	5/5/2016	10:43	NR	NR	NR	NR	NR	81	95	ng/m3	Box 82	NA	NA	Headspace	Electronics/Shoes	Laptop, shoes, and flute.	103
1282	Property 1	Residential	5/5/2016	10:49	NR	NR	NR	NR	NR	41	48	ng/m3	Box 83	NA	NA	Headspace	Blankets	Penguin blanket and daughter's scarf	109
1282	Property 1	Residential	5/5/2016	10:56	NR	NR	NR	NR	NR	54	67	ng/m3	Box 84	NA	NA	Headspace	Decorative	Miscellaneous items from the house	104
1282	Property 1	Residential	5/5/2016	10:58	NR	NR	NR	NR	NR	115	125	ng/m3	Box 85	NA	NA	Headspace	Tools	Miscellaneous tools and nails	107
1282	Property 1	Residential	5/5/2016	11:01	NR	NR	NR	NR	NR	168	174	ng/m3	Poly bag 521	NA	NA	Headspace	Storage	Large wicker basket from mud room (re-test)	112
1282	Property 1	Residential	5/5/2016	11:12	NR	NR	NR	NR	NR	190	206	ng/m3	Poly bag 522	NA	NA	Headspace	Furniture	Ottoman from daughter's bedroom (re-test)	115
1282	Property 1	Residential	5/5/2016	11:15	NR	NR	NR	NR	NR	93	103	ng/m3	Poly bag 523	NA	NA	Headspace	Furniture	Chair with silver beads on sides (re-test)	106
1282	Property 1	Residential	5/5/2016	11:18	NR	NR	NR	NR	NR	66	72	ng/m3	Box 86	NA	NA	Headspace	Decorative	Christmas decorations	94
1282	Property 1	Residential	5/5/2016	11:38	NR	NR	NR	NR	NR	28	36	ng/m3	Box 87	NA	NA	Headspace	Decorative	Christmas decorations	90
1282	Property 1	Residential	5/5/2016	11:43	NR	NR	NR	NR	NR	34	46	ng/m3	Box 88	NA	NA	Headspace	Decorative	Christmas decorations	113
1282	Property 1	Residential	5/5/2016	11:53	NR	NR	NR	NR	NR	42	47	ng/m3	Box 89	NA	NA	Headspace	Decorative	Christmas decorations	90
1282	Property 1	Residential	5/5/2016	11:58	NR	NR	NR	NR	NR	26	33	ng/m3	Box 90	NA	NA	Headspace	Decorative	Christmas decorations	103
1282	Property 1	Residential	5/5/2016	12:02	NR	NR	NR	NR	NR	47	52	ng/m3	Box 91	NA	NA	Headspace	Tools	Miscellaneous tools from garage	109
1282	Property 1	Residential	5/5/2016	12:03	NR	NR	NR	NR	NR	46	54	ng/m3	Box 92	NA	NA	Headspace	Decorative	Mirror and picture frame	94
1282	Property 1	Residential	5/5/2016	15:00	NR	NR	NR	NR	NR	43	47	ng/m3	Box 93	NA	NA	Headspace	Decorative	Christmas decorations	90
1210	Property 1	Residential	5/5/2016	13:40	NR	NR	NR	NR	NR	7795	8144	ng/m3	Poly bag 1	NA	NA	Headspace	Clothes	NR	90
1210	Property 1	Residential	5/5/2016	13:42	NR	NR	NR	NR	NR	1165	1249	ng/m3	Poly bag 2	NA	NA	Headspace	Clothes	NR	90
1282	Property 1	Residential	5/5/2016	14:32	NR	NR	NR	NR	NR	225	393	ng/m3	Poly bag 524	NA	NA	Headspace	Purses	Vera Bradley	>90
1282	Property 1	Residential	5/5/2016	14:55	NR	NR	NR	NR	NR	35	42	ng/m3	Box 95	NA	NA	Headspace	Clothes	Miscellaneous clothes	92
1282	Property 1	Residential	5/5/2016	15:05	NR	NR	NR	NR	NR	37	45	ng/m3	Box 94	NA	NA	Headspace	Decorative	Plastic flower basket	90
1282	Property 1	Residential	5/5/2016	15:12	NR	NR	NR	NR	NR	67	77	ng/m3	Box 96	NA	NA	Headspace	Food	Spices	107
1282	Property 1	Residential	5/5/2016	15:20	NR	NR	NR	NR	NR	36	43	ng/m3	Box 97	NA	NA	Headspace	Pictures	NR	111
1282	Property 1	Residential	5/5/2016	15:32	NR	NR	NR	NR	NR	31	36	ng/m3	Box 98	NA	NA	Headspace	Storage	Wicker chest	132
1282	Property 1	Residential	5/5/2016	15:34	NR	NR	NR	NR	NR	29	33	ng/m3	Box 99	NA	NA	Headspace	Storage	Cooler	93
1282	Property 1	Residential	5/5/2016	15:37	NR	NR	NR	NR	NR	161	169	ng/m3	Poly bag 525	NA	NA	Headspace	Toys	Sled	106
1282	Property 1	Residential	5/5/2016	15:42	NR	NR	NR	NR	NR	41	45	ng/m3	Poly bag 163	NA	NA	Headspace	Toys	Re-test, huge stuffed animal bear	98
1282	Property 1	Residential	5/5/2016	15:47	NR	NR	NR	NR	NR	30	35	ng/m3	Poly bag 526	NA	NA	Headspace	Storage	Blue storage bin	104
1282	Property 1	Residential	5/5/2016	15:50	NR	NR	NR	NR	NR	31	35	ng/m3	Poly bag 527	NA	NA	Headspace	Decorative	Large star	113
1282	Property 2	Residential	5/5/2016	16:17	NR	NR	NR	NR	NR	265	280	ng/m3	Poly bag 3	NA	NA	Headspace	Clothes	NR	77
1282	Property 2	Residential	5/5/2016	16:19	NR	NR	NR	NR	NR	1100	1163	ng/m3	Poly bag 4	NA	NA	Headspace	Clothes	NR	90
1282	Property 2	Residential	5/5/2016	16:24	NR	NR	NR	NR	NR	970	1207	ng/m3	Poly bag 5	NA	NA	Headspace	Clothes	NR	91
1282	Property 1	Residential	5/5/2016	16:30	NR	NR	NR	NR	NR	27	33	ng/m3	Poly bag 528	NA	NA	Headspace	Toys	Rocking horse	120
1282	Property 1	Residential	5/5/2016	16:37	NR	NR	NR	NR	NR	32	36	ng/m3	Poly bag 529	NA	NA	Headspace	Storage	Wooden chest	125
1210	Property 2	Residential	5/6/2016	9:08	NR	NR	NR	NR	NR	399	418	ng/m3	Foyer	NR	NR	Breathing Zone	NR	Doorway entrance	71
1210	Property 2	Residential	5/6/2016	9:14	NR	NR	NR	NR	NR	598	1100	ng/m3	Foyer	NR	NR	Floor	NR	Door entrance (After vacuuming)	72
1210	Property 2	Residential	5/6/2016	9:13	NR	NR	NR	NR	NR	404	411	ng/m3	Dining Room	NR	NR	Breathing Zone	NR	NR	72
1210	Property 2	Residential	5/6/2016	9:13	NR	NR	NR	NR	NR	556	583	ng/m3	Dining Room	NR	NR	Floor	NR	(After vacuuming)	72
1210	Property 2	Residential	5/6/2016	9:14	NR	NR	NR	NR	NR	830	1020	ng/m3	Office	NR	NR	Floor	NR	(After vacuuming)	70
1210	Property 2	Residential	5/6/2016	9:15	NR	NR	NR	NR	NR	432	440	ng/m3	Office	NR	NR	Breathing Zone	NR	NR	70
1210	Property 2	Residential	5/6/2016	9:16	NR	NR	NR	NR	NR	418	423	ng/m3	Bathroom-Downstairs	NR	NR	Breathing Zone	NR	NR	72
1210	Property 2	Residential	5/6/2016	9:17	NR	NR	NR	NR	NR	436	454	ng/m3	Bathroom-Downstairs	NR	NR	Floor	NR	NR	71
1210	Property 2	Residential	5/6/2016	9:18	NR	NR	NR	NR	NR	397	423	ng/m3	Living Room	NR	NR	Breathing Zone	NR	NR	76
1210	Property 2	Residential	5/6/2016	9:19	NR	NR	NR	NR	NR	447	496	ng/m3	Living Room	NR	NR	Floor	NR	NR	76
1210	Property 2	Residential	5/6/2016	9:20	NR	NR	NR	NR	NR	987	1210	ng/m3	Hallway to Garage	NR	NR	Floor	NR	Door entrance to garage	76
1210	Property 2	Residential	5/6/2016	9:21	NR	NR	NR	NR	NR	531	551	ng/m3	Hallway-Garage	NR	NR	Breathing Zone	NR	Next to garage door entrance	76
1210	Property 2	Residential	5/6/2016	9:23	NR	NR	NR	NR	NR	513	525	ng/m3	Kitchen	NR	NR	Breathing Zone	NR	NR	82
1210	Property 2	Residential	5/6/2016	9:24	NR	NR	NR	NR	NR	707	750	ng/m3	Kitchen	NR	NR	Floor	NR	NR	73
1210	Property 2	Residential	5/6/2016	9:28	NR	NR	NR	NR	NR	386	411	ng/m3	Breakfast Nook	NR	NR	Breathing Zone	NR	Near kitchen table	78
1210	Property 2	Residential	5/6/2016	9:29	NR	NR	NR	NR	NR	388	423	ng/m3	Breakfast Nook	NR	NR	Floor	NR	Near kitche table	80
1210	Property 2	Residential	5/6/2016	9:29	NR	NR	NR	NR	NR	411	435	ng/m3	Laundry Room	NR	NR	Breathing Zone	NR	NR	75

NA- Not Applicable
NR- Not Recorded
R - Standard Deviation

Appendix G: Lumex Screening Results Summary Table
Greenleafe Drive Mercury Response Site
Baldwinsville, Onondaga County, New York

Serial Number	Property Number	Land Use	Date	Time	Screeining-1	Screeining-2	Screeining-3	Average Screening Result	R	Minimum	Maximum	Units	Location	Floor	Floor Cover	Height	Item Type	Description	Temperature (°F)
1210	Property 2	Residential	5/6/2016	9:30	NR	NR	NR	NR	NR	504	565	ng/m3	Laundry Room	NR	NR	Floor	NR	NR	75
1210	Property 2	Residential	5/6/2016	9:31	NR	NR	NR	NR	NR	981	1065	ng/m3	Stairwell-Landing	NR	NR	Floor	NR	Bottom of landing	75
1210	Property 2	Residential	5/6/2016	9:33	NR	NR	NR	NR	NR	555	564	ng/m3	Stairwell-Landing	NR	NR	Breathing Zone	NR	NR	75
1210	Property 2	Residential	5/6/2016	9:34	NR	NR	NR	NR	NR	600	5135	ng/m3	Stairwell-Upstairs	NR	NR	Floor	NR	Every third step (average). First step hottest	76
1210	Property 2	Residential	5/6/2016	9:37	NR	NR	NR	NR	NR	780	868	ng/m3	Stairwell-Upstairs	NR	NR	Breathing Zone	NR	NR	73
1210	Property 2	Residential	5/6/2016	9:37	NR	NR	NR	NR	NR	668	688	ng/m3	Hallway-Upstairs	NR	NR	Breathing Zone	NR	Top of stairs	72
1210	Property 2	Residential	5/6/2016	9:38	NR	NR	NR	NR	NR	2425	2748	ng/m3	Hallway-Upstairs	NR	NR	Floor	NR	NR	72
1210	Property 2	Residential	5/6/2016	9:40	NR	NR	NR	NR	NR	751	808	ng/m3	Guest Room 1	NR	NR	Breathing Zone	NR	Left of stairs	72
1210	Property 2	Residential	5/6/2016	9:41	NR	NR	NR	NR	NR	741	786	ng/m3	Guest Room 1	NR	NR	Floor	NR	Left of stairs	73
1210	Property 2	Residential	5/6/2016	9:42	NR	NR	NR	NR	NR	677	691	ng/m3	Guest Room 2	NR	NR	Breathing Zone	NR	Diagonal to stairs	69
1210	Property 2	Residential	5/6/2016	9:43	NR	NR	NR	NR	NR	73	776	ng/m3	Guest Room 2	NR	NR	Floor	NR	Diagonal to stairs	69
1210	Property 2	Residential	5/6/2016	9:47	NR	NR	NR	NR	NR	897	944	ng/m3	Bathroom-Upstairs	NR	NR	Breathing Zone	NR	NR	69
1210	Property 2	Residential	5/6/2016	9:48	NR	NR	NR	NR	NR	884	939	ng/m3	Bathroom-Upstairs	NR	NR	Floor	NR	NR	76
1210	Property 2	Residential	5/6/2016	9:44	NR	NR	NR	NR	NR	701	714	ng/m3	Bedroom-Son	NR	NR	Breathing Zone	NR	NR	71
1210	Property 2	Residential	5/6/2016	9:45	NR	NR	NR	NR	NR	875	938	ng/m3	Bedroom-Son	NR	NR	Floor	NR	NR	71
1210	Property 2	Residential	5/6/2016	9:48	NR	NR	NR	NR	NR	797	818	ng/m3	Bedroom-Master	NR	NR	Breathing Zone	NR	NR	71
1210	Property 2	Residential	5/6/2016	9:49	NR	NR	NR	NR	NR	1080	1221	ng/m3	Bedroom-Master	NR	NR	Floor	NR	NR	71
1210	Property 2	Residential	5/6/2016	9:50	NR	NR	NR	NR	NR	808	829	ng/m3	Bathroom-Master	NR	NR	Breathing Zone	NR	NR	71
1210	Property 2	Residential	5/6/2016	9:51	NR	NR	NR	NR	NR	1296	1376	ng/m3	Bathroom-Master	NR	NR	Floor	NR	NR	74
1210	Property 2	Residential	5/6/2016	9:52	NR	NR	NR	NR	NR	1090	1875	ng/m3	Bathroom-Master	NR	NR	Headspace	NR	Tub drain	70
1210	Property 2	Residential	5/6/2016	9:52	NR	NR	NR	NR	NR	864	895	ng/m3	Bathroom-Master	NR	NR	Headspace	NR	Shower drain	70
1210	Property 2	Residential	5/6/2016	9:52	NR	NR	NR	NR	NR	913	923	ng/m3	Bathroom-Master	NR	NR	Headspace	NR	Sink drain	70
1210	Property 2	Residential	5/6/2016	9:53	NR	NR	NR	NR	NR	869	881	ng/m3	Bathroom-Upstairs	NR	NR	Headspace	NR	Tub drain	71
1210	Property 2	Residential	5/6/2016	9:53	NR	NR	NR	NR	NR	915	934	ng/m3	Bathroom-Upstairs	NR	NR	Headspace	NR	Sink drain	71
1210	Property 2	Residential	5/6/2016	9:56	NR	NR	NR	NR	NR	799	808	ng/m3	Basement-Stairwell	NR	NR	Breathing Zone	NR	Staircase going down	73
1210	Property 2	Residential	5/6/2016	9:56	NR	NR	NR	NR	NR	963	2352	ng/m3	Basement-Stairwell	NR	NR	Floor	NR	Staircase going down	73
1210	Property 2	Residential	5/6/2016	9:58	NR	NR	NR	NR	NR	1077	1138	ng/m3	Basement	NR	NR	Breathing Zone	NR	Near stairs	69
1210	Property 2	Residential	5/6/2016	9:59	NR	NR	NR	NR	NR	1196	1251	ng/m3	Basement	NR	NR	Floor	NR	Near stairs	67
1210	Property 2	Residential	5/6/2016	10:00	NR	NR	NR	NR	NR	855	862	ng/m3	Basement-Kitchen area	NR	NR	Breathing Zone	NR	NR	69
1210	Property 2	Residential	5/6/2016	10:01	NR	NR	NR	NR	NR	857	875	ng/m3	Basement-Kitchen area	NR	NR	Floor	NR	NR	66
1210	Property 2	Residential	5/6/2016	10:02	NR	NR	NR	NR	NR	843	871	ng/m3	Basement-TV room	NR	NR	Breathing Zone	NR	NR	71
1210	Property 2	Residential	5/6/2016	10:03	NR	NR	NR	NR	NR	892	937	ng/m3	Basement-TV room	NR	NR	Floor	NR	NR	66
1210	Property 2	Residential	5/6/2016	10:04	NR	NR	NR	NR	NR	887	929	ng/m3	Basement-Office	NR	NR	Breathing Zone	NR	NR	75
1210	Property 2	Residential	5/6/2016	10:04	NR	NR	NR	NR	NR	1012	1068	ng/m3	Basement-Office	NR	NR	Floor	NR	NR	66
1210	Property 2	Residential	5/6/2016	10:07	NR	NR	NR	NR	NR	738	753	ng/m3	Basement-Bedroom	NR	NR	Breathing Zone	NR	NR	73
1210	Property 2	Residential	5/6/2016	10:08	NR	NR	NR	NR	NR	788	833	ng/m3	Basement-Bedroom	NR	NR	Floor	NR	NR	73
1210	Property 2	Residential	5/6/2016	10:08	NR	NR	NR	NR	NR	909	940	ng/m3	Basement-Bathroom	NR	NR	Breathing Zone	NR	NR	73
1210	Property 2	Residential	5/6/2016	10:09	NR	NR	NR	NR	NR	892	907	ng/m3	Basement-Bathroom	NR	NR	Floor	NR	NR	67
1210	Property 2	Residential	5/6/2016	10:10	NR	NR	NR	NR	NR	873	887	ng/m3	Basement-Bathroom	NR	NR	Headspace	NR	Shower drain	67
1210	Property 2	Residential	5/6/2016	11:05	NR	NR	NR	NR	NR	387	402	ng/m3	Garage	NR	NR	Breathing Zone	NR	No heat yet	57
1210	Property 2	Residential	5/6/2016	11:06	NR	NR	NR	NR	NR	490	502	ng/m3	Garage	NR	NR	Floor	NR	(After vacuuming)	54
1210	Property 2	Residential	5/6/2016	11:21	NR	NR	NR	NR	NR	5000	5900	ng/m3	Garage	NR	NR	Floor	NR	Crack in floor	56
1210	Property 2	Residential	5/6/2016	11:23	NR	NR	NR	NR	NR	20000	24000	ng/m3	Garage	NR	NR	Floor	NR	Crack in floor	56
1210	Property 2	Residential	5/6/2016	11:24	NR	NR	NR	NR	NR	5500	6000	ng/m3	Garage	NR	NR	Floor	NR	Expansion joint	56
1282	Property 1	Residential	5/6/2016	15:30	NR	NR	NR	NR	NR	31	35	ng/m3	Box 100	NA	NA	Headspace	Food	Alcohol	107
1282	Property 1	Residential	5/6/2016	15:34	NR	NR	NR	NR	NR	39	41	ng/m3	Box 101	NA	NA	Headspace	Towels	Beach towels	103
1282	Property 1	Residential	5/6/2016	15:40	NR	NR	NR	NR	NR	88	93	ng/m3	Poly bag 334	NA	NA	Headspace	Towels	(Retest) Kitchen towels	133
1282	Property 1	Residential	5/6/2016	15:44	NR	NR	NR	NR	NR	122	129	ng/m3	Poly bag 238	NA	NA	Headspace	Decorative	(Retest) mirror	117
1282	Property 1	Residential	5/6/2016	15:49	NR	NR	NR	NR	NR	9	11	ng/m3	Poly bag 361	NA	NA	Headspace	Building materials	(Retest) shelf brackets/legs	110
1282	Property 1	Residential	5/6/2016	15:53	NR	NR	NR	NR	NR	295	306	ng/m3	Poly bag 20	NA	NA	Headspace	Electronics	(Retest) speaker	109
1282	Property 1	Residential	5/6/2016	15:58	NR	NR	NR	NR	NR	29	36	ng/m3	Poly bag 531	NA	NA	Headspace	Miscellaneous	Miscellaneous items	128
1282	Property 1	Residential	5/6/2016	16:00	NR	NR	NR	NR	NR	25	28	ng/m3	Poly bag 532	NA	NA	Headspace	Decorative	Football wall hanging	112
1282	Property 1	Residential	5/6/2016	16:03	NR	NR	NR	NR	NR	14	24	ng/m3	Poly bag 533	NA	NA	Headspace	Furniture	Blue table	118
1210	Property 2	Residential	5/6/2016	16:23	NR	NR	NR	NR	NR	1215	2720	ng/m3	Poly bag 6	NA	NA	Headspace	Shoes	Miscellaneous shoes	106
1210	Property 2	Residential	5/6/2016	16:32	NR	NR	NR	NR	NR	1987	2511	ng/m3	Poly bag 7	NA	NA	Headspace	Shoes	Separated	111
1210	Property 2	Residential	5/6/2016	16:33	NR	NR	NR	NR	NR	884	985	ng/m3	Poly bag 8	NA	NA	Headspace	Shoes	Separated	116
1210	Property 2	Residential	5/6/2016	16:34	NR	NR	NR	NR	NR	515	559	ng/m3	Poly bag 9	NA	NA	Headspace	Shoes	Separated	110
1282	Property 1	Residential	5/6/2016	16:15	NR	NR	NR	NR	NR	300	322	ng/m3	Poly bag 534	NA	NA	Headspace	Clothes	Re-test, clothes and purses	115
1282	Property 1	Residential	5/6/2016	16:13	NR	NR	NR	NR	NR	125	130	ng/m3	Poly bag 535	NA	NA	Headspace	Clothes	Re-test, miscellaneous clothes	113
1282	Property 2	Residential	5/7/2016	7:48	NR	NR	NR	NR	NR	371	391	ng/m3	Kitchen	NR	NR	Breathing Zone	NR	NR	90
1282	Property 2	Residential	5/7/2016	7:49	NR	NR	NR	NR	NR	322	366	ng/m3	Kitchen	NR	NR	Floor	NR	NR	90
1282	Property 2	Residential	5/7/2016	7:50	NR	NR	NR	NR	NR	680	770	ng/m3	Hallway near Garage	NR	NR	Floor	NR	NR	80
1282	Property 2	Residential	5/7/2016	7:52	NR	NR	NR	NR	NR	480	500	ng/m3	Laundry Room	NR	NR	Floor	NR	NR	92
1282	Property 2	Residential	5/7/2016	7:53	NR	NR	NR	NR	NR	358	372	ng/m3	Laundry Room	NR	NR	Breathing Zone	NR	NR	90
1282	Property 2	Residential	5/7/2016	7:53	NR	NR	NR	NR	NR	413	421	ng/m3	Breakfast Nook	NR	NR	Breathing Zone	NR	NR	96
1282	Property 2	Residential	5/7/2016	7:54	NR	NR	NR	NR	NR	387	490	ng/m3	Breakfast Nook	NR	NR	Floor	NR	NR	93
1282	Property 2	Residential	5/7/2016	7:55	NR	NR	NR	NR	NR	393	562	ng/m3	Kitchen	NR	NR	Floor	NR	Cracks under sink	97
1282	Property 2	Residential	5/7/2016	7:56	NR	NR	NR	NR	NR	418	447	ng/m3	Living Room	NR	NR	Breathing Zone	NR	NR	102
1282	Property 2	Residential	5/7/2016	7:56	NR	NR	NR	NR	NR	684	736	ng/m3	Living Room	NR	NR	Floor	NR	NR	98
1282	Property 2	Residential	5/7/2016	8:02	NR	NR	NR	NR	NR	386	404	ng/m3	Dining Room	NR	NR	Breathing Zone	NR	NR	89
1282	Property 2	Residential	5/7/2016	8:03	NR	NR	NR	NR	NR	319	328	ng/m3	Dining Room	NR	NR	Floor	NR	NR	89
1282	Property 2	Residential	5/7/2016	8:14	NR	NR	NR	NR	NR	462	546	ng/m3	Office	NR	NR	Breathing Zone	NR	NR	91
1282	Property 2	Residential	5/7/2016	8:15	NR	NR	NR	NR	NR	506	1349	ng/m3	Office	NR	NR	Floor	NR	NR	92
1282	Property 2	Residential	5/7/2016	8:31	NR	NR	NR	NR	NR	384	407	ng/m3	Bathroom-Downstairs	NR	NR	Breathing Zone	NR	NR	84
1282	Property 2	Residential	5/7/2016	8:31	NR	NR	NR	NR	NR	342	469	ng/m3	Bathroom-Downstairs	NR	NR	Floor	NR	NR	84
1282	Property 2	Residential	5/7/2016	8:28	NR	NR	NR	NR	NR	491	512	ng/m3	Hallway-Downstairs	NR	NR	Breathing Zone	NR	NR	88
1282	Property 2	Residential	5/7/2016	8:28	NR	NR	NR	NR	NR	460	736	ng/m3	Hallway-Downstairs	NR	NR	Floor	NR	NR	88
1282	Property 2	Residential	5/7/2016	8:05	NR	NR	NR	NR	NR	800	10170	ng/m3	Living Room	NR	NR	Headspace	NR	Red couches	94
1282	Property 2	Residential	5/7/2016	8:17	NR	NR	NR	NR	NR	2000	2518	ng/m3	Office	NR	NR	Headspace	NR	Couch	92
1282	Property 2	Residential	5/7/2016	8:34	NR	NR	NR	NR	NR	138	149	ng/m3	Basement-Stairwell	NR	NR	Breathing Zone	NR	NR	83
1282	Property 2	Residential	5/7/2016	8:34	NR	NR	NR	NR	NR	265	1791	ng/m3	Basement-Stairwell	NR	NR	Floor	NR	NR	83
1282	Property 2	Residential	5/7/2016	8:36	NR	NR	NR	NR	NR	125	130	ng/m3	Basement-Kitchen	NR	NR	Breathing Zone	NR	NR	81
1282	Property 2	Residential	5/7/2016	8:36	NR	NR	NR	NR	NR	247	224	ng/m3	Basement-Kitchen	NR	NR	Floor	NR	NR	74
1282	Property 2	Residential	5/7/2016	8:40	NR	NR	NR	NR	NR	120	128	ng/m3	Basement-TV area	NR	NR	Breathing Zone	NR	NR	76
1282	Property 2	Residential	5/7/2016	8:41	NR	NR	NR	NR	NR	159	180	ng/m3	Basement-TV area	NR	NR	Floor	NR	NR	68

NA- Not Applicable
NR- Not Recorded
R - Standard Deviation

Appendix G: Lumex Screening Results Summary Table
Greenleafe Drive Mercury Response Site
Baldwinsville, Onondaga County, New York

Serial Number	Property Number	Land Use	Date	Time	Screening-1	Screening-2	Screening-3	Average Screening Result	R	Minimum	Maximum	Units	Location	Floor	Floor Cover	Height	Item Type	Description	Temperature (˚F)
1282	Property 2	Residential	5/7/2016	8:49	NR	NR	NR	NR	NR	126	157	ng/m3	Basement-Office	NR	NR	Breathing Zone	NR	NR	85
1282	Property 2	Residential	5/7/2016	8:49	NR	NR	NR	NR	NR	196	335	ng/m3	Basement-Office	NR	NR	Floor	NR	NR	72
1282	Property 2	Residential	5/7/2016	8:45	NR	NR	NR	NR	NR	90	98	ng/m3	Basement-Bedroom	NR	NR	Breathing Zone	NR	NR	78
1282	Property 2	Residential	5/7/2016	8:45	NR	NR	NR	NR	NR	74	86	ng/m3	Basement-Bedroom	NR	NR	Floor	NR	NR	78
1282	Property 2	Residential	5/7/2016	8:43	NR	NR	NR	NR	NR	187	210	ng/m3	Basement-TV area	NR	NR	Headspace	NR	NR	75
1282	Property 2	Residential	5/7/2016	8:47	NR	NR	NR	NR	NR	118	133	ng/m3	Basement-Bathroom	NR	NR	Breathing Zone	NR	NR	82
1282	Property 2	Residential	5/7/2016	8:47	NR	NR	NR	NR	NR	108	133	ng/m3	Basement-Bathroom	NR	NR	Floor	NR	NR	72
1282	Property 2	Residential	5/7/2016	9:02	NR	NR	NR	NR	NR	500	570	ng/m3	Stairwell-Landing	NR	NR	Breathing Zone	NR	NR	88
1282	Property 2	Residential	5/7/2016	9:04	NR	NR	NR	NR	NR	1700	3400	ng/m3	Stairwell-Landing	NR	NR	Floor	NR	NR	88
1282	Property 2	Residential	5/7/2016	9:05	NR	NR	NR	NR	NR	502	522	ng/m3	Stairwell-Upstairs	NR	NR	Breathing Zone	NR	NR	91
1282	Property 2	Residential	5/7/2016	9:05	NR	NR	NR	NR	NR	1798	3768	ng/m3	Stairwell-Upstairs	NR	NR	Floor	NR	NR	91
1282	Property 2	Residential	5/7/2016	9:09	NR	NR	NR	NR	NR	503	522	ng/m3	Hallway-Upstairs	NR	NR	Breathing Zone	NR	NR	90
1282	Property 2	Residential	5/7/2016	9:09	NR	NR	NR	NR	NR	800	1100	ng/m3	Hallway-Upstairs	NR	NR	Floor	NR	NR	90
1282	Property 2	Residential	5/7/2016	9:10	NR	NR	NR	NR	NR	430	442	ng/m3	Bedroom-Guest 1	NR	NR	Breathing Zone	NR	Left of stairs	90
1282	Property 2	Residential	5/7/2016	9:11	NR	NR	NR	NR	NR	515	520	ng/m3	Bedroom-Guest 2	NR	NR	Breathing Zone	NR	Diagonal of stairs	90
1282	Property 2	Residential	5/7/2016	9:12	NR	NR	NR	NR	NR	445	498	ng/m3	Bedroom-Master	NR	NR	Breathing Zone	NR	NR	91
1210	Property 2	Residential	5/7/2016	9:28	NR	NR	NR	NR	NR	100	120	ng/m3	Bathroom-Master	NR	NR	Breathing Zone	NR	Windows open	82
1210	Property 2	Residential	5/7/2016	9:28	NR	NR	NR	NR	NR	92	110	ng/m3	Bathroom-Master	NR	NR	Floor	NR	Windows open	83
1210	Property 2	Residential	5/7/2016	9:26	NR	NR	NR	NR	NR	151	163	ng/m3	Bedroom-Son	NR	NR	Breathing Zone	NR	Windows open	80
1210	Property 1	Residential	5/7/2016	11:48	NR	NR	NR	NR	NR	85	102	ng/m3	Poly bag 558	NA	NA	Headspace	Toys	Stuffed animals	122
1210	Property 1	Residential	5/7/2016	11:52	NR	NR	NR	NR	NR	55	64	ng/m3	Poly bag 560	NA	NA	Headspace	Clothes	Miscellaneous clothes	120
1210	Property 1	Residential	5/7/2016	11:55	NR	NR	NR	NR	NR	135	157	ng/m3	Poly bag 559	NA	NA	Headspace	Clothes	Winter clothes	102
1210	Property 1	Residential	5/7/2016	11:57	NR	NR	NR	NR	NR	237	260	ng/m3	Poly bag 557	NA	NA	Headspace	Decorative	Christmas decorations	124
1210	Property 1	Residential	5/7/2016	11:59	NR	NR	NR	NR	NR	454	567	ng/m3	Poly bag 551	NA	NA	Headspace	Clothes	Miscellaneous clothes	119
1210	Property 1	Residential	5/7/2016	13:37	NR	NR	NR	NR	NR	480	522	ng/m3	Poly bag 10	NA	NA	Headspace	Shoes	Shoes from laundry room	114
1210	Property 1	Residential	5/7/2016	13:57	NR	NR	NR	NR	NR	140	169	ng/m3	Poly bag 552	NA	NA	Headspace	Clothes	Miscellaneous clothes	107
1210	Property 1	Residential	5/7/2016	14:01	NR	NR	NR	NR	NR	904	1262	ng/m3	Poly bag 564	NA	NA	Headspace	Clothes	Miscellaneous clothes	110
1210	Property 1	Residential	5/7/2016	15:28	NR	NR	NR	NR	NR	171	239	ng/m3	Poly bag 566	NA	NA	Headspace	Clothes	Miscellaneous clothes	123
1210	Property 1	Residential	5/7/2016	15:35	NR	NR	NR	NR	NR	329	362	ng/m3	Poly bag 555	NA	NA	Headspace	Blankets	Miscellaneous blankets	140
1210	Property 1	Residential	5/7/2016	15:41	NR	NR	NR	NR	NR	64	67	ng/m3	Poly bag 538	NA	NA	Headspace	Toys	Dolls and books	123
1210	Property 1	Residential	5/7/2016	15:43	NR	NR	NR	NR	NR	130	138	ng/m3	Poly bag 561	NA	NA	Headspace	Decorative	Pictures	112
1210	Property 1	Residential	5/7/2016	15:45	NR	NR	NR	NR	NR	270	273	ng/m3	Poly bag 544	NA	NA	Headspace	Decorative	Pictures/wall hangings	115
1210	Property 1	Residential	5/7/2016	16:06	NR	NR	NR	NR	NR	24	27	ng/m3	Screening Tent	NA	NA	Headspace	Appliance	Dryer	70
1210	Property 2	Residential	5/7/2016	16:31	NR	NR	NR	NR	NR	1100	1485	ng/m3	Poly bag 11	NA	NA	Headspace	Clothes	Miscellaneous clothes	110
1210	Property 2	Residential	5/7/2016	16:40	NR	NR	NR	NR	NR	1865	2168	ng/m3	Poly bag 12	NA	NA	Headspace	Clothes	Miscellaneous clothes	118
1210	Property 1	Residential	5/8/2016	11:04	NR	NR	NR	NR	NR	104	107	ng/m3	Poly bag 547	NA	NA	Headspace	Storage	Wicker baskets	112
1210	Property 1	Residential	5/8/2016	11:08	NR	NR	NR	NR	NR	46	57	ng/m3	Poly bag 548	NA	NA	Headspace	Decorative	Fall decorations	112
1210	Property 1	Residential	5/8/2016	11:11	NR	NR	NR	NR	NR	78	83	ng/m3	Poly bag 600	NA	NA	Headspace	Cleaning products	Bucket and cleaning products	107
1210	Property 1	Residential	5/8/2016	11:16	NR	NR	NR	NR	NR	68	74	ng/m3	Poly bag 601	NA	NA	Headspace	Decorative	Lamp and decorations	121
1210	Property 1	Residential	5/8/2016	11:20	NR	NR	NR	NR	NR	78	122	ng/m3	Poly bag 602	NA	NA	Headspace	Cleaning products	Liquid soaps	101
1210	Property 1	Residential	5/8/2016	11:26	NR	NR	NR	NR	NR	23	26	ng/m3	Poly bag 416	NA	NA	Headspace	Miscellaneous	Wooden paddle	103
1210	Property 1	Residential	5/8/2016	11:28	NR	NR	NR	NR	NR	1115	1382	ng/m3	Poly bag 603	NA	NA	Headspace	Tools	Miscellaneous home improvement supplies	103
1210	Property 1	Residential	5/8/2016	11:32	NR	NR	NR	NR	NR	46	48	ng/m3	Poly bag 569	NA	NA	Headspace	Glassware	Kitchen mugs	107
1210	Property 1	Residential	5/8/2016	11:36	NR	NR	NR	NR	NR	126	159	ng/m3	Poly bag 536	NA	NA	Headspace	Electronics	Speaker and boxed miscellaneous electronics	106
1210	Property 1	Residential	5/8/2016	11:39	NR	NR	NR	NR	NR	28	33	ng/m3	Poly bag 573	NA	NA	Headspace	Glassware	Mugs and bowls	101
1210	Property 1	Residential	5/8/2016	11:45	NR	NR	NR	NR	NR	36	39	ng/m3	Poly bag 581	NA	NA	Headspace	Decorative	Pictures/collage	108
1210	Property 1	Residential	5/8/2016	11:48	NR	NR	NR	NR	NR	38	44	ng/m3	Poly bag 574	NA	NA	Headspace	Glassware	Kitchenware	104
1210	Property 1	Residential	5/8/2016	11:50	NR	NR	NR	NR	NR	65	97	ng/m3	Poly bag 554	NA	NA	Headspace	Miscellaneous	Toy guitar and wall hanging	103
1210	Property 1	Residential	5/8/2016	11:53	NR	NR	NR	NR	NR	25	28	ng/m3	Poly bag 563	NA	NA	Headspace	Miscellaneous	Glassware	101
1210	Property 1	Residential	5/8/2016	11:57	NR	NR	NR	NR	NR	4069	4111	ng/m3	Poly bag 603	NA	NA	Headspace	Rug	Small area rug	108
1210	Property 1	Residential	5/8/2016	12:01	NR	NR	NR	NR	NR	24	27	ng/m3	Poly bag 575	NA	NA	Headspace	Decorative	Pictures and miscellaneous decorations	108
1210	Property 1	Residential	5/8/2016	12:04	NR	NR	NR	NR	NR	39	45	ng/m3	Poly bag 556	NA	NA	Headspace	Miscellaneous	Pictures and decorations	110
1210	Property 1	Residential	5/8/2016	14:12	NR	NR	NR	NR	NR	365	484	ng/m3	Poly bag 565	NA	NA	Headspace	Decorative	Pictures	101
1210	Property 1	Residential	5/8/2016	14:20	NR	NR	NR	NR	NR	12	14	ng/m3	Poly bag 550	NA	NA	Headspace	Glassware	Kitchenware	102
1210	Property 1	Residential	5/8/2016	14:29	NR	NR	NR	NR	NR	35	41	ng/m3	Poly bag 604	NA	NA	Headspace	Utensils	Kitchen utensils	102
1210	Property 1	Residential	5/8/2016	14:32	NR	NR	NR	NR	NR	42	61	ng/m3	Poly bag 570	NA	NA	Headspace	Decorative	Christmas decorations	106
1210	Property 1	Residential	5/8/2016	14:38	NR	NR	NR	NR	NR	833	880	ng/m3	Poly bag 605	NA	NA	Headspace	Miscellaneous	Miscellaneous items	103
1210	Property 1	Residential	5/8/2016	14:42	NR	NR	NR	NR	NR	53	58	ng/m3	Poly bag 553	NA	NA	Headspace	Decorative	Christmas wreath	104
1210	Property 1	Residential	5/8/2016	14:46	NR	NR	NR	NR	NR	99	117	ng/m3	Poly bag 541	NA	NA	Headspace	Bedding	Pillow and blankets	111
1210	Property 1	Residential	5/8/2016	14:49	NR	NR	NR	NR	NR	42	47	ng/m3	Poly bag 583	NA	NA	Headspace	Shoes	Miscellaneous shoes.	112
1210	Property 1	Residential	5/8/2016	14:56	NR	NR	NR	NR	NR	38	54	ng/m3	Poly bag 542	NA	NA	Headspace	Clothes	Bathing suits and beach towels	104
1210	Property 1	Residential	5/8/2016	15:03	NR	NR	NR	NR	NR	18	24	ng/m3	Poly bag 606	NA	NA	Headspace	Shoes	Miscellaneous shoes	106
1210	Property 1	Residential	5/8/2016	15:31	NR	NR	NR	NR	NR	29	37	ng/m3	Poly bag 607	NA	NA	Headspace	Clothes	Miscellaneous clothes (daughter's room)	105
1210	Property 1	Residential	5/8/2016	15:37	NR	NR	NR	NR	NR	613	740	ng/m3	Poly bag 608	NA	NA	Headspace	Clothes	Miscellaneous clothes	109
1210	Property 1	Residential	5/8/2016	15:40	NR	NR	NR	NR	NR	43	47	ng/m3	Poly bag 609	NA	NA	Headspace	Clothes	Miscellaneous clothes	115
1210	Property 1	Residential	5/8/2016	15:43	NR	NR	NR	NR	NR	26	27	ng/m3	Poly bag 610	NA	NA	Headspace	Clothes	Miscellaneous clothes	111
1210	Property 2	Residential	5/8/2016	16:22	NR	NR	NR	NR	NR	482	1029	ng/m3	Poly bag 13	NA	NA	Headspace	Clothes	Miscellaneous clothes	130
1210	Property 2	Residential	5/8/2016	16:24	NR	NR	NR	NR	NR	37	58	ng/m3	Poly bag 14	NA	NA	Headspace	Shoes	Miscellaneous shoes	114
1210	Property 2	Residential	5/8/2016	16:26	NR	NR	NR	NR	NR	816	1164	ng/m3	Poly bag 15	NA	NA	Headspace	Clothes	Miscellaneous clothes	107
1210	Property 2	Residential	5/8/2016	16:28	NR	NR	NR	NR	NR	127	164	ng/m3	Poly bag 16	NA	NA	Headspace	Clothes	Miscellaneous clothes	113
1210	Property 1	Residential	5/9/2016	8:42	NR	NR	NR	NR	NR	71	115	ng/m3	Poly bag 611	NA	NA	Headspace	Miscellaneous	Electronics,boots	130
1210	Property 1	Residential	5/9/2016	9:03	NR	NR	NR	NR	NR	47	50	ng/m3	Poly bag 612	NA	NA	Headspace	Furniture	White couch	91
1210	Property 1	Residential	5/9/2016	9:30	NR	NR	NR	NR	NR	26	38	ng/m3	Poly bag 185	NA	NA	Headspace	Toy	Kids toy	130
1210	Property 1	Residential	5/9/2016	9:31	NR	NR	NR	NR	NR	20	25	ng/m3	Poly bag 576	NA	NA	Headspace	Decorative	Decoration	127.5
1210	Property 1	Residential	5/9/2016	9:32	NR	NR	NR	NR	NR	100	157	ng/m3	Poly bag 546	NA	NA	Headspace	Toy	Stuffed animals	147.5
1210	Property 1	Residential	5/9/2016	9:36	NR	NR	NR	NR	NR	32	56	ng/m3	Poly bag 613	NA	NA	Headspace	Miscellaneous	Pic frame, leather boots,sneakers	114
1210	Property 1	Residential	5/9/2016	9:37	NR	NR	NR	NR	NR	122	179	ng/m3	Poly bag 614	NA	NA	Headspace	Miscellaneous	Wicker basket, pillow	113
1210	Property 1	Residential	5/9/2016	9:40	NR	NR	NR	NR	NR	68	110	ng/m3	Poly bag 578	NA	NA	Headspace	Miscellaneous	Household goods	116
1210	Property 1	Residential	5/9/2016	9:42	NR	NR	NR	NR	NR	54	60	ng/m3	Poly bag 577	NA	NA	Headspace	Miscellaneous	Candles	113
1210	Property 1	Residential	5/9/2016	9:43	NR	NR	NR	NR	NR	114	125	ng/m3	Poly bag 545	NA	NA	Headspace	Clothes	NR	146
1210	Property 1	Residential	5/9/2016	9:46	NR	NR	NR	NR	NR	122	137	ng/m3	Poly bag 539	NA	NA	Headspace	Clothes	NR	139
1210	Property 1	Residential	5/9/2016	9:48	NR	NR	NR	NR	NR	430	527	ng/m3	Poly bag 582	NA	NA	Headspace	Clothes	NR	131
1210	Property 1	Residential	5/9/2016	9:50	NR	NR	NR	NR	NR	530	734	ng/m3	Poly bag 540	NA	NA	Headspace	Clothes	NR	131
1210	Property 1	Residential	5/9/2016	9:53	NR	NR	NR	NR	NR	112	127	ng/m3	Poly bag 220	NA	NA	Headspace	Clothes	NR	132
1210	Property 1	Residential	5/9/2016	9:54	NR	NR	NR	NR	NR	184	258	ng/m3	Poly bag 537	NA	NA	Headspace	Clothes	NR	132

NA- Not Applicable
NR- Not Recorded
R - Standard Deviation

Appendix G: Lumex Screening Results Summary Table
Greenleafe Drive Mercury Response Site
Baldwinsville, Onondaga County, New York

Serial Number	Property Number	Land Use	Date	Time	Screeining-1	Screeining-2	Screeining-3	Average Screening Result	R	Minimum	Maximum	Units	Location	Floor	Floor Cover	Height	Item Type	Description	Temperature (°F)
1210	Property 1	Residential	5/9/2016	9:57	NR	NR	NR	NR	NR	247	300	ng/m3	Poly bag 572	NA	NA	Headspace	Clothes	NR	140
1210	Property 1	Residential	5/9/2016	10:00	NR	NR	NR	NR	NR	61	77	ng/m3	Poly bag 615	NA	NA	Headspace	Clothes	Socks	137
1210	Property 1	Residential	5/9/2016	10:02	NR	NR	NR	NR	NR	129	141	ng/m3	Poly bag 616	NA	NA	Headspace	Clothes	NR	125
1210	Property 1	Residential	5/9/2016	10:05	NR	NR	NR	NR	NR	177	181	ng/m3	Poly bag 543	NA	NA	Headspace	Clothes	NR	127
1210	Property 1	Residential	5/9/2016	10:07	NR	NR	NR	NR	NR	130	163	ng/m3	Poly bag 571	NA	NA	Headspace	Clothes	NR	135
1210	Property 1	Residential	5/9/2016	10:09	NR	NR	NR	NR	NR	62	84	ng/m3	Poly bag 617	NA	NA	Headspace	Plastic record	NR	108
1210	Property 1	Residential	5/9/2016	10:12	NR	NR	NR	NR	NR	34	38	ng/m3	Poly bag 618	NA	NA	Headspace	Furniture	Trunk	130
1210	Property 1	Residential	5/9/2016	10:15	NR	NR	NR	NR	NR	142	157	ng/m3	Poly bag 619	NA	NA	Headspace	Clothes	NR	147
1210	Property 1	Residential	5/9/2016	10:18	NR	NR	NR	NR	NR	31	35	ng/m3	Poly bag 620	NA	NA	Headspace	Kitchen pan	NR	136
1210	Property 1	Residential	5/9/2016	10:21	NR	NR	NR	NR	NR	50	67	ng/m3	Poly bag 621	NA	NA	Headspace	Kitchen pan	Pots and pans	147
1210	Property 1	Residential	5/9/2016	10:24	NR	NR	NR	NR	NR	30	35	ng/m3	Poly bag 337	NA	NA	Headspace	Shelving	Wooden shelf	127
1210	Property 1	Residential	5/9/2016	10:25	NR	NR	NR	NR	NR	45	60	ng/m3	Poly bag 622	NA	NA	Headspace	Clothes	NR	138
1210	Property 1	Residential	5/9/2016	10:26	NR	NR	NR	NR	NR	47	52	ng/m3	Poly bag 623	NA	NA	Headspace	Decorative	Pic frames	111
1210	Property 1	Residential	5/9/2016	10:27	NR	NR	NR	NR	NR	77	82	ng/m3	Poly bag 624	NA	NA	Headspace	Decorative	Linens and wooden frame	115
1210	Property 1	Residential	5/9/2016	10:29	NR	NR	NR	NR	NR	38	43	ng/m3	Poly bag 625	NA	NA	Headspace	Toy	Plastic toy	118
1210	Property 1	Residential	5/9/2016	10:30	NR	NR	NR	NR	NR	55	62	ng/m3	Poly bag 626	NA	NA	Headspace	Decorative	Purses	116
1210	Property 1	Residential	5/9/2016	10:35	NR	NR	NR	NR	NR	45	51	ng/m3	Poly bag 303	NA	NA	Headspace	Furniture	Re-test leather chair	90
1210	Property 1	Residential	5/9/2016	10:51	NR	NR	NR	NR	NR	11	17	ng/m3	Poly bag 378	NA	NA	Headspace	Toys	Re-test guitar	110
1210	Property 1	Residential	5/9/2016	10:52	NR	NR	NR	NR	NR	26	29	ng/m3	Poly bag 627	NA	NA	Headspace	Decorative	Christmas	105
1210	Property 1	Residential	5/9/2016	10:54	NR	NR	NR	NR	NR	22	26	ng/m3	Poly bag 320	NA	NA	Headspace	Miscellaneous	Towels, decorations	130
1210	Property 1	Residential	5/9/2016	10:57	NR	NR	NR	NR	NR	77	99	ng/m3	Poly bag 628	NA	NA	Headspace	Shoes	Women's shoes	114
1210	Property 1	Residential	5/9/2016	10:59	NR	NR	NR	NR	NR	168	179	ng/m3	Poly bag 629	NA	NA	Headspace	Miscellaneous	Towels and decorations	117
1210	Property 1	Residential	5/9/2016	11:00	NR	NR	NR	NR	NR	95	105	ng/m3	Poly bag 630	NA	NA	Headspace	Purses	Vera Bradley	110
1210	Property 1	Residential	5/9/2016	11:01	NR	NR	NR	NR	NR	97	185	ng/m3	Poly bag 631	NA	NA	Headspace	Blankets	Blankets and towels	127
1210	Property 1	Residential	5/9/2016	11:03	NR	NR	NR	NR	NR	60	65	ng/m3	Poly bag 632	NA	NA	Headspace	Food	Kitchen items	110
1210	Property 1	Residential	5/9/2016	11:04	NR	NR	NR	NR	NR	69	83	ng/m3	Poly bag 634	NA	NA	Headspace	Decorative	Christmas	126
1210	Property 1	Residential	5/9/2016	11:06	NR	NR	NR	NR	NR	97	183	ng/m3	Poly bag 635	NA	NA	Headspace	Miscellaneous	Garage items	122
1210	Property 1	Residential	5/9/2016	11:07	NR	NR	NR	NR	NR	80	89	ng/m3	Poly bag 636	NA	NA	Headspace	Lighting	Base of silver lamp	102
1210	Property 1	Residential	5/9/2016	11:09	NR	NR	NR	NR	NR	50	56	ng/m3	Poly bag 637	NA	NA	Headspace	Decorative	Christmas	112
1210	Property 1	Residential	5/9/2016	11:11	NR	NR	NR	NR	NR	35	40	ng/m3	Poly bag 638	NA	NA	Headspace	Food	From pantry	116
1210	Property 1	Residential	5/9/2016	11:13	NR	NR	NR	NR	NR	54	69	ng/m3	Poly bag 639	NA	NA	Headspace	Clothes	Sweaters and sweatshirts	138
1210	Property 1	Residential	5/9/2016	11:14	NR	NR	NR	NR	NR	22	27	ng/m3	Poly bag 640	NA	NA	Headspace	Miscellaneous	Wooden cutting board, decorations	118
1210	Property 1	Residential	5/9/2016	11:15	NR	NR	NR	NR	NR	45	50	ng/m3	Poly bag 641	NA	NA	Headspace	Food	From pantry	129
1210	Property 1	Residential	5/9/2016	11:17	NR	NR	NR	NR	NR	92	105	ng/m3	Poly bag 642	NA	NA	Headspace	Storage	Basket	118
1210	Property 1	Residential	5/9/2016	11:19	NR	NR	NR	NR	NR	29	31	ng/m3	Poly bag 643	NA	NA	Headspace	Decorative	Christmas	113
1210	Property 1	Residential	5/9/2016	11:21	NR	NR	NR	NR	NR	24	31	ng/m3	Poly bag 644	NA	NA	Headspace	Decorative	Fall and Halloween	98
1210	Property 1	Residential	5/9/2016	11:23	NR	NR	NR	NR	NR	105	134	ng/m3	Poly bag 647	NA	NA	Headspace	Storage	Cooler	126
1210	Property 1	Residential	5/9/2016	11:00	NR	NR	NR	NR	NR	72	79	ng/m3	Poly bag 645	NA	NA	Headspace	Miscellaneous	Notebooks and movies	128
1210	Property 1	Residential	5/9/2016	11:24	NR	NR	NR	NR	NR	330	461	ng/m3	Poly bag 646	NA	NA	Headspace	Miscellaneous	Lax helmet, dolls, etc.	115
1210	Property 1	Residential	5/9/2016	11:27	NR	NR	NR	NR	NR	62	77	ng/m3	Poly bag 648	NA	NA	Headspace	Decorative	Table clothes etc	113
1210	Property 1	Residential	5/9/2016	11:28	NR	NR	NR	NR	NR	700	1000	ng/m3	Poly bag 649	NA	NA	Headspace	Clothes	Sweatshirts, scarves and cardigans	123
1210	Property 1	Residential	5/9/2016	11:29	NR	NR	NR	NR	NR	148	154	ng/m3	Poly bag 650	NA	NA	Headspace	Clothes	Miscellaneous Clothes	129
1210	Property 1	Residential	5/9/2016	11:30	NR	NR	NR	NR	NR	188	203	ng/m3	Poly bag 651	NA	NA	Headspace	Decorative	Picture, serving tray	111
1210	Property 1	Residential	5/9/2016	11:32	NR	NR	NR	NR	NR	54	59	ng/m3	Poly bag 652	NA	NA	Headspace	Miscellaneous	Tote bag and boxes	112
1210	Property 1	Residential	5/9/2016	11:34	NR	NR	NR	NR	NR	39	41	ng/m3	Poly bag 653	NA	NA	Headspace	Miscellaneous	Books, frames	128
1210	Property 1	Residential	5/9/2016	11:51	NR	NR	NR	NR	NR	41	68	ng/m3	Poly bag 654	NA	NA	Headspace	Miscellaneous	Pillows	148
1210	Property 1	Residential	5/9/2016	11:53	NR	NR	NR	NR	NR	18	24	ng/m3	Poly bag 655	NA	NA	Headspace	Miscellaneous	Pictures frames/ books	132
1210	Property 1	Residential	5/9/2016	11:55	NR	NR	NR	NR	NR	137	178	ng/m3	Poly bag 656	NA	NA	Headspace	Miscellaneous	Towels	134
1210	Property 1	Residential	5/9/2016	11:57	NR	NR	NR	NR	NR	65	92	ng/m3	Poly bag 657	NA	NA	Headspace	Clothes	Winter coat , blanket	140
1210	Property 1	Residential	5/9/2016	13:42	NR	NR	NR	NR	NR	66	87	ng/m3	Poly bag 658	NA	NA	Headspace	Decorative	Vases and pottery	131
1210	Property 1	Residential	5/9/2016	13:44	NR	NR	NR	NR	NR	10	14	ng/m3	Poly bag 549	NA	NA	Headspace	Food	From pantry	150
1210	Property 1	Residential	5/9/2016	13:45	NR	NR	NR	NR	NR	18	21	ng/m3	Poly bag 659	NA	NA	Headspace	Glassware	Plates	137
1210	Property 1	Residential	5/9/2016	13:46	NR	NR	NR	NR	NR	10	12	ng/m3	Poly bag 633	NA	NA	Headspace	Glassware	Plates and glasses	140
1210	Property 1	Residential	5/9/2016	13:47	NR	NR	NR	NR	NR	6	8	ng/m3	Poly bag 660	NA	NA	Headspace	Kitchenware	Miscellaneous pans and pots	108
1210	Property 1	Residential	5/9/2016	13:50	NR	NR	NR	NR	NR	11	13	ng/m3	Poly bag 661	NA	NA	Headspace	Glassware	Miscellaneous items from kitchen	148
1210	Property 1	Residential	5/9/2016	13:52	NR	NR	NR	NR	NR	109	177	ng/m3	Poly bag 662	NA	NA	Headspace	Storage	Cooler	107
1210	Property 1	Residential	5/9/2016	13:54	NR	NR	NR	NR	NR	10	14	ng/m3	Poly bag 663	NA	NA	Headspace	Miscellaneous	Decorations	112
1210	Property 1	Residential	5/9/2016	13:56	NR	NR	NR	NR	NR	44	57	ng/m3	Poly bag 664	NA	NA	Headspace	Athletics	Golf clubs	110
1210	Property 1	Residential	5/9/2016	13:58	NR	NR	NR	NR	NR	20	25	ng/m3	Poly bag 307	NA	NA	Headspace	Decorative	Mirror	125
1210	Property 1	Residential	5/9/2016	13:59	NR	NR	NR	NR	NR	692	793	ng/m3	Poly bag 665	NA	NA	Headspace	Miscellaneous	Ladder from garage	123
1210	Property 1	Residential	5/9/2016	14:01	NR	NR	NR	NR	NR	50	69	ng/m3	Poly bag 301	NA	NA	Headspace	Miscellaneous	Ironing board	117
1210	Property 1	Residential	5/9/2016	14:03	NR	NR	NR	NR	NR	34	42	ng/m3	Poly bag 666	NA	NA	Headspace	Athletics	Skins	129
1210	Property 1	Residential	5/9/2016	14:05	NR	NR	NR	NR	NR	26	29	ng/m3	Poly bag 300	NA	NA	Headspace	Furniture	Dining room table chair	113
1210	Property 1	Residential	5/9/2016	14:07	NR	NR	NR	NR	NR	38	42	ng/m3	Poly bag 667	NA	NA	Headspace	Decorative	Chalk board	105
1210	Property 1	Residential	5/9/2016	14:09	NR	NR	NR	NR	NR	18	22	ng/m3	Poly bag 584	NA	NA	Headspace	Decorative	Candles	123
1210	Property 1	Residential	5/9/2016	14:11	NR	NR	NR	NR	NR	14	16	ng/m3	Poly bag 668	NA	NA	Headspace	Glassware	Holiday plates	118
1210	Property 1	Residential	5/9/2016	14:13	NR	NR	NR	NR	NR	52	60	ng/m3	Poly bag 669	NA	NA	Headspace	Decorative	Candles	111
1210	Property 1	Residential	5/9/2016	14:16	NR	NR	NR	NR	NR	18	21	ng/m3	Poly bag 670	NA	NA	Headspace	Glassware	Ceramic bowls and plates	124
1210	Property 1	Residential	5/9/2016	14:18	NR	NR	NR	NR	NR	14	18	ng/m3	Poly bag 671	NA	NA	Headspace	Furniture	Baseboard from baby bed	111
1210	Property 1	Residential	5/9/2016	14:22	NR	NR	NR	NR	NR	11	15	ng/m3	Poly bag 672	NA	NA	Headspace	Furniture	Table	99
1210	Property 1	Residential	5/9/2016	14:25	NR	NR	NR	NR	NR	15	17	ng/m3	Poly bag 318	NA	NA	Headspace	Furniture	White dresser	150
1210	Property 1	Residential	5/9/2016	14:27	NR	NR	NR	NR	NR	43	57	ng/m3	Poly bag 673	NA	NA	Headspace	Furniture	Dining room table chair	114
1210	Property 1	Residential	5/9/2016	14:28	NR	NR	NR	NR	NR	22	29	ng/m3	Poly bag 302	NA	NA	Headspace	Furniture	Leather chair	113
1210	Property 1	Residential	5/9/2016	14:31	NR	NR	NR	NR	NR	186	237	ng/m3	Poly bag 674	NA	NA	Headspace	Miscellaneous	Tent	110
1210	Property 1	Residential	5/9/2016	14:34	NR	NR	NR	NR	NR	15	17	ng/m3	Poly bag 333	NA	NA	Headspace	Furniture	Couch	130
1210	Property 1	Residential	5/9/2016	14:37	NR	NR	NR	NR	NR	22	23	ng/m3	Poly bag 676	NA	NA	Headspace	Furniture	Cabinet	124
1210	Property 1	Residential	5/9/2016	14:32	NR	NR	NR	NR	NR	14	24	ng/m3	Poly bag 677	NA	NA	Headspace	Furniture	Cabinet	132
1210	Property 1	Residential	5/9/2016	14:49	NR	NR	NR	NR	NR	17	21	ng/m3	Poly bag 675	NA	NA	Headspace	Furniture	Cabinet	101
1210	Property 1	Residential	5/9/2016	14:53	NR	NR	NR	NR	NR	63	66	ng/m3	Poly bag 290	NA	NA	Headspace	Furniture	2 stacked chairs	105
1210	Property 2	Residential	5/9/2016	15:03	NR	NR	NR	NR	NR	45	209	ng/m3	Laundry room	NR	NA	Headspace	Washer	Interior	59
1210	Property 2	Residential	5/9/2016	15:09	NR	NR	NR	NR	NR	29	37	ng/m3	Laundry room	NR	NA	Headspace	Dryer	Interior	59
1210	Property 2	Residential	5/9/2016	15:19	NR	NR	NR	NR	NR	50	98	ng/m3	Laundry room	NR	NA	Breathing zone	NR	NR	61
1210	Property 2	Residential	5/9/2016	15:19	NR	NR	NR	NR	NR	27	54	ng/m3	Laundry room	NR	NA	Floor	NR	NR	60
1210	Property 2	Residential	5/9/2016	15:22	NR	NR	NR	NR	NR	30	41	ng/m3	Hallway to Laundry room	NR	NR	Floor	NR	NR	60
1210	Property 2	Residential	5/9/2016	15:22	NR	NR	NR	NR	NR	30	41	ng/m3	Hallway to Laundry room	NR	NR	Breathing zone	NR	NR	60

NA- Not Applicable
NR- Not Recorded
R - Standard Deviation

Appendix G: Lumex Screening Results Summary Table
Greenleafe Drive Mercury Response Site
Baldwinsville, Onondaga County, New York

Serial Number	Property Number	Land Use	Date	Time	Screening-1	Screening-2	Screening-3	Average Screening Result	R	Minimum	Maximum	Units	Location	Floor	Floor Cover	Height	Item Type	Description	Temperature (˚F)
1210	Property 2	Residential	5/9/2016	15:26	NR	NR	NR	NR	NR	22	65	ng/m3	Kitchen	NR	NR	Floor	NR	NR	61
1210	Property 2	Residential	5/9/2016	15:26	NR	NR	NR	NR	NR	15	27	ng/m3	Kitchen	NR	NR	Breathing zone	NR	NR	61
1210	Property 2	Residential	5/9/2016	15:29	NR	NR	NR	NR	NR	12	26	ng/m3	Stairwell	NR	NR	Breathing zone	NR	NR	60
1210	Property 2	Residential	5/9/2016	15:31	NR	NR	NR	NR	NR	7	13	ng/m3	Stairwell	NR	NR	Floor	NR	NR	62
1210	Property 2	Residential	5/9/2016	15:33	NR	NR	NR	NR	NR	3	6	ng/m3	Stairwell	NR	NR	Breathing zone	Top step	NR	60
1210	Property 2	Residential	5/9/2016	15:34	NR	NR	NR	NR	NR	4	33	ng/m3	Stairwell	NR	NR	Floor	Top step	NR	61
1210	Property 2	Residential	5/9/2016	15:35	NR	NR	NR	NR	NR	7	13	ng/m3	Stairwell	NR	NR	Breathing zone	Middle step	NR	61
1210	Property 2	Residential	5/9/2016	15:37	NR	NR	NR	NR	NR	9	15	ng/m3	Stairwell	NR	NR	Floor	Middle step	NR	60
1210	Property 2	Residential	5/9/2016	15:39	NR	NR	NR	NR	NR	10	14	ng/m3	Stairwell	NR	NR	Breathing zone	Landing	NR	61
1210	Property 2	Residential	5/9/2016	15:40	NR	NR	NR	NR	NR	5	21	ng/m3	Stairwell	NR	NR	Floor	Landing	NR	61
1210	Property 1	Residential	5/9/2016	16:05	NR	NR	NR	NR	NR	489	575	ng/m3	Poly bag 678	NA	NA	Headspace	Furniture	Tool box	113
1210	Property 1	Residential	5/9/2016	16:12	NR	NR	NR	NR	NR	37	62	ng/m3	Poly bag 679	NA	NA	Headspace	Clothes	Jeans	116
1210	Property 1	Residential	5/9/2016	14:20	NR	NR	NR	NR	NR	244	305	ng/m3	Poly bag 680	NA	NA	Headspace	Clothes	NR	117
1210	Property 1	Residential	5/9/2016	14:25	NR	NR	NR	NR	NR	20	27	ng/m3	Poly bag 681	NA	NA	Headspace	Miscellaneous	Dehumidifier	148
1210	Property 1	Residential	5/9/2016	16:30	NR	NR	NR	NR	NR	83	180	ng/m3	Poly bag 682	NA	NA	Headspace	Clothes	NR	152
1210	Property 1	Residential	5/9/2016	NR	NR	NR	NR	NR	NR	NR	NR	ng/m3	NR	NR	NR	Headspace	--	NR	NR
1210	Property 1	Residential	5/9/2016	16:38	NR	NR	NR	NR	NR	343	478	ng/m3	Poly bag 684	NA	NA	Headspace	Clothes	NR	153
1210	Property 1	Residential	5/9/2016	16:40	NR	NR	NR	NR	NR	3	4	ng/m3	Poly bag 294	NA	NA	Headspace	Miscellaneous	Kids toy	122
1210	Property 1	Residential	5/9/2016	16:42	NR	NR	NR	NR	NR	1507	2221	ng/m3	Poly bag 683	NA	NA	Headspace	Clothes	NR	159
1210	Property 1	Residential	5/9/2016	16:50	NR	NR	NR	NR	NR	24	27	ng/m3	Poly bag 685	NA	NA	Headspace	Clothes	NR	90
1210	Property 1	Residential	5/9/2016	16:54	NR	NR	NR	NR	NR	220	550	ng/m3	Poly bag 686	NA	NA	Headspace	Furniture	Table	143
1210	Property 1	Residential	5/9/2016	16:59	NR	NR	NR	NR	NR	90	124	ng/m3	Poly bag 442	NA	NA	Headspace	Miscellaneous	Trash can	106
1210	Property 1	Residential	5/9/2016	17:01	NR	NR	NR	NR	NR	30	43	ng/m3	Poly bag 687	NA	NA	Headspace	Miscellaneous	Xmas lights	120
1210	Property 1	Residential	5/9/2016	17:04	NR	NR	NR	NR	NR	40	54	ng/m3	Poly bag 688	NA	NA	Headspace	Clothes	NR	130
1210	Property 1	Residential	5/9/2016	17:10	NR	NR	NR	NR	NR	126	160	ng/m3	Poly bag 689	NA	NA	Headspace	Furniture	White sofa chair	110
1210	Property 1	Residential	5/9/2016	17:13	NR	NR	NR	NR	NR	34	41	ng/m3	Poly bag 476	NA	NA	Headspace	Furniture	End table , cloth	116
1210	Property 1	Residential	5/9/2016	17:16	NR	NR	NR	NR	NR	1104	2164	ng/m3	Poly bag 425	NA	NA	Headspace	Furniture	Foot rest	127
1210	Property 1	Residential	5/9/2016	17:19	NR	NR	NR	NR	NR	135	226	ng/m3	Poly bag 690	NA	NA	Headspace	Furniture	White couch cushion	110
1210	Property 1	Residential	5/9/2016	17:21	NR	NR	NR	NR	NR	16	33	ng/m3	Poly bag 691	NA	NA	Headspace	Furniture	White sofa chair	113
1210	Property 1	Residential	5/9/2016	17:23	NR	NR	NR	NR	NR	242	447	ng/m3	Poly bag 692	NA	NA	Headspace	Furniture	White couch cushion	125
1210	Property 1	Residential	5/9/2016	17:26	NR	NR	NR	NR	NR	5	9	ng/m3	Poly bag 488	NA	NA	Headspace	Decorative	Gold candle holder	110
1210	Property 1	Residential	5/9/2016	17:29	NR	NR	NR	NR	NR	140	262	ng/m3	Poly bag 693	NA	NA	Headspace	Furniture	White couch cushion	111
1210	Property 1	Residential	5/9/2016	17:31	NR	NR	NR	NR	NR	700	796	ng/m3	Poly bag 694	NA	NA	Headspace	Furniture	White couch cushion	140
1210	Property 1	Residential	5/9/2016	17:33	NR	NR	NR	NR	NR	30	36	ng/m3	Poly bag 695	NA	NA	Headspace	Miscellaneous	Blue folding chair	113
1210	Property 2	Residential	5/9/2016	17:48	NR	NR	NR	NR	NR	532	582	ng/m3	Laundry room	NR	NR	Headspace	Washer	Interior	80
1210	Property 2	Residential	5/9/2016	17:50	NR	NR	NR	NR	NR	18	22	ng/m3	Laundry room	NR	NR	Headspace	Dryer	Interior	80
1210	Property 2	Residential	5/9/2016	17:49	NR	NR	NR	NR	NR	32	38	ng/m3	Laundry room	NR	NR	Breathing zone	NR	NR	80
1210	Property 2	Residential	5/9/2016	17:50	NR	NR	NR	NR	NR	49	289	ng/m3	Laundry room	NR	NR	Floor	NR	NR	80
1210	Property 2	Residential	5/9/2016	17:51	NR	NR	NR	NR	NR	76	112	ng/m3	Hallway to Laundry room	NR	NR	Floor	NR	Dear garage door	80
1210	Property 2	Residential	5/9/2016	17:51	NR	NR	NR	NR	NR	40	61	ng/m3	Hallway to Laundry room	NR	NR	Breathing zone	NR	NR	80
1210	Property 2	Residential	5/9/2016	17:52	NR	NR	NR	NR	NR	61	141	ng/m3	Kitchen	NR	NR	Floor	NR	Under plastic near cabinet	80
1210	Property 2	Residential	5/9/2016	17:52	NR	NR	NR	NR	NR	80	106	ng/m3	Kitchen	NR	NR	Breathing zone	NR	NR	80
1210	Property 2	Residential	5/9/2016	17:53	NR	NR	NR	NR	NR	36	54	ng/m3	Stairwell	NR	NR	Breathing zone	NR	NR	80
1210	Property 2	Residential	5/9/2016	17:54	NR	NR	NR	NR	NR	32	39	ng/m3	Stairwell	NR	NR	Floor	NR	Middle step	80
1210	Property 2	Residential	5/9/2016	17:55	NR	NR	NR	NR	NR	28	31	ng/m3	Stairwell	NR	NR	Breathing zone	Top step	NR	80
1210	Property 2	Residential	5/9/2016	17:54	NR	NR	NR	NR	NR	31	34	ng/m3	Stairwell	NR	NR	Floor	Top step	NR	80
1210	Property 2	Residential	5/9/2016	17:54	NR	NR	NR	NR	NR	29	40	ng/m3	Stairwell	NR	NR	Breathing zone	Middle step	NR	80
1210	Property 2	Residential	5/9/2016	17:55	NR	NR	NR	NR	NR	35	35	ng/m3	Stairwell	NR	NR	Breathing zone	Landing	NR	80
1210	Property 2	Residential	5/9/2016	17:53	NR	NR	NR	NR	NR	30	32	ng/m3	Stairwell	NR	NR	Floor	Landing	NR	80
1210	Property 1	Residential	5/10/16	8:44	NR	NR	NR	NR	NR	1170	1200	ng/m3	Flag D1	NA	NA	Headspace	NR	Driveway Sample	62
1210	Property 1	Residential	5/10/16	8:45	NR	NR	NR	NR	NR	5600	41080	ng/m3	Flag D2	NA	NA	Headspace	NR	Driveway Sample	63
1210	Property 1	Residential	5/10/16	8:46	NR	NR	NR	NR	NR	3911	4159	ng/m3	Flag D3	NA	NA	Headspace	NR	Driveway Sample	63
1210	Property 1	Residential	5/10/16	8:53	NR	NR	NR	NR	NR	4590	9160	ng/m3	Flag D4	NA	NA	Headspace	NR	Driveway Sample	62
1210	Property 1	Residential	5/10/16	8:56	NR	NR	NR	NR	NR	250	266	ng/m3	Flag D5	NA	NA	Headspace	NR	Driveway Sample	61
1210	Property 1	Residential	5/10/16	9:00	NR	NR	NR	NR	NR	670	831	ng/m3	Flag D6	NA	NA	Headspace	NR	Driveway Sample	60
1210	Property 1	Residential	5/10/16	9:01	NR	NR	NR	NR	NR	4100	4320	ng/m3	Flag D7	NA	NA	Headspace	NR	Driveway Sample	70
1210	Property 1	Residential	5/10/16	9:03	NR	NR	NR	NR	NR	4000	4382	ng/m3	Flag D8	NA	NA	Headspace	NR	Driveway Sample	71
1210	Property 1	Residential	5/10/16	9:04	NR	NR	NR	NR	NR	5250	5420	ng/m3	Flag D9	NA	NA	Headspace	NR	Driveway Sample	88
1210	Property 1	Residential	5/10/16	8:47	NR	NR	NR	NR	NR	800	2100	ng/m3	Flag D10	NA	NA	Headspace	NR	Driveway Sample. New dirt near basketball hoop	65
1210	Property 1	Residential	5/10/16	8:58	NR	NR	NR	NR	NR	9111	1007	ng/m3	Flag G1	NA	NA	Headspace	NR	Mulch near grass area	83
1210	Property 1	Residential	5/10/16	8:56	NR	NR	NR	NR	NR	128	130	ng/m3	Flag G2	NA	NA	Headspace	NR	Mulch near grass area	80
1210	Property 1	Residential	5/10/16	8:59	NR	NR	NR	NR	NR	94	120	ng/m3	Flag G1A	NA	NA	Headspace	NR	Mulch near grass area	82
1210	Property 1	Residential	5/10/16	9:09	NR	NR	NR	NR	NR	47	66	ng/m3	Flag G4B	NA	NA	Headspace	NR	Edge of dirt and grass	62
1210	Property 1	Residential	5/10/16	9:10	NR	NR	NR	NR	NR	33	60	ng/m3	Flag G6B	NA	NA	Headspace	NR	NR	58
1210	Property 1	Residential	5/10/16	9:12	NR	NR	NR	NR	NR	176	300	ng/m3	Pathway in Grass	NA	NA	Headspace	NR	NR	57
1210	Property 1	Residential	5/10/16	9:15	NR	NR	NR	NR	NR	410	437	ng/m3	Flag D11	NA	NA	Headspace	NR	Dirt next to driveway	56
1210	Property 1	Residential	5/10/16	9:18	NR	NR	NR	NR	NR	540	824	ng/m3	Flag G5A	NA	NA	Headspace	NR	NR	57
1210	Property 1	Residential	5/10/16	9:19	NR	NR	NR	NR	NR	24	42	ng/m3	Flag G8	NA	NA	Headspace	NR	NR	58
1210	Property 1	Residential	5/10/16	9:34	NR	NR	NR	NR	NR	71	83	ng/m3	Poly bag 696	NA	NA	Headspace	Miscellaneous	Bag	102
1210	Property 1	Residential	5/10/16	9:38	NR	NR	NR	NR	NR	817	995	ng/m3	Poly bag 697	NA	NA	Headspace	Accessories	Boots, boat shoes (items will be screened	105
1210	Property 1	Residential	5/10/16	9:40	NR	NR	NR	NR	NR	74	81	ng/m3	Poly bag 698	NA	NA	Headspace	Miscellaneous	Kitchen goods	117
1210	Property 1	Residential	5/10/16	9:42	NR	NR	NR	NR	NR	87	100	ng/m3	Poly bag 699	NA	NA	Headspace	Toy	Basketball	140
1210	Property 1	Residential	5/10/16	9:46	NR	NR	NR	NR	NR	70	84	ng/m3	Poly bag 331	NA	NA	Headspace	Furniture	Cabinet	137
1210	Property 1	Residential	5/10/16	9:49	NR	NR	NR	NR	NR	63	69	ng/m3	Poly bag 700	NA	NA	Headspace	Accessories	Box, picture frame	125
1210	Property 1	Residential	5/10/16	9:54	NR	NR	NR	NR	NR	62	81	ng/m3	Poly bag 415	NA	NA	Headspace	Accessories	Drapes	102
1210	Property 1	Residential	5/10/16	10:00	NR	NR	NR	NR	NR	482	967	ng/m3	Poly bag 701	NA	NA	Headspace	Clothing	Ugg boots from bag 697	92
1210	Property 1	Residential	5/10/16	10:03	NR	NR	NR	NR	NR	1300	1831	ng/m3	Poly bag 702	NA	NA	Headspace	Clothing	Boat shoes from bag 697	117
1210	Property 1	Residential	5/10/16	10:05	NR	NR	NR	NR	NR	242	308	ng/m3	Poly bag 703	NA	NA	Headspace	Clothing	Rain boots from bag 697	140
1210	Property 1	Residential	5/10/16	10:08	NR	NR	NR	NR	NR	193	316	ng/m3	Poly bag 704	NA	NA	Headspace	Clothing	Sandals from bag 697	116
1210	Property 1	Residential	5/10/16	11:34	NR	NR	NR	NR	NR	37	52	ng/m3	Poly bag 705	NA	NA	Headspace	Clothing	NR	114
1210	Property 1	Residential	5/10/16	13:22	NR	NR	NR	NR	NR	1616	1912	ng/m3	Poly bag 706	NA	NA	Headspace	Furniture	Slip covers: white couch	148
1210	Property 1	Residential	5/10/16	13:26	NR	NR	NR	NR	NR	45	76	ng/m3	Poly bag 707	NA	NA	Headspace	Clothes	NR	120
1210	Property 1	Residential	5/10/16	13:27	NR	NR	NR	NR	NR	1451	1702	ng/m3	Poly bag 708	NA	NA	Headspace	Furniture	Slip covers: white couch	141
1210	Property 1	Residential	5/10/16	13:29	NR	NR	NR	NR	NR	48	63	ng/m3	Poly bag 709	NA	NA	Headspace	Clothes	NR	130
1210	Property 1	Residential	5/10/16	13:30	NR	NR	NR	NR	NR	28	34	ng/m3	Poly bag 710	NA	NA	Headspace	Clothes	NR	137

NA- Not Applicable
NR- Not Recorded
R - Standard Deviation

Appendix G: Lumex Screening Results Summary Table
Greenleafe Drive Mercury Response Site
Baldwinsville, Onondaga County, New York

Serial Number	Property Number	Land Use	Date	Time	Screeining-1	Screeining-2	Screeining-3	Average Screening Result	R	Minimum	Maximum	Units	Location	Floor	Floor Cover	Height	Item Type	Description	Temperature (˚F)
1210	Property 1	Residential	5/10/16	13:32	NR	NR	NR	NR	NR	84	147	ng/m3	Poly bag 711	NA	NA	Headspace	Clothes	NR	142
1210	Property 1	Residential	5/10/16	13:35	NR	NR	NR	NR	NR	72	90	ng/m3	Poly bag 712	NA	NA	Headspace	Clothes	NR	130
1210	Property 1	Residential	5/10/16	13:37	NR	NR	NR	NR	NR	54	60	ng/m3	Poly bag 713	NA	NA	Headspace	Clothes	Lax gear from bag 711	137
1210	Property 1	Residential	5/10/16	13:38	NR	NR	NR	NR	NR	175	227	ng/m3	Poly bag 714	NA	NA	Headspace	Linens	Towels (ext of towel test)	153
1210	Property 1	Residential	5/10/16	13:46	NR	NR	NR	NR	NR	232	282	ng/m3	Poly bag 715	NA	NA	Headspace	Clothes	Kids	141
1210	Property 1	Residential	5/10/16	13:49	NR	NR	NR	NR	NR	121	199	ng/m3	Poly bag 716	NA	NA	Headspace	Clothes	NR	127
1210	Property 1	Residential	5/10/16	13:52	NR	NR	NR	NR	NR	11000	16490	ng/m3	Poly bag 717	NA	NA	Headspace	Tools	Air compressor	133
1210	Property 1	Residential	5/10/16	14:35	NR	NR	NR	NR	NR	249	314	ng/m3	Soil N driveway	NA	NA	Floor	Soil	Middle	84
1210	Property 1	Residential	5/10/16	14:39	NR	NR	NR	NR	NR	103	312	ng/m3	Soil N driveway	NA	NA	Floor	Soil	Top (near fence)	78
491	Property 2	Residential	5/10/2016	14:41	NR	NR	NR	NR	NR	144	499	ng/m3	Soil N driveway	NA	NA	Floor	Soil	Top center	80
491	Property 2	Residential	5/10/2016	14:44	NR	NR	NR	NR	NR	178	329	ng/m3	Soil N driveway	NA	NA	Floor	Soil	Top center 3" bgs	78
491	Property 2	Residential	5/10/2016	14:46	NR	NR	NR	NR	NR	156	322	ng/m3	Soil N driveway	NA	NA	Floor	Soil	Middle away from driveway	85
491	Property 2	Residential	5/10/2016	14:48	NR	NR	NR	NR	NR	42	170	ng/m3	Soil N driveway	NA	NA	Floor	Soil	Bottom away from driveway	83
491	Property 2	Residential	5/10/2016	14:54	NR	NR	NR	NR	NR	2000	12369	ng/m3	Front walk way	NA	NA	Floor	Pavers	Pathway, near driveway	100
491	Property 2	Residential	5/10/2016	14:56	NR	NR	NR	NR	NR	2565	4100	ng/m3	Front walk way	NA	NA	Floor	Pavers	Pathway, middle	98
491	Property 2	Residential	5/10/2016	14:58	NR	NR	NR	NR	NR	789	1650	ng/m3	Front walk way	NA	NA	Floor	Pavers	90 degree turn	96
491	Property 2	Residential	5/10/2016	15:03	NR	NR	NR	NR	NR	1495	3780	ng/m3	Front walk way	NA	NA	Floor	Dirt	Dirt away from house closer to street, closest to	90
491	Property 2	Residential	5/10/2016	15:04	NR	NR	NR	NR	NR	N.R	4260	ng/m3	Front walk way	NA	NA	Floor	Dirt	Dirt away from house closer to street, middle	90
1210	Property 2	Residential	5/10/2016	15:21	NR	NR	NR	NR	NR	2374	2755	ng/m3	Front walk way	NA	NA	Floor	Dirt	Dirt on outer 90 awat from driveway	90
1210	Property 2	Residential	5/10/2016	15:31	NR	NR	NR	NR	NR	221	260	ng/m3	Laundry room	NR	NR	Headspace	NR	Washer	89
1210	Property 2	Residential	5/10/2016	15:32	NR	NR	NR	NR	NR	28	34	ng/m3	Laundry room	NR	NR	Headspace	NR	Dryer	89
1210	Property 2	Residential	5/10/2016	15:32	NR	NR	NR	NR	NR	57	64	ng/m3	Laundry room	NR	NR	Breathing zone	NR	NR	89
1210	Property 2	Residential	5/10/2016	15:32	NR	NR	NR	NR	NR	47	59	ng/m3	Laundry room	NR	NR	Floor	NR	NR	89
1210	Property 2	Residential	5/10/2016	15:34	NR	NR	NR	NR	NR	95	154	ng/m3	Hallway to Laundry room	NR	NR	Floor	NR	Dear garage door	83
1210	Property 2	Residential	5/10/2016	15:34	NR	NR	NR	NR	NR	58	66	ng/m3	Hallway to Laundry room	NR	NR	Breathing zone	NR	NR	83
1210	Property 2	Residential	5/10/2016	15:35	NR	NR	NR	NR	NR	86	167	ng/m3	Kitchen	NR	NR	Floor	NR	Under plastic near cabinet	87
1210	Property 2	Residential	5/10/2016	15:37	NR	NR	NR	NR	NR	60	65	ng/m3	Kitchen	NR	NR	Breathing zone	NR	NR	87
1210	Property 2	Residential	5/10/2016	15:40	NR	NR	NR	NR	NR	49	55	ng/m3	Stairwell	NR	NR	Floor	NR	Middle step	86
1210	Property 2	Residential	5/10/2016	15:41	NR	NR	NR	NR	NR	48	54	ng/m3	Stairwell	NR	NR	Breathing zone	NR	Top step	87
1210	Property 2	Residential	5/10/2016	15:41	NR	NR	NR	NR	NR	50	60	ng/m3	Stairwell	NR	NR	Floor	NR	Top step	87
1210	Property 2	Residential	5/10/2016	15:39	NR	NR	NR	NR	NR	56	41	ng/m3	Stairwell	NR	NR	Breathing zone	NR	Middle step	86
1210	Property 2	Residential	5/10/2016	15:38	NR	NR	NR	NR	NR	54	63	ng/m3	Stairwell	NR	NR	Breathing zone	NR	Landing	88
1210	Property 2	Residential	5/10/2016	15:38	NR	NR	NR	NR	NR	42	56	ng/m3	Stairwell	NR	NR	Floor	NR	Landing	88
1210	Property 2	Residential	5/10/2016	15:45	NR	NR	NR	NR	NR	52	54	ng/m3	Bedroom-Guest 1	NR	NR	Breathing zone	NR	Middle	86
1210	Property 2	Residential	5/10/2016	15:46	NR	NR	NR	NR	NR	64	72	ng/m3	Bedroom-Guest 1	NR	NR	Floor	NR	Middle	86
1210	Property 2	Residential	5/10/2016	15:47	NR	NR	NR	NR	NR	53	58	ng/m3	Bedroom-Guest 2	NR	NR	Breathing zone	NR	Middle	88
1210	Property 2	Residential	5/10/2016	15:47	NR	NR	NR	NR	NR	56	67	ng/m3	Bedroom-Guest 2	NR	NR	Floor	NR	Middle	88
1210	Property 2	Residential	5/10/2016	15:49	NR	NR	NR	NR	NR	59	63	ng/m3	Bedroom-Master	NR	NR	Breathing zone	NR	Middle	85
1210	Property 2	Residential	5/10/2016	15:49	NR	NR	NR	NR	NR	65	90	ng/m3	Bedroom-Master	NR	NR	Floor	NR	Middle	85
1210	Property 2	Residential	5/10/2016	15:54	NR	NR	NR	NR	NR	57	63	ng/m3	Bedroom-Son	NR	NR	Breathing zone	NR	Middle	85
1210	Property 2	Residential	5/10/2016	15:55	NR	NR	NR	NR	NR	57	80	ng/m3	Bedroom-Son	NR	NR	Floor	NR	Middle	85
1210	Property 2	Residential	5/10/2016	15:56	NR	NR	NR	NR	NR	53	60	ng/m3	2nd floor bathroom	NR	NR	Breathing zone	NR	Middle	81
1210	Property 2	Residential	5/10/2016	15:57	NR	NR	NR	NR	NR	59	65	ng/m3	2nd floor bathroom	NR	NR	Floor	NR	Middle	81
1210	Property 2	Residential	5/10/2016	16:00	NR	NR	NR	NR	NR	60	65	ng/m3	Master Bathroom	NR	NR	Breathing zone	NR	Middle	86
1210	Property 2	Residential	5/10/2016	16:00	NR	NR	NR	NR	NR	60	72	ng/m3	Master bathroom	NR	NR	Floor	NR	Middle	86
1210	Property 2	Residential	5/10/2016	16:01	NR	NR	NR	NR	NR	121	143	ng/m3	Master Bathroom	NR	NR	Headspace	NR	Tub drain	82
1210	Property 2	Residential	5/10/2016	16:01	NR	NR	NR	NR	NR	63	67	ng/m3	Master Bathroom	NR	NR	Headspace	NR	Sink drain	82
1210	Property 2	Residential	5/10/2016	16:02	NR	NR	NR	NR	NR	55	60	ng/m3	Bathroom-Upstairs	NR	NR	Headspace	NR	Tub drain	84
1210	Property 2	Residential	5/10/2016	16:03	NR	NR	NR	NR	NR	61	64	ng/m3	Bathroom-Upstairs	NR	NR	Headspace	NR	Sink drain	84
1210	Property 2	Residential	5/10/2016	16:05	NR	NR	NR	NR	NR	130	169	ng/m3	Kitchen	NR	NR	Headspace	NR	Sink drain (disposal side)	86
1210	Property 2	Residential	5/10/2016	16:07	NR	NR	NR	NR	NR	77	84	ng/m3	Kitchen	NR	NR	Headspace	NR	Sink drain	86
1210	Property 2	Residential	5/10/2016	16:08	NR	NR	NR	NR	NR	72	75	ng/m3	Laundry Room	NR	NR	Headspace	NR	Sink drain	84
1210	Property 2	Residential	5/10/2016	16:09	NR	NR	NR	NR	NR	446	601	ng/m3	Bathroom-Downstairs	NR	NR	Headspace	NR	Sink drain	83
491	Property 1	Residential	5/10/2016	17:11	NR	NR	NR	NR	NR	585	614	ng/m3	Poly bag 718	NA	NA	Headspace	Blanket	Patriot's blanket	140
491	Property 1	Residential	5/10/2016	17:19	NR	NR	NR	NR	NR	553	612	ng/m3	Poly bag 720	NA	NA	Headspace	Bedding	Decorative pillow	130
491	Property 1	Residential	5/10/2016	17:22	NR	NR	NR	NR	NR	252	377	ng/m3	Poly bag 721	NA	NA	Headspace	Clothes	Miscellaneous clothes	128
941	Property 1	Residential	5/11/2016	8:27	NR	NR	NR	NR	NR	113	172	ng/m3	Poly bag 722	NA	NA	Headspace	Clothes	Jeans	122
941	Property 1	Residential	5/11/2016	8:35	NR	NR	NR	NR	NR	180	375	ng/m3	Poly bag 765	NA	NA	Headspace	Rug	Oriental Rug	100
701	Property 1	Residential	5/11/2016	9:06	NR	NR	NR	NR	NR	88	91	ng/m3	Poly bag 723	NA	NA	Headspace	Electronics	VHS movies	104
701	Property 1	Residential	5/11/2016	9:09	NR	NR	NR	NR	NR	535	583	ng/m3	Poly bag 724	NA	NA	Headspace	Kitchen	Miscellaneous	124
701	Property 1	Residential	5/11/2016	9:13	NR	NR	NR	NR	NR	45	49	ng/m3	Poly bag 725	NA	NA	Headspace	Kitchen	Pots and pans	103
701	Property 1	Residential	5/11/2016	10:51	NR	NR	NR	NR	NR	30	32	ng/m3	Poly bag 726	NA	NA	Headspace	Clothes	Hat	133
701	Property 1	Residential	5/11/2016	10:53	NR	NR	NR	NR	NR	276	291	ng/m3	Poly bag 727	NA	NA	Headspace	Clothes	Miscellaneous clothes	130
701	Property 1	Residential	5/11/2016	10:56	NR	NR	NR	NR	NR	180	274	ng/m3	Poly bag 728	NA	NA	Headspace	Clothes	Miscellaneous clothes	115
701	Property 1	Residential	5/11/2016	10:58	NR	NR	NR	NR	NR	360	475	ng/m3	Poly bag 729	NA	NA	Headspace	Decorative	Canvas paintings	118
701	Property 1	Residential	5/11/2016	11:00	NR	NR	NR	NR	NR	60	130	ng/m3	Poly bag 730	NA	NA	Headspace	Clothes	Baby outfit	113
701	Property 1	Residential	5/11/2016	11:02	NR	NR	NR	NR	NR	1345	1700	ng/m3	Poly bag 731	NA	NA	Headspace	Toys	Miscellaneous toys	132
701	Property 1	Residential	5/11/2016	11:05	NR	NR	NR	NR	NR	270	300	ng/m3	Poly bag 732	NA	NA	Headspace	Clothes	Miscellaneous clothes	120
701	Property 1	Residential	5/11/2016	11:07	NR	NR	NR	NR	NR	515	699	ng/m3	Poly bag 733	NA	NA	Headspace	Miscellaneous	Blue tarp and shovel	135
701	Property 1	Residential	5/11/2016	11:11	NR	NR	NR	NR	NR	250	481	ng/m3	Poly bag 734	NA	NA	Headspace	Clothes	Miscellaneous clothes	121
701	Property 1	Residential	5/11/2016	11:13	NR	NR	NR	NR	NR	35000	>50000	ng/m3	Poly bag 735	NA	NA	Headspace	Purses	Miscellaneous bags and other items	114
701	Property 1	Residential	5/11/2016	11:15	NR	NR	NR	NR	NR	71	96	ng/m3	Poly bag 736	NA	NA	Headspace	Clothes	Baby's clothes	118
701	Property 1	Residential	5/11/2016	11:17	NR	NR	NR	NR	NR	13180	14100	ng/m3	Poly bag 737	NA	NA	Headspace	Blankets	White blanket	127
701	Property 1	Residential	5/11/2016	11:19	NR	NR	NR	NR	NR	185	221	ng/m3	Poly bag 738	NA	NA	Headspace	Miscellaneous	Miscellaneous items including candles	102
701	Property 1	Residential	5/11/2016	11:22	NR	NR	NR	NR	NR	2780	3500	ng/m3	Poly bag 739	NA	NA	Headspace	Clothes	Son's clothes	122
701	Property 1	Residential	5/11/2016	11:25	NR	NR	NR	NR	NR	94	102	ng/m3	Poly bag 740	NA	NA	Headspace	Bedding	Pink sheets	145
701	Property 1	Residential	5/11/2016	11:27	NR	NR	NR	NR	NR	51	60	ng/m3	Poly bag 741	NA	NA	Headspace	Bedding	Red sheets	134
701	Property 1	Residential	5/11/2016	11:30	NR	NR	NR	NR	NR	97	113	ng/m3	Poly bag 742	NA	NA	Headspace	Bedding	Pillow from baby room	142
701	Property 1	Residential	5/11/2016	11:32	NR	NR	NR	NR	NR	3380	4780	ng/m3	Poly bag 743	NA	NA	Headspace	Clothes	Pillow and miscellaneous clothes	121
701	Property 1	Residential	5/11/2016	11:34	NR	NR	NR	NR	NR	130	155	ng/m3	Poly bag 744	NA	NA	Headspace	Toys	Pink stroller	136
701	Property 1	Residential	5/11/2016	11:37	NR	NR	NR	NR	NR	8670	10050	ng/m3	Poly bag 745	NA	NA	Headspace	Clothes	Men's clothes	142
701	Property 1	Residential	5/11/2016	11:39	NR	NR	NR	NR	NR	230	329	ng/m3	Poly bag 746	NA	NA	Headspace	Clothes	Baby's clothes	123
701	Property 1	Residential	5/11/2016	13:02	NR	NR	NR	NR	NR	53	32	ng/m3	Poly bag 747	NA	NA	Headspace	Furniture	Daughter's dresser	95
701	Property 1	Residential	5/11/2016	13:04	NR	NR	NR	NR	NR	76	144	ng/m3	Poly bag 748	NA	NA	Headspace	Furniture	White couch no cover or cushions	120
701	Property 1	Residential	5/11/2016	13:08	NR	NR	NR	NR	NR	178	824	ng/m3	Poly bag 749	NA	NA	Headspace	Decorative	Christmas	108

NA- Not Applicable
NR- Not Recorded
R - Standard Deviation

Appendix G: Lumex Screening Results Summary Table
Greenleafe Drive Mercury Response Site
Baldwinsville, Onondaga County, New York

Serial Number	Property Number	Land Use	Date	Time	Screeining-1	Screeining-2	Screeining-3	Average Screening Result	R	Minimum	Maximum	Units	Location	Floor	Floor Cover	Height	Item Type	Description	Temperature (°F)
701	Property 1	Residential	5/11/2016	13:09	NR	NR	NR	NR	NR	9100	17000	ng/m3	Poly bag 750	NA	NA	Headspace	Bedding	White sheet	101
701	Property 1	Residential	5/11/2016	13:11	NR	NR	NR	NR	NR	146	271	ng/m3	Poly bag 751	NA	NA	Headspace	Blankets	Miscellaneous blankets	116
701	Property 1	Residential	5/11/2016	13:12	NR	NR	NR	NR	NR	88	93	ng/m3	Poly bag 752	NA	NA	Headspace	Miscellaneous	Diapers, cups, etc.	126
701	Property 1	Residential	5/11/2016	13:13	NR	NR	NR	NR	NR	1403	1905	ng/m3	Poly bag 753	NA	NA	Headspace	Miscellaneous	Christmas, jeans, etc.	125
701	Property 1	Residential	5/11/2016	13:14	NR	NR	NR	NR	NR	9660	10250	ng/m3	Poly bag 754	NA	NA	Headspace	Rug	Small rug	117
701	Property 1	Residential	5/11/2016	13:17	NR	NR	NR	NR	NR	57	120	ng/m3	Poly bag 755	NA	NA	Headspace	Toys	Stuffed animals	99
701	Property 1	Residential	5/11/2016	13:20	NR	NR	NR	NR	NR	182	299	ng/m3	Poly bag 756	NA	NA	Headspace	Clothes	Miscellaneous clothes	112
701	Property 1	Residential	5/11/2016	13:23	NR	NR	NR	NR	NR	6000	6509	ng/m3	Poly bag 757	NA	NA	Headspace	Miscellaneous	Blankets, other items	99
701	Property 1	Residential	5/11/2016	13:24	NR	NR	NR	NR	NR	50	57	ng/m3	Poly bag 758	NA	NA	Headspace	Clothes	Miscellaneous clothes	96
701	Property 1	Residential	5/11/2016	13:26	NR	NR	NR	NR	NR	1280	1370	ng/m3	Poly bag 759	NA	NA	Headspace	Rug	Small white rug	101
701	Property 1	Residential	5/11/2016	13:27	NR	NR	NR	NR	NR	496	551	ng/m3	Poly bag 760	NA	NA	Headspace	Clothes	Miscellaneous clothes	99
1210	Property 1	Residential	5/11/2016	14:05	NR	NR	NR	NR	NR	52	58	ng/m3	Poly bag 761	NA	NA	Headspace	Blankets	Pink blanket	105
1210	Property 1	Residential	5/11/2016	14:03	NR	NR	NR	NR	NR	732	862	ng/m3	Poly bag 762	NA	NA	Headspace	Storage	Blue tub	95
1210	Property 1	Residential	5/11/2016	14:16	NR	NR	NR	NR	NR	2300	5600	ng/m3	Poly bag 763	NA	NA	Headspace	Bedding	Pillows	93
1210	Property 1	Residential	5/11/2016	14:09	NR	NR	NR	NR	NR	485	1500	ng/m3	Poly bag 764	NA	NA	Headspace	Storage	Tool Box	130
1210	Property 1	Residential	5/11/2016	14:40	NR	NR	NR	NR	NR	5600	11700	ng/m3	Poly bag 765	NA	NA	Headspace	Rug	Oriental rug	115
1210	Property 1	Residential	5/11/2016	14:22	NR	NR	NR	NR	NR	565	789	ng/m3	Poly bag 766	NA	NA	Headspace	Blankets	Miscellaneous blankets	90
1210	Property 1	Residential	5/11/2016	14:24	NR	NR	NR	NR	NR	302	321	ng/m3	Poly bag 767	NA	NA	Headspace	Bedding	Pillow	90
1210	Property 1	Residential	5/11/2016	14:46	NR	NR	NR	NR	NR	760	1185	ng/m3	Poly bag 768	NA	NA	Headspace	Miscellaneous	Paint	91
1210	Property 1	Residential	5/11/2016	15:07	NR	NR	NR	NR	NR	8709	9611	ng/m3	D Bin 1	NA	NA	Headspace	White Bin	Driveway next to mulch	90
1210	Property 1	Residential	5/11/2016	15:08	NR	NR	NR	NR	NR	8237	11270	ng/m3	D Bin 2	NA	NA	Headspace	White Bin	Driveway next to mulch	93
1210	Property 1	Residential	5/11/2016	15:09	NR	NR	NR	NR	NR	NR	>50000	ng/m3	D Bin 3	NA	NA	Headspace	White Bin	Driveway next to mulch	97
1210	Property 1	Residential	5/11/2016	15:10	NR	NR	NR	NR	NR	NR	>50000	ng/m3	D Bin 4	NA	NA	Headspace	Black Bin	Driveway next to mulch	110
1210	Property 1	Residential	5/11/2016	15:11	NR	NR	NR	NR	NR	NR	>50000	ng/m3	D Bin 5	NA	NA	Headspace	White Bin	Driveway next to mulch	107
1210	Property 1	Residential	5/11/2016	15:12	NR	NR	NR	NR	NR	NR	>50000	ng/m3	D Bin 6	NA	NA	Headspace	Black Bin	Driveway next to mulch	108
1210	Property 1	Residential	5/11/2016	15:13	NR	NR	NR	NR	NR	12120	15190	ng/m3	D Bin 7	NA	NA	Headspace	Black Bin	Driveway next to mulch	108
1210	Property 1	Residential	5/11/2016	15:14	NR	NR	NR	NR	NR	8405	8730	ng/m3	D Bin 8	NA	NA	Headspace	White Bin	Driveway next to mulch	105
1210	Property 1	Residential	5/11/2016	15:15	NR	NR	NR	NR	NR	4864	5383	ng/m3	D Bin 9	NA	NA	Headspace	White Bin	Driveway next to mulch	102
1210	Property 1	Residential	5/11/2016	17:05	NR	NR	NR	NR	NR	183	810	ng/m3	M Bin 1	NA	NA	Headspace	White Bin	Mulch area	72
1210	Property 1	Residential	5/11/2016	17:06	NR	NR	NR	NR	NR	212	236	ng/m3	M Bin 2	NA	NA	Headspace	White Bin	Mulch area	81
1210	Property 1	Residential	5/11/2016	17:07	NR	NR	NR	NR	NR	2171	3106	ng/m3	M Bin 3	NA	NA	Headspace	White Bin	Mulch area	90
1210	Property 1	Residential	5/11/2016	17:08	NR	NR	NR	NR	NR	922	1123	ng/m3	M Bin 4	NA	NA	Headspace	Black Bin	Mulch area	85
1210	Property 1	Residential	5/11/2016	17:10	NR	NR	NR	NR	NR	3142	3407	ng/m3	M Bin 5	NA	NA	Headspace	White Bin	Mulch area	82
1210	Property 1	Residential	5/11/2016	17:11	NR	NR	NR	NR	NR	1657	2239	ng/m3	M Bin 6	NA	NA	Headspace	Black Bin	Mulch area	95
1210	Property 1	Residential	5/11/2016	17:12	NR	NR	NR	NR	NR	1230	1360	ng/m3	M Bin 7	NA	NA	Headspace	Black Bin	Mulch area	104
1210	Property 1	Residential	5/11/2016	17:13	NR	NR	NR	NR	NR	1125	1242	ng/m3	M Bin 8	NA	NA	Headspace	White Bin	Mulch area	87
1210	Property 1	Residential	5/11/2016	17:15	NR	NR	NR	NR	NR	763	1030	ng/m3	M Bin 9	NA	NA	Headspace	White Bin	Mulch area	91
1210	Property 2	Residential	5/12/2016	8:49	NR	NR	NR	NR	NR	183	210	ng/m3	Laundry room	NR	NR	Headspace	NR	Washer	90
1210	Property 2	Residential	5/12/2016	8:50	NR	NR	NR	NR	NR	81	92	ng/m3	Laundry room	NR	NR	Headspace	NR	Dryer	90
1210	Property 2	Residential	5/12/2016	8:51	NR	NR	NR	NR	NR	83	88	ng/m3	Laundry room	NR	NR	Breathing zone	NR	NR	88
1210	Property 2	Residential	5/12/2016	8:51	NR	NR	NR	NR	NR	124	154	ng/m3	Laundry room	NR	NR	Floor	NR	NR	NR
1210	Property 2	Residential	5/12/2016	8:45	NR	NR	NR	NR	NR	247	739	ng/m3	Hallway to Laundry room	NR	NR	Floor	NR	Dear garage door	89
1210	Property 2	Residential	5/12/2016	8:47	NR	NR	NR	NR	NR	141	152	ng/m3	Hallway to Laundry room	NR	NR	Breathing zone	NR	NR	89
1210	Property 2	Residential	5/12/2016	8:51	NR	NR	NR	NR	NR	65	102	ng/m3	Kitchen	NR	NR	Floor	NR	Near oven	91
1210	Property 2	Residential	5/12/2016	8:52	NR	NR	NR	NR	NR	53	56	ng/m3	Kitchen	NR	NR	Breathing zone	NR	NR	90
1210	Property 2	Residential	5/12/2016	9:06	NR	NR	NR	NR	NR	43	50	ng/m3	Stairwell	NR	NR	Floor	NR	Middle step	86
1210	Property 2	Residential	5/12/2016	9:06	NR	NR	NR	NR	NR	39	48	ng/m3	Stairwell	NR	NR	Breathing zone	NR	Top step	86
1210	Property 2	Residential	5/12/2016	9:07	NR	NR	NR	NR	NR	46	51	ng/m3	Stairwell	NR	NR	Floor	NR	Top step	NR
1210	Property 2	Residential	5/12/2016	9:00	NR	NR	NR	NR	NR	43	48	ng/m3	Stairwell	NR	NR	Breathing zone	NR	Middle step	88
1210	Property 2	Residential	5/12/2016	8:56	NR	NR	NR	NR	NR	43	47	ng/m3	Stairwell	NR	NR	Breathing zone	NR	Landing	90
1210	Property 2	Residential	5/12/2016	8:58	NR	NR	NR	NR	NR	80	112	ng/m3	Stairwell	NR	NR	Floor	NR	Landing	89
1210	Property 2	Residential	5/12/2016	9:09	NR	NR	NR	NR	NR	40	43	ng/m3	Bedroom-Guest 1	NR	NR	Breathing zone	NR	Middle	85
1210	Property 2	Residential	5/12/2016	9:10	NR	NR	NR	NR	NR	62	90	ng/m3	Bedroom-Guest 1	NR	NR	Floor	NR	Middle	84
1210	Property 2	Residential	5/12/2016	9:11	NR	NR	NR	NR	NR	41	49	ng/m3	Bedroom-Guest 2	NR	NR	Breathing zone	NR	Middle	82
1210	Property 2	Residential	5/12/2016	9:13	NR	NR	NR	NR	NR	68	102	ng/m3	Bedroom-Guest 2	NR	NR	Floor	NR	Middle	82
1210	Property 2	Residential	5/12/2016	9:15	NR	NR	NR	NR	NR	41	48	ng/m3	Bedroom-Master	NR	NR	Breathing zone	NR	Middle	87
1210	Property 2	Residential	5/12/2016	9:16	NR	NR	NR	NR	NR	48	54	ng/m3	Bedroom-Master	NR	NR	Floor	NR	Middle	87
1210	Property 2	Residential	5/12/2016	9:17	NR	NR	NR	NR	NR	46	52	ng/m3	Bedroom-Son	NR	NR	Breathing zone	NR	Middle	84
1210	Property 2	Residential	5/12/2016	9:19	NR	NR	NR	NR	NR	48	55	ng/m3	Bedroom-Son	NR	NR	Floor	NR	Middle	85
1210	Property 2	Residential	5/12/2016	9:21	NR	NR	NR	NR	NR	54	57	ng/m3	2nd floor bathroom	NR	NR	Breathing zone	NR	Middle	81
1210	Property 2	Residential	5/12/2016	9:22	NR	NR	NR	NR	NR	59	84	ng/m3	2nd floor bathroom	NR	NR	Floor	NR	Middle	83
1210	Property 2	Residential	5/12/2016	9:25	NR	NR	NR	NR	NR	351	516	ng/m3	Master Bathroom	NR	NR	Headspace	NR	Tub drain	82
1210	Property 2	Residential	5/12/2016	9:26	NR	NR	NR	NR	NR	60	63	ng/m3	Master Bathroom	NR	NR	Headspace	NR	Sink drain	83
1210	Property 2	Residential	5/12/2016	9:24	NR	NR	NR	NR	NR	52	58	ng/m3	Bathroom-Upstairs	NR	NR	Headspace	NR	Tub drain	83
1210	Property 2	Residential	5/12/2016	9:24	NR	NR	NR	NR	NR	56	58	ng/m3	Bathroom-Upstairs	NR	NR	Headspace	NR	Sink drain	84
1210	Property 2	Residential	5/12/2016	9:32	NR	NR	NR	NR	NR	498	262	ng/m3	Kitchen	NR	NR	Headspace	NR	Sink drain (disposal side)	87
1210	Property 2	Residential	5/12/2016	9:33	NR	NR	NR	NR	NR	71	77	ng/m3	Kitchen	NR	NR	Headspace	NR	Sink drain	87
1210	Property 2	Residential	5/12/2016	9:34	NR	NR	NR	NR	NR	43	47	ng/m3	Laundry Room	NR	NR	Headspace	NR	Sink drain	86
1210	Property 2	Residential	5/12/2016	9:27	NR	NR	NR	NR	NR	2730	4025	ng/m3	Bathroom-Downstairs	NR	NR	Headspace	NR	Sink drain	83
1210	Property 1	Residential	5/12/2016	9:34	NR	NR	NR	NR	NR	47	52	ng/m3	Bathroom-Downstairs	NR	NR	Breathing zone	Breathing zone	NR	86
1210	Property 1	Residential	5/12/2016	9:35	NR	NR	NR	NR	NR	77	165	ng/m3	Bathroom-Downstairs	NR	NR	Floor	Floor	NR	86
1210	Property 1	Residential	5/12/2016	9:40	NR	NR	NR	NR	NR	124	476	ng/m3	Middle crack closest to garage	NR	NR	Headspace	Floor	NR	55
1210	Property 1	Residential	5/12/2016	10:07	NR	NR	NR	NR	NR	41	89	ng/m3	Crack, middle of garage	NR	NR	Headspace	Floor	NR	60
1210	Property 1	Residential	5/12/2016	10:08	NR	NR	NR	NR	NR	32	43	ng/m3	Crack, middle of garage, close	NR	NR	Headspace	Floor	NR	60
1210	Property 1	Residential	5/12/2016	10:09	NR	NR	NR	NR	NR	31	47	ng/m3	Door step going into house	NR	NR	Headspace	Floor	NR	62
1210	Property 1	Residential	5/12/2016	10:10	NR	NR	NR	NR	NR	23	67	ng/m3	Wall close to garage door ext	NR	NR	Headspace	Floor	NR	60
1210	Property 1	Residential	5/12/2016	10:11	NR	NR	NR	NR	NR	36	61	ng/m3	Middle of ext wall in garage	NR	NR	Headspace	Floor	NR	60
1210	Property 1	Residential	5/12/2016	10:12	NR	NR	NR	NR	NR	27	32	ng/m3	Ext wall closest to house side	NR	NR	Headspace	Floor	NR	60
1210	Property 1	Residential	5/12/2016	10:13	NR	NR	NR	NR	NR	59	78	ng/m3	Wall close to garage door int	NR	NR	Headspace	Floor	NR	60
1210	Property 1	Residential	5/12/2016	10:13	NR	NR	NR	NR	NR	56	74	ng/m3	Middle of int wall in garage	NR	NR	Headspace	Floor	NR	60
1210	Property 1	Residential	5/12/2016	11:28	NR	NR	NR	NR	NR	2446	2535	ng/m3	Poly bag 769	NA	NA	Headspace	Snow blower	NR	104
1210	Property 1	Residential	5/12/2016	11:31	NR	NR	NR	NR	NR	2756	2910	ng/m3	Poly bag 770	NA	NA	Headspace	Lawn mower	NR	105
1210	Property 2	Residential	5/12/2016	11:34	NR	NR	NR	NR	NR	59	63	ng/m3	Poly bag 771	NA	NA	Headspace	Lawn chairs	NR	115
1210	Property 2	Residential	5/12/2016	16:00	NR	NR	NR	NR	NR	2743	3264	ng/m3	W1	NA	NA	Headspace	NR	Center walkway	153
1210	Property 2	Residential	5/12/2016	16:01	NR	NR	NR	NR	NR	913	989	ng/m3	W2	NA	NA	Headspace	NR	Center walkway	137

NA- Not Applicable
NR- Not Recorded
R - Standard Deviation

Appendix G: Lumex Screening Results Summary Table
Greenleafe Drive Mercury Response Site
Baldwinsville, Onondaga County, New York

Serial Number	Property Number	Land Use	Date	Time	Screeining-1	Screeining-2	Screeining-3	Average Screening Result	R	Minimum	Maximum	Units	Location	Floor	Floor Cover	Height	Item Type	Description	Temperature (˚F)
1210	Property 2	Residential	5/12/2016	16:03	NR	NR	NR	NR	NR	613	741	ng/m3	W3	NA	NA	Headspace	NR	Soil on side of walkway	105
1210	Property 2	Residential	5/12/2016	16:04	NR	NR	NR	NR	NR	2662	2993	ng/m3	W4	NA	NA	Headspace	NR	Soil on side of walkway	108
1210	Property 2	Residential	5/12/2016	16:05	NR	NR	NR	NR	NR	9628	9952	ng/m3	W5	NA	NA	Headspace	NR	Soil on side of walkway	101
1210	Property 2	Residential	5/12/2016	16:05	NR	NR	NR	NR	NR	5911	6827	ng/m3	W6	NA	NA	Headspace	NR	Soil on side of walkway	111
1210	Property 2	Residential	5/12/2016	16:06	NR	NR	NR	NR	NR	562	588	ng/m3	W7	NA	NA	Headspace	NR	Soil on side of walkway	102
1210	Property 2	Residential	5/12/2016	16:07	NR	NR	NR	NR	NR	5271	6889	ng/m3	W8	NA	NA	Headspace	NR	Soil on side of walkway	106
1210	Property 2	Residential	5/12/2016	16:08	NR	NR	NR	NR	NR	982	1035	ng/m3	W9	NA	NA	Headspace	NR	Soil on side of walkway	108
1210	Property 2	Residential	5/12/2016	16:09	NR	NR	NR	NR	NR	467	585	ng/m3	W10	NA	NA	Headspace	NR	Soil on side of walkway	105
1210	Property 2	Residential	5/12/2016	16:10	NR	NR	NR	NR	NR	243	282	ng/m3	W11	NA	NA	Headspace	NR	Soil on side of walkway	113
1210	Property 2	Residential	5/12/2016	16:11	NR	NR	NR	NR	NR	242	262	ng/m3	ND1	NA	NA	Headspace	NR	Soil north side of driveway	124
1210	Property 2	Residential	5/12/2016	16:12	NR	NR	NR	NR	NR	466	690	ng/m3	ND2	NA	NA	Headspace	NR	Soil north side of driveway	124
1210	Property 2	Residential	5/12/2016	16:13	NR	NR	NR	NR	NR	82	94	ng/m3	ND3	NA	NA	Headspace	NR	Soil north side of driveway	114
1210	Property 2	Residential	5/12/2016	16:14	NR	NR	NR	NR	NR	163	178	ng/m3	ND4	NA	NA	Headspace	NR	Soil north side of driveway	121
1210	Property 2	Residential	5/12/2016	17:02	NR	NR	NR	NR	NR	610	786	ng/m3	W1A	NA	NA	Headspace	NR	Center walkway	93
1210	Property 2	Residential	5/12/2016	17:04	NR	NR	NR	NR	NR	82	121	ng/m3	W2A	NA	NA	Headspace	NR	Center walkway	96
1210	Property 2	Residential	5/12/2016	17:05	NR	NR	NR	NR	NR	40	101	ng/m3	W3A	NA	NA	Headspace	NR	Soil on side of walkway	94
1210	Property 2	Residential	5/12/2016	17:07	NR	NR	NR	NR	NR	178	250	ng/m3	W4A	NA	NA	Headspace	NR	Soil on side of walkway	93
1210	Property 2	Residential	5/12/2016	17:11	NR	NR	NR	NR	NR	92	120	ng/m3	W5A	NA	NA	Headspace	NR	Soil on side of walkway	95
1210	Property 2	Residential	5/12/2016	17:15	NR	NR	NR	NR	NR	211	364	ng/m3	W6A	NA	NA	Headspace	NR	Soil on side of walkway	94
1210	Property 2	Residential	5/12/2016	17:16	NR	NR	NR	NR	NR	96	167	ng/m3	W7A	NA	NA	Headspace	NR	Soil on side of walkway	84
1210	Property 2	Residential	5/12/2016	17:26	NR	NR	NR	NR	NR	95	210	ng/m3	W8A	NA	NA	Headspace	NR	Soil on side of walkway	102
1210	Property 2	Residential	5/12/2016	17:31	NR	NR	NR	NR	NR	32	1080	ng/m3	W9A	NA	NA	Headspace	NR	Soil on side of walkway	104
1210	Property 2	Residential	5/12/2016	17:32	NR	NR	NR	NR	NR	46	109	ng/m3	W10A	NA	NA	Headspace	NR	Soil on side of walkway	93
1210	Property 2	Residential	5/12/2016	17:36	NR	NR	NR	NR	NR	41	84	ng/m3	W11A	NA	NA	Headspace	NR	Soil on side of walkway	103
1210	Property 2	Residential	5/12/2016	17:38	NR	NR	NR	NR	NR	24	37	ng/m3	ND1A	NA	NA	Headspace	NR	Soil north side of driveway	86
1210	Property 2	Residential	5/12/2016	17:39	NR	NR	NR	NR	NR	64	126	ng/m3	ND2A	NA	NA	Headspace	NR	Soil north side of driveway	106
1210	Property 1	Residential	5/13/2016	9:18	NR	NR	NR	NR	NR	2212	2898	ng/m3	Oriental rug	NA	NA	Headspace	NR	End of rug	90
1210	Property 1	Residential	5/13/2016	9:19	NR	NR	NR	NR	NR	551	1312	ng/m3	Oriental rug	NA	NA	Headspace	NR	Middle	100
1210	Property 1	Residential	5/13/2016	9:19	NR	NR	NR	NR	NR	288	450	ng/m3	Oriental rug	NA	NA	Headspace	NR	End of rug	95
1210	Property 1	Residential	5/13/2016	9:31	NR	NR	NR	NR	NR	2100	2380	ng/m3	NR	NA	NA	NR	NR	End of rug	92
1210	Property 1	Residential	5/13/2016	9:33	NR	NR	NR	NR	NR	200	1079	ng/m3	NR	NA	NA	NR	NR	Middle of rug	89
1210	Property 1	Residential	5/13/2016	9:34	NR	NR	NR	NR	NR	176	365	ng/m3	NR	NA	NA	NR	NR	End of rug	77
1210	Property 1	Residential	5/13/2016	13:10	NR	NR	NR	NR	NR	6662	9910	ng/m3	Middle crack closest to garage	NA	NA	Headspace	Floor	NR	70
491	Property 1	Residential	5/13/2016	15:01	NR	NR	NR	NR	NR	86	129	ng/m3	Poly bag 772	NA	NA	Headspace	Miscellaneous	School supplies	118
491	Property 1	Residential	5/13/2016	15:04	NR	NR	NR	NR	NR	29	33	ng/m3	Poly bag 773	NA	NA	Headspace	Accessories	Wicker basket	123
1210	Property 1	Residential	5/13/2016	15:10	NR	NR	NR	NR	NR	61	69	ng/m3	Poly bag 774	NA	NA	Headspace	Miscellaneous	Odds and ends	130
1210	Property 1	Residential	5/13/2016	15:13	NR	NR	NR	NR	NR	133	154	ng/m3	Poly bag 775	NA	NA	Headspace	Toys	NR	97
1210	Property 1	Residential	5/13/2016	15:14	NR	NR	NR	NR	NR	96	116	ng/m3	Poly bag 776	NA	NA	Headspace	Miscellaneous	NR	102
1210	Property 1	Residential	5/13/2016	15:15	NR	NR	NR	NR	NR	73	84	ng/m3	Poly bag 777	NA	NA	Headspace	Accessories	Picture frames	111
1210	Property 1	Residential	5/13/2016	15:16	NR	NR	NR	NR	NR	38	45	ng/m3	Poly bag 778	NA	NA	Headspace	Toys	NR	96
1210	Property 1	Residential	5/13/2016	15:17	NR	NR	NR	NR	NR	1152	1310	ng/m3	Poly bag 779	NA	NA	Headspace	Accessories	Xmas lights	105
1210	Property 1	Residential	5/13/2016	15:18	NR	NR	NR	NR	NR	1452	1696	ng/m3	Poly bag 780	NA	NA	Headspace	Miscellaneous	Ext. cords	108
1210	Property 1	Residential	5/13/2016	15:19	NR	NR	NR	NR	NR	41	47	ng/m3	Poly bag 781	NA	NA	Headspace	Miscellaneous	Rack?	111
1210	Property 1	Residential	5/13/2016	15:20	NR	NR	NR	NR	NR	2343	2420	ng/m3	Poly bag 782	NA	NA	Headspace	Linen	Pats blanket	111
1210	Property 1	Residential	5/13/2016	15:22	NR	NR	NR	NR	NR	233	264	ng/m3	Poly bag 783	NA	NA	Headspace	Clothes	NR	113
1210	Property 1	Residential	5/13/2016	15:25	NR	NR	NR	NR	NR	35	46	ng/m3	Poly bag 784	NA	NA	Headspace	Linen	Blankets	113
1210	Property 1	Residential	5/13/2016	15:25	NR	NR	NR	NR	NR	411	486	ng/m3	Poly bag 785	NA	NA	Headspace	Toys	NR	104
1210	Property 1	Residential	5/13/2016	15:26	NR	NR	NR	NR	NR	67	77	ng/m3	Poly bag 786	NA	NA	Headspace	Miscellaneous	Tent	106
1210	Property 1	Residential	5/13/2016	15:27	NR	NR	NR	NR	NR	1452	1563	ng/m3	Poly bag 787	NA	NA	Headspace	Accessories	Boots	110
1210	Property 1	Residential	5/13/2016	15:30	NR	NR	NR	NR	NR	72	110	ng/m3	Poly bag 788	NA	NA	Headspace	Miscellaneous	Movies	99
1210	Property 1	Residential	5/13/2016	15:31	NR	NR	NR	NR	NR	57	73	ng/m3	Poly bag 789	NA	NA	Headspace	Miscellaneous	Toys, bags, etc	124
1210	Property 1	Residential	5/13/2016	15:32	NR	NR	NR	NR	NR	55	75	ng/m3	Poly bag 790	NA	NA	Headspace	Miscellaneous	Pot	110
1210	Property 1	Residential	5/13/2016	15:33	NR	NR	NR	NR	NR	275	415	ng/m3	Poly bag 791	NA	NA	Headspace	Clothes	NR	107
1210	Property 1	Residential	5/13/2016	15:34	NR	NR	NR	NR	NR	288	347	ng/m3	Poly bag 792	NA	NA	Headspace	Miscellaneous	Mostly clothes	135
1210	Property 1	Residential	5/13/2016	15:35	NR	NR	NR	NR	NR	43	49	ng/m3	Poly bag 793	NA	NA	Headspace	Miscellaneous	Decor	110
1210	Property 1	Residential	5/13/2016	15:39	NR	NR	NR	NR	NR	745	1139	ng/m3	Poly bag 794	NA	NA	Headspace	Linen/clothes	NR	143
1210	Property 1	Residential	5/13/2016	15:41	NR	NR	NR	NR	NR	121	136	ng/m3	Poly bag 795	NA	NA	Headspace	Miscellaneous	Couch cushion	118
1210	Property 1	Residential	5/13/2016	15:43	NR	NR	NR	NR	NR	27	39	ng/m3	Poly bag 796	NA	NA	Headspace	Miscellaneous	Wooden accessories	98
1210	Property 1	Residential	5/13/2016	15:44	NR	NR	NR	NR	NR	139	157	ng/m3	Poly bag 797	NA	NA	Headspace	Miscellaneous	Goods	109
1210	Property 1	Residential	5/13/2016	15:46	NR	NR	NR	NR	NR	83	117	ng/m3	Poly bag 798	NA	NA	Headspace	Miscellaneous	Tote/ decor	119
1210	Property 1	Residential	5/13/2016	15:50	NR	NR	NR	NR	NR	297	472	ng/m3	Poly bag 799	NA	NA	Headspace	Miscellaneous	Hair products	117
1210	Property 1	Residential	5/13/2016	15:51	NR	NR	NR	NR	NR	292	356	ng/m3	Poly bag 800	NA	NA	Headspace	Miscellaneous	Tote	137
1210	Property 1	Residential	5/13/2016	15:52	NR	NR	NR	NR	NR	313	347	ng/m3	Poly bag 801	NA	NA	Headspace	Miscellaneous	Belt	111
1210	Property 1	Residential	5/13/2016	15:54	NR	NR	NR	NR	NR	586	783	ng/m3	Poly bag 802	NA	NA	Headspace	Miscellaneous	Lamps	116
1210	Property 1	Residential	5/13/2016	16:32	NR	NR	NR	NR	NR	23	31	ng/m3	Poly bag 803	NA	NA	Headspace	NR	Couch cushion	137
1210	Property 1	Residential	5/13/2016	16:34	NR	NR	NR	NR	NR	26	33	ng/m3	Poly bag 804	NA	NA	Headspace	NR	Couch cushion	120
1210	Property 1	Residential	5/13/2016	16:37	NR	NR	NR	NR	NR	27	37	ng/m3	Poly bag 805	NA	NA	Headspace	NR	Couch cushion	110
1210	Property 1	Residential	5/13/2016	16:41	NR	NR	NR	NR	NR	333	457	ng/m3	Poly bag 806	NA	NA	Headspace	Miscellaneous	Toys	106
1210	Property 1	Residential	5/13/2016	16:42	NR	NR	NR	NR	NR	27	32	ng/m3	Poly bag 807	NA	NA	Headspace	Miscellaneous	TV Wall Mount	112
1210	Property 1	Residential	5/13/2016	16:45	NR	NR	NR	NR	NR	25	29	ng/m3	Poly bag 808	NA	NA	Headspace	Miscellaneous	BB gun	105
1210	Property 1	Residential	5/13/2016	16:47	NR	NR	NR	NR	NR	139	150	ng/m3	Poly bag 809	NA	NA	Headspace	Miscellaneous	Tote	115
1210	Property 1	Residential	5/13/2016	16:48	NR	NR	NR	NR	NR	44	54	ng/m3	Poly bag 810	NA	NA	Headspace	Miscellaneous	Various hair supplies	110
1210	Property 1	Residential	5/13/2016	16:51	NR	NR	NR	NR	NR	57	72	ng/m3	Poly bag 811	NA	NA	Headspace	Miscellaneous	Tote	113
1210	Property 1	Residential	5/13/2016	16:53	NR	NR	NR	NR	NR	235	257	ng/m3	Poly bag 812	NA	NA	Headspace	Miscellaneous	Wicker basket	116
1210	Property 1	Residential	5/13/2016	16:55	NR	NR	NR	NR	NR	27	35	ng/m3	Poly bag 813	NA	NA	Headspace	Miscellaneous	Tray	124
1210	Property 1	Residential	5/13/2016	16:58	NR	NR	NR	NR	NR	109	124	ng/m3	Poly bag 814	NA	NA	Headspace	Clothes	NR	112
1210	Property 1	Residential	5/13/2016	16:59	NR	NR	NR	NR	NR	23	29	ng/m3	Poly bag 815	NA	NA	Headspace	Clothes	NR	122
1210	Property 1	Residential	5/13/2016	16:59	NR	NR	NR	NR	NR	19	27	ng/m3	Poly bag 816	NA	NA	Headspace	Miscellaneous	Throw rug, clothes	122
1210	Property 1	Residential	5/13/2016	17:00	NR	NR	NR	NR	NR	309	331	ng/m3	Poly bag 817	NA	NA	Headspace	Miscellaneous	Lunch cooler	116
1210	Property 1	Residential	5/13/2016	17:01	NR	NR	NR	NR	NR	33	41	ng/m3	Poly bag 818	NA	NA	Headspace	Clothes	NR	120
1210	Property 1	Residential	5/13/2016	17:02	NR	NR	NR	NR	NR	39	45	ng/m3	Poly bag 819	NA	NA	Headspace	Accessories	Purse	125
1210	Property 1	Residential	5/13/2016	17:03	NR	NR	NR	NR	NR	292	369	ng/m3	Poly bag 820	NA	NA	Headspace	Clothes	NR	124
1210	Property 1	Residential	5/13/2016	17:05	NR	NR	NR	NR	NR	21	25	ng/m3	Poly bag 821	NA	NA	Headspace	Clothes	NR	147
1210	Property 1	Residential	5/13/2016	17:06	NR	NR	NR	NR	NR	19	26	ng/m3	Poly bag 822	NA	NA	Headspace	Miscellaneous	Couch cover	147
1210	Property 1	Residential	5/13/2016	17:06	NR	NR	NR	NR	NR	161	183	ng/m3	Poly bag 823	NA	NA	Headspace	Miscellaneous	Sneakers	112

NA- Not Applicable
NR- Not Recorded
R - Standard Deviation

Appendix G: Lumex Screening Results Summary Table
Greenleafe Drive Mercury Response Site
Baldwinsville, Onondaga County, New York

Serial Number	Property Number	Land Use	Date	Time	Screening-1	Screening-2	Screening-3	Average Screening Result	R	Minimum	Maximum	Units	Location	Floor	Floor Cover	Height	Item Type	Description	Temperature (°F)
1210	Property 1	Residential	5/13/2016	17:07	NR	NR	NR	NR	NR	213	244	ng/m3	Poly bag 824	NA	NA	Headspace	Miscellaneous	Blankets	115
1210	Property 1	Residential	5/13/2016	17:08	NR	NR	NR	NR	NR	88	125	ng/m3	Poly bag 825	NA	NA	Headspace	Miscellaneous	Lantern	124
1210	Property 1	Residential	5/13/2016	17:10	NR	NR	NR	NR	NR	554	694	ng/m3	Poly bag 826	NA	NA	Headspace	Furniture	Foot Rest	131
1210	Property 1	Residential	5/13/2016	17:12	NR	NR	NR	NR	NR	195	212	ng/m3	poly bag 827	NA	NA	Headspace	Miscellaneous	Blinds / Curtains	108
1210	Property 1	Residential	5/14/2016	9:41	NR	NR	NR	NR	NR	756	810	ng/m3	Poly bag 769	NA	NA	Headspace	Snowblower	NR	97
1210	Property 1	Residential	5/14/2016	9:45	NR	NR	NR	NR	NR	225	286	ng/m3	Poly bag 770	NA	NA	Headspace	Lawnmower	NR	100
1210	Property 1	Residential	5/14/2016	15:11	NR	NR	NR	NR	NR	684	1018	ng/m3	Items for homeowner	NA	NA	Headspace	Tools	Various tools	105
1210	Property 1	Residential	5/14/2016	15:22	NR	NR	NR	NR	NR	63	108	ng/m3	Items for homeowner	NA	NA	Headspace	Accessories	Hat and umbrella	99
1210	Property 1	Residential	5/14/2016	15:26	NR	NR	NR	NR	NR	60	81	ng/m3	Items for homeowner	NA	NA	Headspace	Miscellaneous	Antique lamp, plastic basket, wooden tool box	105
1210	Property 1	Residential	5/14/2016	15:33	NR	NR	NR	NR	NR	27	33	ng/m3	Items for homeowner	NA	NA	Headspace	Miscellaneous	Pens, markers, sharpies, deodorant, wooden holding [illegible]	102
1210	Property 1	Residential	5/14/2016	15:38	NR	NR	NR	NR	NR	147	226	ng/m3	Items for homeowner	NA	NA	Headspace	Clothes	Men's winter jacket and bathing suit	103
1210	Property 1	Residential	5/14/2016	15:48	NR	NR	NR	NR	NR	296	428	ng/m3	Items for homeowner	NA	NA	Headspace	Tools	Weed wacker	104
1210	Property 1	Residential	5/14/2016	16:21	NR	NR	NR	NR	NR	1247	2353	ng/m3	Items for homeowner	NA	NA	Headspace	Motor bike	NR	106
491	Property 2	Residential	5/14/2016	11:20	NR	NR	NR	NR	NR	56	61	ng/m3	Poly bag 828	NA	NA	Headspace	Electronics	NR	>90
491	Property 2	Residential	5/14/2016	11:21	NR	NR	NR	NR	NR	58	63	ng/m3	Poly bag 829	NA	NA	Headspace	Pictures	NR	>90
491	Property 2	Residential	5/14/2016	11:23	NR	NR	NR	NR	NR	275	293	ng/m3	Poly bag 830	NA	NA	Floor	Garage	Crack in center of garage	>90
1210	Property 2	Residential	5/14/2016	11:26	NR	NR	NR	NR	NR	59	64	ng/m3	Poly bag 831	NA	NA	Headspace	Decorative	Picture frames	>90
1210	Property 2	Residential	5/14/2016	11:30	NR	NR	NR	NR	NR	58	67	ng/m3	Poly bag 832	NA	NA	Headspace	Decorative	Lamp shade and blinds	>90
1210	Property 2	Residential	5/14/2016	11:31	NR	NR	NR	NR	NR	15	22	ng/m3	Poly bag 833	NA	NA	Headspace	Decorative	Window shades	>90
1210	Property 2	Residential	5/14/2016	11:33	NR	NR	NR	NR	NR	33	41	ng/m3	Poly bag 834	NA	NA	Headspace	Miscellaneous	Books and blinds	>90
1210	Property 2	Residential	5/14/2016	11:34	NR	NR	NR	NR	NR	98	112	ng/m3	Poly bag 835	NA	NA	Headspace	Miscellaneous	Personal hygiene and bathroom toiletries	>90
1210	Property 2	Residential	5/14/2016	11:35	NR	NR	NR	NR	NR	72	89	ng/m3	Poly bag 836	NA	NA	Headspace	Personal hygiene	NR	>90
1210	Property 2	Residential	5/14/2016	11:37	NR	NR	NR	NR	NR	52	70	ng/m3	Poly bag 837	NA	NA	Headspace	Books	Stool	>90
1210	Property 2	Residential	5/14/2016	11:38	NR	NR	NR	NR	NR	44	47	ng/m3	Poly bag 838	NA	NA	Headspace	Furniture	NR	>90
1210	Property 2	Residential	5/14/2016	11:39	NR	NR	NR	NR	NR	47	56	ng/m3	Poly bag 839	NA	NA	Headspace	Decorations	NR	>90
1210	Property 2	Residential	5/14/2016	11:41	NR	NR	NR	NR	NR	142	170	ng/m3	Poly bag 840	NA	NA	Headspace	Pillows	Throw pillows	>90
1210	Property 2	Residential	5/14/2016	11:42	NR	NR	NR	NR	NR	57	63	ng/m3	Poly bag 841	NA	NA	Headspace	Furniture	Bar stools	>90
1210	Property 2	Residential	5/14/2016	11:42	NR	NR	NR	NR	NR	55	64	ng/m3	Poly bag 842	NA	NA	Headspace	Furniture	Bar stool	>90
1210	Property 2	Residential	5/14/2016	11:43	NR	NR	NR	NR	NR	94	114	ng/m3	Poly bag 843	NA	NA	Headspace	Bedding	NR	>90
1210	Property 2	Residential	5/14/2016	11:45	NR	NR	NR	NR	NR	132	155	ng/m3	Poly bag 844	NA	NA	Headspace	Miscellaneous	Books and a sheet	>90
1210	Property 2	Residential	5/14/2016	11:47	NR	NR	NR	NR	NR	95	113	ng/m3	Poly bag 845	NA	NA	Headspace	Miscellaneous	Kitchen items and note board	>90
1210	Property 2	Residential	5/14/2016	11:48	NR	NR	NR	NR	NR	204	265	ng/m3	Poly bag 846	NA	NA	Headspace	Pillows	Couch pillows	>90
1210	Property 2	Residential	5/14/2016	11:50	NR	NR	NR	NR	NR	119	127	ng/m3	Poly bag 847	NA	NA	Headspace	Shoes	NR	>90
1210	Property 2	Residential	5/14/2016	11:58	NR	NR	NR	NR	NR	113	135	ng/m3	Poly bag 848	NA	NA	Headspace	Decorative	Picture frames	>90
1210	Property 2	Residential	5/14/2016	13:31	NR	NR	NR	NR	NR	31	43	ng/m3	Poly bag 849	NA	NA	Headspace	Furniture	Chair	>90
1210	Property 2	Residential	5/14/2016	13:34	NR	NR	NR	NR	NR	35	45	ng/m3	Poly bag 850	NA	NA	Headspace	Miscellaneous	Picture frame and books	>90
1210	Property 2	Residential	5/14/2016	13:36	NR	NR	NR	NR	NR	47	54	ng/m3	Poly bag 851	NA	NA	Headspace	Towels	Bath towels	>90
1210	Property 2	Residential	5/14/2016	14:24	NR	NR	NR	NR	NR	26	33	ng/m3	Poly bag 852	NA	NA	Headspace	Miscellaneous	Blow dryers bath towels	>90
1210	Property 2	Residential	5/14/2016	14:29	NR	NR	NR	NR	NR	29	35	ng/m3	Poly bag 853	NA	NA	Headspace	Furniture	Chair (dining)	>90
1210	Property 2	Residential	5/14/2016	14:31	NR	NR	NR	NR	NR	188	243	ng/m3	Poly bag 854	NA	NA	Headspace	Furniture	Chair (dining)	>90
1210	Property 2	Residential	5/14/2016	14:34	NR	NR	NR	NR	NR	53	65	ng/m3	Poly bag 855	NA	NA	Headspace	Furniture	Chair (dining)	>90
1210	Property 2	Residential	5/14/2016	14:37	NR	NR	NR	NR	NR	38	44	ng/m3	Poly bag 856	NA	NA	Headspace	Furniture	Chair (dining)	>90
1210	Property 2	Residential	5/14/2016	14:39	NR	NR	NR	NR	NR	29	38	ng/m3	Poly bag 857	NA	NA	Headspace	Furniture	Chair (dining)	>90
1210	Property 2	Residential	5/14/2016	14:42	NR	NR	NR	NR	NR	39	46	ng/m3	Poly bag 858	NA	NA	Headspace	Furniture	Chair (dining)	>90
1210	Property 2	Residential	5/14/2016	14:45	NR	NR	NR	NR	NR	33	37	ng/m3	Poly bag 859	NA	NA	Headspace	Furniture	Chair (dining)	>90
1210	Property 2	Residential	5/14/2016	14:48	NR	NR	NR	NR	NR	28	37	ng/m3	Poly bag 860	NA	NA	Headspace	Miscellaneous	Lamp shade , tissues	>90
1210	Property 2	Residential	5/14/2016	14:52	NR	NR	NR	NR	NR	25	31	ng/m3	Poly bag 861	NA	NA	Headspace	Magazines	Magazines From above the aquarium	>90
1210	Property 2	Residential	5/14/2016	14:55	NR	NR	NR	NR	NR	31	39	ng/m3	Poly bag 862	NA	NA	Headspace	Decorative	Pictures from living room	>90
1210	Property 2	Residential	5/14/2016	15:32	NR	NR	NR	NR	NR	37	47	ng/m3	Poly bag 863	NA	NA	Headspace	Books	Books from above the aquarium	>90
1210	Property 2	Residential	5/14/2016	15:36	NR	NR	NR	NR	NR	29	34	ng/m3	Poly bag 864	NA	NA	Headspace	Books	Books from hallway	>90
1210	Property 2	Residential	5/14/2016	15:41	NR	NR	NR	NR	NR	29	38	ng/m3	Poly bag 865	NA	NA	Headspace	Luggage	Red suitcase and luggage	>90
1210	Property 2	Residential	5/14/2016	15:43	NR	NR	NR	NR	NR	85	90	ng/m3	Poly bag 866	NA	NA	Headspace	Furniture	Chair (dining)	>90
1210	Property 2	Residential	5/14/2016	15:50	NR	NR	NR	NR	NR	105	137	ng/m3	Poly bag 867	NA	NA	Headspace	Furniture	Chair (dining)	>90
1210	Property 2	Residential	5/14/2016	15:53	NR	NR	NR	NR	NR	48	65	ng/m3	Poly bag 868	NA	NA	Headspace	Furniture	Chair (dining)	>90
1210	Property 2	Residential	5/14/2016	16:13	NR	NR	NR	NR	NR	48	56	ng/m3	Poly bag 869	NA	NA	Headspace	Furniture	Chair (dining)	>90
1210	Property 2	Residential	5/14/2016	16:18	NR	NR	NR	NR	NR	37	42	ng/m3	Poly bag 870	NA	NA	Headspace	Furniture	Chair (dining)	>90
1210	Property 2	Residential	5/14/2016	16:24	NR	NR	NR	NR	NR	33	41	ng/m3	Poly bag 871	NA	NA	Headspace	Furniture	Chair (dining)	>90
1210	Property 2	Residential	5/14/2016	16:28	NR	NR	NR	NR	NR	396	505	ng/m3	Poly bag 872	NA	NA	Headspace	Tool	Bissell vacuum cleaner	>90
1210	Property 2	Residential	5/14/2016	16:36	NR	NR	NR	NR	NR	66	70	ng/m3	Poly bag 873	NA	NA	Headspace	Miscellaneous	Wood set	>90
1210	Property 2	Residential	5/14/2016	16:43	NR	NR	NR	NR	NR	194	236	ng/m3	Poly bag 874	NA	NA	Headspace	Furniture	Red futon	>90
1210	Property 2	Residential	5/14/2016	17:30	NR	NR	NR	NR	NR	26	31	ng/m3	Poly bag 875	NA	NA	Headspace	Furniture	Late white bean bag	>90
1210	Property 2	Residential	5/14/2016	17:33	NR	NR	NR	NR	NR	37	46	ng/m3	Poly bag 876	NA	NA	Headspace	Decorative	Wall paper	>90
1210	Property 2	Residential	5/14/2016	17:37	NR	NR	NR	NR	NR	675	815	ng/m3	Poly bag 877	NA	NA	Headspace	Furniture	Large red bean bag chair	>90
1210	Property 2	Residential	5/14/2016	17:46	NR	NR	NR	NR	NR	32	39	ng/m3	Poly bag 878	NA	NA	Headspace	N/A	N/A	>90
1210	Property 2	Residential	5/15/2016	10:11	NR	NR	NR	NR	NR	39	46	ng/m3	Poly bag 879	NA	NA	Headspace	Clothing	NR	93.7
1210	Property 2	Residential	5/15/2016	10:17	NR	NR	NR	NR	NR	21	26	ng/m3	Poly bag 880	NA	NA	Headspace	Toiletries	NR	96.3
1210	Property 2	Residential	5/15/2016	10:20	NR	NR	NR	NR	NR	111	157	ng/m3	Poly bag 881	NA	NA	Headspace	Clothing	NR	101.1
1210	Property 2	Residential	5/15/2016	10:22	NR	NR	NR	NR	NR	583	740	ng/m3	Poly bag 882	NA	NA	Headspace	Bedding	Bean bag cover	118.7
1210	Property 2	Residential	5/15/2016	10:27	NR	NR	NR	NR	NR	31	39	ng/m3	Poly bag 883	NA	NA	Headspace	Bedding	Couch pillows	104.7
1210	Property 2	Residential	5/15/2016	10:42	NR	NR	NR	NR	NR	153	196	ng/m3	Poly bag 884	NA	NA	Headspace	Clothing	NR	92.2
1210	Property 2	Residential	5/15/2016	10:48	NR	NR	NR	NR	NR	152	171	ng/m3	Poly bag 885	NA	NA	Headspace	Decorative	NR	92.9
1210	Property 2	Residential	5/15/2016	10:54	NR	NR	NR	NR	NR	62	95	ng/m3	Poly bag 886	NA	NA	Headspace	Clothing	NR	93.11
1210	Property 2	Residential	5/15/2016	10:58	NR	NR	NR	NR	NR	167	202	ng/m3	Poly bag 887	NA	NA	Headspace	Clothing	NR	108.3
1210	Property 2	Residential	5/15/2016	11:09	NR	NR	NR	NR	NR	131	155	ng/m3	Poly bag 888	NA	NA	Headspace	Clothing	NR	94.8
1210	Property 2	Residential	5/15/2016	11:13	NR	NR	NR	NR	NR	1874	2939	ng/m3	Poly bag 889	NA	NA	Headspace	Clothing	Miscellaneous clothes and socks	105.1
1210	Property 2	Residential	5/15/2016	11:23	NR	NR	NR	NR	NR	27	37	ng/m3	Poly bag 890	NA	NA	Headspace	Toys	Toy box	65.9
1210	Property 2	Residential	5/15/2016	11:30	NR	NR	NR	NR	NR	42	49	ng/m3	Poly bag 891	NA	NA	Headspace	Books	From upstairs hallway	66.8
1210	Property 2	Residential	5/15/2016	11:33	NR	NR	NR	NR	NR	77	93	ng/m3	Poly bag 892	NA	NA	Headspace	Miscellaneous	Hangers for clothes and a fan	108.3
1210	Property 2	Residential	5/15/2016	11:36	NR	NR	NR	NR	NR	76	80	ng/m3	Poly bag 893	NA	NA	Headspace	Decorative	Picture frames	97.1
1210	Property 2	Residential	5/15/2016	11:38	NR	NR	NR	NR	NR	169	196	ng/m3	Poly bag 894	NA	NA	Headspace	Decorative	Picture frames	99.2
1210	Property 2	Residential	5/15/2016	11:40	NR	NR	NR	NR	NR	65	82	ng/m3	Poly bag 895	NA	NA	Headspace	Miscellaneous	Hangers	107
1210	Property 2	Residential	5/15/2016	11:43	NR	NR	NR	NR	NR	83	89	ng/m3	Poly bag 896	NA	NA	Headspace	Miscellaneous	Hangers	97
1210	Property 2	Residential	5/15/2016	13:14	NR	NR	NR	NR	NR	4915	5675	ng/m3	Poly bag 897	NA	NA	Headspace	Miscellaneous	Assorted medication	101.7
1210	Property 2	Residential	5/15/2016	13:18	NR	NR	NR	NR	NR	29	37	ng/m3	Poly bag 898	NA	NA	Headspace	Decorative	Pictures and frames	117.1
1210	Property 2	Residential	5/15/2016	13:23	NR	NR	NR	NR	NR	25	31	ng/m3	Poly bag 899	NA	NA	Headspace	Clothing	NR	97

NA- Not Applicable
NR- Not Recorded
R - Standard Deviation

Appendix G: Lumex Screening Results Summary Table
Greenleafe Drive Mercury Response Site
Baldwinsville, Onondaga County, New York

Serial Number	Property Number	Land Use	Date	Time	Screeining-1	Screeining-2	Screeining-3	Average Screening Result	R	Minimum	Maximum	Units	Location	Floor	Floor Cover	Height	Item Type	Description	Temperature (°F)
1210	Property 2	Residential	5/15/2016	13:26	NR	NR	NR	NR	NR	35	47	ng/m3	Poly bag 900	NA	NA	Headspace	Clothing	NR	100.9
1210	Property 2	Residential	5/15/2016	13:31	NR	NR	NR	NR	NR	28	64	ng/m3	Poly bag 901	NA	NA	Headspace	Clothing	NR	102
1210	Property 2	Residential	5/15/2016	13:36	NR	NR	NR	NR	NR	21	29	ng/m3	Poly bag 902	NA	NA	Headspace	Clothing	NR	118
1210	Property 2	Residential	5/15/2016	13:44	NR	NR	NR	NR	NR	184	222	ng/m3	Poly bag 903	NA	NA	Headspace	Miscellaneous	Pet supplies	107
1210	Property 2	Residential	5/15/2016	14:18	NR	NR	NR	NR	NR	104	464	ng/m3	Poly bag 904	NA	NA	Headspace	Clothing	NR	104.2
1210	Property 2	Residential	5/15/2016	14:21	NR	NR	NR	NR	NR	92	130	ng/m3	Poly bag 905	NA	NA	Headspace	Shoes	NR	97.4
1210	Property 2	Residential	5/15/2016	14:28	NR	NR	NR	NR	NR	123	136	ng/m3	Poly bag 906	NA	NA	Headspace	Clothing/Towels	NR	98.1
1210	Property 2	Residential	5/15/2016	15:12	NR	NR	NR	NR	NR	181	264	ng/m3	Poly bag 907	NA	NA	Headspace	Bedding	Pillows and blankets	108.4
1210	Property 2	Residential	5/15/2016	15:15	NR	NR	NR	NR	NR	875	1528	ng/m3	Poly bag 908	NA	NA	Headspace	Clothing	NR	110.4
1210	Property 2	Residential	5/15/2016	15:24	NR	NR	NR	NR	NR	21	32	ng/m3	Poly bag 909	NA	NA	Headspace	Miscellaneous	Coat hangers	102.1
1210	Property 2	Residential	5/15/2016	15:31	NR	NR	NR	NR	NR	19	27	ng/m3	Poly bag 910	NA	NA	Headspace	Bedding/Toys	Blankets and stuffed animals	108.8
1210	Property 2	Residential	5/15/2016	15:35	NR	NR	NR	NR	NR	22	28	ng/m3	Poly bag 911	NA	NA	Headspace	Miscellaneous	Magazines	101.2
1210	Property 2	Residential	5/15/2016	15:37	NR	NR	NR	NR	NR	25	35	ng/m3	Poly bag 912	NA	NA	Headspace	Clothing	NR	105.5
1210	Property 2	Residential	5/15/2016	15:41	NR	NR	NR	NR	NR	17	26	ng/m3	Poly bag 913	NA	NA	Headspace	Toys	Miscellaneous toys and office supplies	97.5
1210	Property 2	Residential	5/15/2016	15:50	NR	NR	NR	NR	NR	22	26	ng/m3	Poly bag 914	NA	NA	Headspace	Toys	Miscellaneous toys and office supplies	92.1
1210	Property 2	Residential	5/15/2016	15:54	NR	NR	NR	NR	NR	115	234	ng/m3	Poly bag 915	NA	NA	Headspace	Toys	Stuffed animals	98.5
1210	Property 2	Residential	5/15/2016	16:00	NR	NR	NR	NR	NR	32	40	ng/m3	Poly bag 916	NA	NA	Headspace	Clothes	NR	108.5
1210	Property 2	Residential	5/15/2016	16:45	NR	NR	NR	NR	NR	22	28	ng/m3	Poly bag 917	NA	NA	Headspace	Furniture	Portable closet	111
1210	Property 2	Residential	5/15/2016	16:48	NR	NR	NR	NR	NR	19	25	ng/m3	Poly bag 918	NA	NA	Headspace	Toys	Puzzle	94.6
1210	Property 2	Residential	5/15/2016	16:51	NR	NR	NR	NR	NR	22	27	ng/m3	Poly bag 919	NA	NA	Headspace	Clothes	Miscellaneous clothes and hangers	91.5
1210	Property 2	Residential	5/15/2016	16:57	NR	NR	NR	NR	NR	25	361	ng/m3	Poly bag 920	NA	NA	Headspace	Shoes	NR	97.3
1210	Property 2	Residential	5/15/2016	17:02	NR	NR	NR	NR	NR	87	104	ng/m3	Poly bag 921	NA	NA	Headspace	Shoes	Women's shoes	105
491	Property 1	Residential	5/16/2016	14:30	NR	NR	NR	NR	NR	90	165	ng/m3	Poly bag TBD	NA	NA	Headspace	Bike	Girls bike	100
491	Property 1	Residential	5/16/2016	14:43	NR	NR	NR	NR	NR	75	119	ng/m3	Poly bag TBD	NA	NA	Headspace	Bike	Boys bike	100
491	Property 1	Residential	5/16/2016	NR	NR	NR	NR	NR	NR	NR	NR	ng/m3	Poly bag TBD	NA	NA	Headspace	Table	Table (circular)	NR
491	Property 1	Residential	5/16/2016	NR	NR	NR	NR	NR	NR	NR	NR	ng/m3	Poly bag TBD	NA	NA	Headspace	NR	NR	NR
491	Property 2	Residential	5/16/2016	16:09	NR	NR	NR	NR	NR	9	24	ng/m3	W1	NA	NA	Headspace	NR	Center walkway	60
491	Property 2	Residential	5/16/2016	16:10	NR	NR	NR	NR	NR	50	79	ng/m3	W2	NA	NA	Headspace	NR	Center walkway	60
491	Property 2	Residential	5/16/2016	16:12	NR	NR	NR	NR	NR	84	139	ng/m3	W3	NA	NA	Headspace	NR	Soil on side of walkway	60
491	Property 2	Residential	5/16/2016	16:13	NR	NR	NR	NR	NR	36	50	ng/m3	W4	NA	NA	Headspace	NR	Soil on side of walkway	71
491	Property 2	Residential	5/16/2016	16:15	NR	NR	NR	NR	NR	22	31	ng/m3	W5	NA	NA	Headspace	NR	Soil on side of walkway	65
491	Property 2	Residential	5/16/2016	16:15	NR	NR	NR	NR	NR	27	33	ng/m3	W6	NA	NA	Headspace	NR	Soil on side of walkway	65
491	Property 2	Residential	5/16/2016	16:16	NR	NR	NR	NR	NR	34	46	ng/m3	W7	NA	NA	Headspace	NR	Soil on side of walkway	59
491	Property 2	Residential	5/16/2016	16:17	NR	NR	NR	NR	NR	64	74	ng/m3	W8	NA	NA	Headspace	NR	Soil on side of walkway	60
491	Property 2	Residential	5/16/2016	16:19	NR	NR	NR	NR	NR	8	18	ng/m3	W9	NA	NA	Headspace	NR	Soil on side of walkway	60
491	Property 2	Residential	5/16/2016	16:21	NR	NR	NR	NR	NR	15	28	ng/m3	W10	NA	NA	Headspace	NR	Soil on side of walkway	60
491	Property 2	Residential	5/16/2016	16:22	NR	NR	NR	NR	NR	11	15	ng/m3	W11	NA	NA	Headspace	NR	Soil on side of walkway	60
701	Property 2	Residential	5/16/2016	16:02	NR	NR	NR	NR	NR	39	43	ng/m3	ND1	NA	NA	Headspace	NR	Soil north side of driveway	64
701	Property 2	Residential	5/16/2016	16:03	NR	NR	NR	NR	NR	11	16	ng/m3	ND2	NA	NA	Headspace	NR	Soil north side of driveway	60
701	Property 2	Residential	5/16/2016	16:07	NR	NR	NR	NR	NR	7	16	ng/m3	ND3	NA	NA	Headspace	NR	Soil north side of driveway	66
701	Property 2	Residential	5/16/2016	16:08	NR	NR	NR	NR	NR	9	13	ng/m3	ND4	NA	NA	Headspace	NR	Soil north side of driveway	66
NR	Property 2	Residential	5/16/2016	9:05	NR	NR	NR	NR	NR	19	29	ng/m3	Poly bag 925	NA	NA	Headspace	Decorative/Shoes	Shoes and picture frames	107.2
NR	Property 2	Residential	5/16/2016	9:12	NR	NR	NR	NR	NR	36	56	ng/m3	Poly bag 926	NA	NA	Headspace	Clothing	NR	104.5
NR	Property 2	Residential	5/16/2016	9:15	NR	NR	NR	NR	NR	19	27	ng/m3	Poly bag 927	NA	NA	Headspace	Storage	Plastic bins	92.2
NR	Property 2	Residential	5/16/2016	9:21	NR	NR	NR	NR	NR	23	30	ng/m3	Poly bag 928	NA	NA	Headspace	Linens/Storage	Laundry basket and towels	104
NR	Property 2	Residential	5/16/2016	9:25	NR	NR	NR	NR	NR	82	130	ng/m3	Poly bag 929	NA	NA	Headspace	Electronics	Assorted electronic devices	109.1
NR	Property 2	Residential	5/16/2016	9:30	NR	NR	NR	NR	NR	45	71	ng/m3	Poly bag 930	NA	NA	Headspace	Miscellaneous	Suitcases and bed sheets	100.2
NR	Property 2	Residential	5/16/2016	9:36	NR	NR	NR	NR	NR	21	25	ng/m3	Poly bag 931	NA	NA	Headspace	Electronics	VHS movies and cassettes	90.5
NR	Property 2	Residential	5/16/2016	9:39	NR	NR	NR	NR	NR	19	25	ng/m3	Poly bag 932	NA	NA	Headspace	Storage	Plastic bins	96.1
NR	Property 2	Residential	5/16/2016	9:43	NR	NR	NR	NR	NR	17	23	ng/m3	Poly bag 933	NA	NA	Headspace	Toiletries	Bathroom supplies	100.9
NR	Property 2	Residential	5/16/2016	9:46	NR	NR	NR	NR	NR	29	40	ng/m3	Poly bag 934	NA	NA	Headspace	Clothing	NR	110.1
NR	Property 2	Residential	5/16/2016	10:08	NR	NR	NR	NR	NR	17	27	ng/m3	Poly bag 935	NA	NA	Headspace	Bedding/Purses	Handbags and blankets	97.1
NR	Property 2	Residential	5/16/2016	10:12	NR	NR	NR	NR	NR	22	27	ng/m3	Poly bag 936	NA	NA	Headspace	Bedding	Sheets	96.8
NR	Property 2	Residential	5/16/2016	10:16	NR	NR	NR	NR	NR	23	30	ng/m3	Poly bag 937	NA	NA	Headspace	Toys	Games and office supplies	98
NR	Property 2	Residential	5/16/2016	10:21	NR	NR	NR	NR	NR	27	50	ng/m3	Poly bag 938	NA	NA	Headspace	Toys	Toys from the bathroom	100.5
NR	Property 2	Residential	5/16/2016	10:24	NR	NR	NR	NR	NR	21	26	ng/m3	Poly bag 939	NA	NA	Headspace	Bedding	Comforter and blanket	97.3
NR	Property 2	Residential	5/16/2016	10:26	NR	NR	NR	NR	NR	17	31	ng/m3	Poly bag 940	NA	NA	Headspace	Bedding/Toys	Pillows and stuffed animals	102.2
NR	Property 2	Residential	5/16/2016	10:29	NR	NR	NR	NR	NR	19	25	ng/m3	Poly bag 941	NA	NA	Headspace	Bedding/Toys	Pillows and stuffed animals	116.6
NR	Property 2	Residential	5/16/2016	10:33	NR	NR	NR	NR	NR	19	40	ng/m3	Poly bag 942	NA	NA	Headspace	Bedding/Toys	Pillows and stuffed animals	115.1
NR	Property 2	Residential	5/16/2016	10:38	NR	NR	NR	NR	NR	81	144	ng/m3	Poly bag 943	NA	NA	Headspace	Bedding/Toys	Pillows and stuffed animals	109.4
NR	Property 2	Residential	5/16/2016	10:44	NR	NR	NR	NR	NR	23	28	ng/m3	Poly bag 944	NA	NA	Headspace	Clothing	NR	104.3
NR	Property 2	Residential	5/16/2016	10:46	NR	NR	NR	NR	NR	710	800	ng/m3	Poly bag 945	NA	NA	Headspace	Clothing	Assorted clothes and a gym bag	114.9
NR	Property 2	Residential	5/16/2016	10:48	NR	NR	NR	NR	NR	55	102	ng/m3	Poly bag 946	NA	NA	Headspace	Clothing	NR	91.9
NR	Property 2	Residential	5/16/2016	10:56	NR	NR	NR	NR	NR	23	30	ng/m3	Poly bag 947	NA	NA	Headspace	Clothing/Toys	Assorted clothes and toys	98.9
NR	Property 2	Residential	5/16/2016	11:02	NR	NR	NR	NR	NR	29	73	ng/m3	Poly bag 948	NA	NA	Headspace	Toys	Stuffed animal giraffe	104.1
NR	Property 2	Residential	5/16/2016	11:05	NR	NR	NR	NR	NR	118	183	ng/m3	Poly bag 949	NA	NA	Headspace	Clothing	NR	116.2
NR	Property 2	Residential	5/16/2016	11:08	NR	NR	NR	NR	NR	54	87	ng/m3	Poly bag 950	NA	NA	Headspace	Bedding	Sheets and pillows	109.2
NR	Property 2	Residential	5/16/2016	11:12	NR	NR	NR	NR	NR	112	244	ng/m3	Poly bag 951	NA	NA	Headspace	Bedding/Toys	Pillows and stuffed animals	105.7
NR	Property 2	Residential	5/16/2016	11:14	NR	NR	NR	NR	NR	67	77	ng/m3	Poly bag 952	NA	NA	Headspace	Towels	NR	100.6
NR	Property 2	Residential	5/16/2016	11:47	NR	NR	NR	NR	NR	22	33	ng/m3	Poly bag 953	NA	NA	Headspace	Bedding	Sheets and pillows	103.9
NR	Property 2	Residential	5/16/2016	11:54	NR	NR	NR	NR	NR	20	29	ng/m3	Poly bag 954	NA	NA	Headspace	Bedding	Sheets and blankets	112.4
NR	Property 2	Residential	5/16/2016	11:57	NR	NR	NR	NR	NR	19	26	ng/m3	Poly bag 955	NA	NA	Headspace	Bedding	Comforter and pillows	130.5
NR	Property 2	Residential	5/16/2016	12:04	NR	NR	NR	NR	NR	23	27	ng/m3	Poly bag 956	NA	NA	Headspace	Bedding	Comforter and pillows	105.6
NR	Property 2	Residential	5/16/2016	13:22	NR	NR	NR	NR	NR	25	31	ng/m3	Poly bag 957	NA	NA	Headspace	Furniture	Black ottoman	111
NR	Property 2	Residential	5/16/2016	13:27	NR	NR	NR	NR	NR	22	28	ng/m3	Poly bag 958	NA	NA	Headspace	Bedding	Comforter	108
NR	Property 2	Residential	5/16/2016	13:35	NR	NR	NR	NR	NR	55	68	ng/m3	Poly bag 959	NA	NA	Headspace	Clothing/Pureses	Assorted clothes and a sunbag	104
NR	Property 2	Residential	5/16/2016	13:38	NR	NR	NR	NR	NR	76	116	ng/m3	Poly bag 960	NA	NA	Headspace	Bedding	Blankets and a robe	115.4
NR	Property 2	Residential	5/16/2016	13:42	NR	NR	NR	NR	NR	95	122	ng/m3	Poly bag 961	NA	NA	Headspace	Bedding	Pillows and a white blanket	92.6
NR	Property 2	Residential	5/16/2016	13:52	NR	NR	NR	NR	NR	56	105	ng/m3	Poly bag 962	NA	NA	Headspace	Bedding	Sheets and towels	101.5
NR	Property 2	Residential	5/16/2016	14:42	NR	NR	NR	NR	NR	74	211	ng/m3	Poly bag 963	NA	NA	Headspace	Clothing/Bedding	Assorted clothes and pillows	112
NR	Property 2	Residential	5/16/2016	14:46	NR	NR	NR	NR	NR	21	34	ng/m3	Poly bag 964	NA	NA	Headspace	Bedding	Assorted sheets and blankets	97
NR	Property 2	Residential	5/16/2016	14:50	NR	NR	NR	NR	NR	23	31	ng/m3	Poly bag 965	NA	NA	Headspace	Clothing	Costumes	108
NR	Property 2	Residential	5/16/2016	14:54	NR	NR	NR	NR	NR	37	40	ng/m3	Poly bag 966	NA	NA	Headspace	Bedding	Comforter from basement closet	101
NR	Property 2	Residential	5/16/2016	14:58	NR	NR	NR	NR	NR	23	27	ng/m3	Poly bag 967	NA	NA	Headspace	Towels	Grey towel	95
NR	Property 2	Residential	5/16/2016	15:03	NR	NR	NR	NR	NR	162	337	ng/m3	Poly bag 968	NA	NA	Headspace	Bedding	Blankets	106

NA- Not Applicable
NR- Not Recorded
R - Standard Deviation

Appendix G: Lumex Screening Results Summary Table
Greenleafe Drive Mercury Response Site
Baldwinsville, Onondaga County, New York

Serial Number	Property Number	Land Use	Date	Time	Screeining-1	Screeining-2	Screeining-3	Average Screening Result	R	Minimum	Maximum	Units	Location	Floor	Floor Cover	Height	Item Type	Description	Temperature (°F)
NR	Property 2	Residential	5/16/2016	15:05	NR	NR	NR	NR	NR	20	28	ng/m3	Poly bag 969	NA	NA	Headspace	Toys/Storage	Red plastic container with miscellaneous toys	104
NR	Property 2	Residential	5/16/2016	15:11	NR	NR	NR	NR	NR	1548	1600	ng/m3	Poly bag 970	NA	NA	Headspace	Linens	Bathroom mats	96
NR	Property 2	Residential	5/16/2016	15:18	NR	NR	NR	NR	NR	1308	1442	ng/m3	Poly bag 971	NA	NA	Headspace	Bedding	Red and white comforters	100
NR	Property 2	Residential	5/16/2016	16:00	NR	NR	NR	NR	NR	185	152	ng/m3	Poly bag 972	NA	NA	Headspace	Bedding	2 white comforters	115
NR	Property 2	Residential	5/16/2016	16:03	NR	NR	NR	NR	NR	56	105	ng/m3	Poly bag 973	NA	NA	Headspace	Bedding	White comforter and flower comforter	104
NR	Property 2	Residential	5/16/2016	16:08	NR	NR	NR	NR	NR	26	35	ng/m3	Poly bag 974	NA	NA	Headspace	Bedding	Brown and white comforter	103
NR	Property 2	Residential	5/16/2016	16:12	NR	NR	NR	NR	NR	29	34	ng/m3	Poly bag 975	NA	NA	Headspace	Miscellaneous	Shoe box and books	104
NR	Property 2	Residential	5/16/2016	16:17	NR	NR	NR	NR	NR	25	30	ng/m3	Poly bag 976	NA	NA	Headspace	Bedding	Assorted blankets and sheets	105
NR	Property 2	Residential	5/16/2016	16:22	NR	NR	NR	NR	NR	15	36	ng/m3	Poly bag 977	NA	NA	Headspace	Clothing	Costumes from the basement	140
NR	Property 2	Residential	5/16/2016	16:24	NR	NR	NR	NR	NR	10	21	ng/m3	Poly bag 978	NA	NA	Headspace	Clothing	NR	121.5
NR	Property 2	Residential	5/16/2016	16:29	NR	NR	NR	NR	NR	15	32	ng/m3	Poly bag 979	NA	NA	Headspace	Clothing	Boy's clothes	133.1
NR	Property 2	Residential	5/16/2016	16:32	NR	NR	NR	NR	NR	50	74	ng/m3	Poly bag 980	NA	NA	Headspace	Shoes	Black shoes	100.9
NR	Property 2	Residential	5/16/2016	16:37	NR	NR	NR	NR	NR	126	159	ng/m3	Poly bag 981	NA	NA	Headspace	Linens	Sheets	102
NR	Property 2	Residential	5/16/2016	16:38	NR	NR	NR	NR	NR	41	58	ng/m3	Poly bag 982	NA	NA	Headspace	Clothing	NR	129
NR	Property 2	Residential	5/16/2016	16:39	NR	NR	NR	NR	NR	20	35	ng/m3	Poly bag 983	NA	NA	Headspace	Toys	Stuffed animals	119
NR	Property 2	Residential	5/16/2016	16:44	NR	NR	NR	NR	NR	270	319	ng/m3	Poly bag 984	NA	NA	Headspace	Clothing	NR	105
NR	Property 2	Residential	5/16/2016	16:47	NR	NR	NR	NR	NR	5	9	ng/m3	Poly bag 985	NA	NA	Headspace	Furniture	Sealed feather bed	129
NR	Property 2	Residential	5/16/2016	16:50	NR	NR	NR	NR	NR	13	23	ng/m3	Poly bag 986	NA	NA	Headspace	Miscellaneous	Laundry items	123
NR	Property 2	Residential	5/16/2016	16:52	NR	NR	NR	NR	NR	60	138	ng/m3	Poly bag 987	NA	NA	Headspace	Storage	Luggage	117
NR	Property 2	Residential	5/16/2016	16:57	NR	NR	NR	NR	NR	6	17	ng/m3	Poly bag 988	NA	NA	Headspace	Miscellaneous	Hangers	94
NR	Property 2	Residential	5/16/2016	16:59	NR	NR	NR	NR	NR	5	15	ng/m3	Poly bag 989	NA	NA	Headspace	Bedding	Assorted blankets and sheets	109
NR	Property 2	Residential	5/16/2016	17:01	NR	NR	NR	NR	NR	20	23	ng/m3	Poly bag 990	NA	NA	Headspace	Bedding	Assorted blankets and sheets	128
NR	Property 2	Residential	5/16/2016	17:05	NR	NR	NR	NR	NR	1140	1214	ng/m3	Poly bag 991	NA	NA	Headspace	Miscellaneous	Dog Toys	102
NR	Property 2	Residential	5/16/2016	17:10	NR	NR	NR	NR	NR	16	18	ng/m3	Poly bag 992	NA	NA	Headspace	Bedding	Miscellaneous bedding	146
701	Property 1	Residential	5/17/2016	16:35	NR	NR	NR	NR	NR	1346	1761	ng/m3	Poly bag TBD	NA	NA	Headspace	Bike	Electric dirt bike	114
701	Property 1	Residential	5/17/2016	16:44	NR	NR	NR	NR	NR	15	27	ng/m3	Poly bag 446	NA	NA	Headspace	Lamp	Lamp	102
701	Property 1	Residential	5/17/2016	16:50	NR	NR	NR	NR	NR	230	572	ng/m3	Poly bag TBD	NA	NA	Headspace	Tools	Assorted tools	117
701	Property 1	Residential	5/17/2016	17:01	NR	NR	NR	NR	NR	103	160	ng/m3	Poly bag TBD	NA	NA	Headspace	Blanket	Blanket	104
701	Property 1	Residential	5/17/2016	17:03	NR	NR	NR	NR	NR	112	162	ng/m3	Poly bag TBD	NA	NA	Headspace	Blanket	Plaid blanket	103
701	Property 1	Residential	5/17/2016	17:10	NR	NR	NR	NR	NR	23	50	ng/m3	Poly bag TBD	NA	NA	Headspace	Jackets	Little girls jackets	107
701	Property 1	Residential	5/17/2016	17:14	NR	NR	NR	NR	NR	9	13	ng/m3	Poly bag TBD	NA	NA	Headspace	Pillow	Hello kitty pillow	103
701	Property 1	Residential	5/17/2016	17:21	NR	NR	NR	NR	NR	6	12	ng/m3	Poly bag TBD	NA	NA	Headspace	Jacket	Ladybug rain jacket	104
701	Property 1	Residential	5/17/2016	17:30	NR	NR	NR	NR	NR	6	19	ng/m3	Poly bag TBD	NA	NA	Headspace	Furniture	Antique table	104
1210	Property 2	Residential	5/17/2016	9:11	NR	NR	NR	NR	NR	28	42	ng/m3	Poly bag 994	NA	NA	Headspace	Clothing	NR	123
1210	Property 2	Residential	5/17/2016	9:13	NR	NR	NR	NR	NR	21	32	ng/m3	Poly bag 995	NA	NA	Headspace	Bedding	Pillows	165
1210	Property 2	Residential	5/17/2016	9:17	NR	NR	NR	NR	NR	187	321	ng/m3	Poly bag 996	NA	NA	Headspace	Clothing	Coats and sweatshirts	107
1210	Property 2	Residential	5/17/2016	9:21	NR	NR	NR	NR	NR	15	24	ng/m3	Poly bag 997	NA	NA	Headspace	Clothing	NR	102
1210	Property 2	Residential	5/17/2016	9:34	NR	NR	NR	NR	NR	25	65	ng/m3	Poly bag 998	NA	NA	Headspace	Furniture	Mattress- Room 2	91
1210	Property 2	Residential	5/17/2016	10:25	NR	NR	NR	NR	NR	21	34	ng/m3	Poly bag 999	NA	NA	Headspace	Furniture	Mattress- Room 4	95
1210	Property 2	Residential	5/17/2016	10:28	NR	NR	NR	NR	NR	24	61	ng/m3	Poly bag 1000	NA	NA	Headspace	Furniture	Mattress- Room 4	90
1210	Property 2	Residential	5/17/2016	9:38	NR	NR	NR	NR	NR	6500	7200	ng/m3	Poly bag 1001	NA	NA	Headspace	Toys	Miscellaneous toys and stuffed animals	118
1210	Property 2	Residential	5/17/2016	9:44	NR	NR	NR	NR	NR	1850	2365	ng/m3	Poly bag 1002	NA	NA	Headspace	Toys	Stuffed animals	108
1210	Property 2	Residential	5/17/2016	9:46	NR	NR	NR	NR	NR	2287	4196	ng/m3	Poly bag 1003	NA	NA	Headspace	Toys	Stuffed animals	145
1210	Property 2	Residential	5/17/2016	9:51	NR	NR	NR	NR	NR	185	271	ng/m3	Poly bag 1004	NA	NA	Headspace	Clothing	Boy's clothes	107
1210	Property 2	Residential	5/17/2016	9:55	NR	NR	NR	NR	NR	1531	1981	ng/m3	Poly bag 1005	NA	NA	Headspace	Clothing	NR	117
1210	Property 2	Residential	5/17/2016	10:01	NR	NR	NR	NR	NR	1481	1834	ng/m3	Poly bag 1006	NA	NA	Headspace	Clothing	Boy's clothes	94
1210	Property 2	Residential	5/17/2016	10:06	NR	NR	NR	NR	NR	3700	4985	ng/m3	Poly bag 1007	NA	NA	Headspace	Bedding	Assorted sheets and blankets	99
1210	Property 2	Residential	5/17/2016	10:11	NR	NR	NR	NR	NR	280	474	ng/m3	Poly bag 1008	NA	NA	Headspace	Clothing	NR	112
1210	Property 2	Residential	5/17/2016	10:14	NR	NR	NR	NR	NR	280	429	ng/m3	Poly bag 1009	NA	NA	Headspace	Clothing	Boy's clothes	95
1210	Property 2	Residential	5/17/2016	10:18	NR	NR	NR	NR	NR	269	585	ng/m3	Poly bag 1010	NA	NA	Headspace	Clothing	NR	96
1210	Property 2	Residential	5/17/2016	10:22	NR	NR	NR	NR	NR	242	355	ng/m3	Poly bag 1011	NA	NA	Headspace	Clothing	NR	98
1210	Property 2	Residential	5/17/2016	11:34	NR	NR	NR	NR	NR	75	122	ng/m3	Poly bag 1012	NA	NA	Headspace	Miscellaneous	Step ladder	105
1210	Property 2	Residential	5/17/2016	11:36	NR	NR	NR	NR	NR	985	1184	ng/m3	Poly bag 1013	NA	NA	Headspace	Miscellaneous	Garage items	106
1210	Property 2	Residential	5/17/2016	11:42	NR	NR	NR	NR	NR	77	92	ng/m3	Poly bag 1014	NA	NA	Headspace	Storage	Cooler from the garage	123
1210	Property 2	Residential	5/17/2016	11:45	NR	NR	NR	NR	NR	45	152	ng/m3	Poly bag 1015	NA	NA	Headspace	Clothing	Boy's clothes	144
1210	Property 2	Residential	5/17/2016	11:48	NR	NR	NR	NR	NR	83	128	ng/m3	Poly bag 1016	NA	NA	Headspace	Clothing	NR	125
1210	Property 2	Residential	5/17/2016	11:51	NR	NR	NR	NR	NR	141	181	ng/m3	Poly bag 1017	NA	NA	Headspace	Miscellaneous	Garage items	138
1210	Property 2	Residential	5/17/2016	13:25	NR	NR	NR	NR	NR	640	994	ng/m3	Poly bag 1018	NA	NA	Headspace	Miscellaneous	Garage items	103
1210	Property 2	Residential	5/17/2016	13:30	NR	NR	NR	NR	NR	27	32	ng/m3	Poly bag 1019	NA	NA	Headspace	Clothing/Bedding	Miscellaneous clothes, sheets, pillows	97
1210	Property 2	Residential	5/17/2016	13:32	NR	NR	NR	NR	NR	22	24	ng/m3	Poly bag 1020	NA	NA	Headspace	Bedding	White sheets	112
1210	Property 2	Residential	5/17/2016	13:34	NR	NR	NR	NR	NR	23	25	ng/m3	Poly bag 1021	NA	NA	Headspace	Miscellaneous	Sewing machine	121
1210	Property 2	Residential	5/17/2016	13:38	NR	NR	NR	NR	NR	111	172	ng/m3	Poly bag 1022	NA	NA	Headspace	Miscellaneous	Assorted books	125
1210	Property 2	Residential	5/17/2016	13:40	NR	NR	NR	NR	NR	98	109	ng/m3	Poly bag 1023	NA	NA	Headspace	Storage	Garage containers	93
1210	Property 2	Residential	5/17/2016	13:44	NR	NR	NR	NR	NR	44	50	ng/m3	Poly bag 1024	NA	NA	Headspace	Furniture	White shelf	103
1210	Property 2	Residential	5/17/2016	13:48	NR	NR	NR	NR	NR	650	1610	ng/m3	Poly bag 1025	NA	NA	Headspace	Furniture	White shelf	98
1210	Property 2	Residential	5/17/2016	13:50	NR	NR	NR	NR	NR	183	236	ng/m3	Poly bag 1026	NA	NA	Headspace	Toys	Miscellaneous toys	107
1210	Property 2	Residential	5/17/2016	13:55	NR	NR	NR	NR	NR	79	90	ng/m3	Poly bag 1027	NA	NA	Headspace	Miscellaneous	Garage items	93
1210	Property 2	Residential	5/17/2016	13:58	NR	NR	NR	NR	NR	55	60	ng/m3	Poly bag 1028	NA	NA	Headspace	Decorative	Wooden snowman	111
1210	Property 2	Residential	5/17/2016	14:01	NR	NR	NR	NR	NR	69	114	ng/m3	Poly bag 1029	NA	NA	Headspace	Towels	Beach towels	107
1210	Property 2	Residential	5/17/2016	14:03	NR	NR	NR	NR	NR	45	64	ng/m3	Poly bag 1030	NA	NA	Headspace	Decorative	2 pieces of art work	112
1210	Property 2	Residential	5/17/2016	14:07	NR	NR	NR	NR	NR	690	981	ng/m3	Poly bag 1031	NA	NA	Headspace	Storage/Toys	Bins and skateboard	110
1210	Property 2	Residential	5/17/2016	14:11	NR	NR	NR	NR	NR	1958	2233	ng/m3	Poly bag 1032	NA	NA	Headspace	Miscellaneous	Garage Tools	99
1210	Property 2	Residential	5/17/2016	14:18	NR	NR	NR	NR	NR	65	150	ng/m3	Poly bag 1033	NA	NA	Headspace	Storage	Blue storage bin	91
1210	Property 2	Residential	5/17/2016	14:32	NR	NR	NR	NR	NR	235	366	ng/m3	Poly bag 1034	NA	NA	Headspace	Storage	Empty boxes	133
1210	Property 2	Residential	5/17/2016	14:36	NR	NR	NR	NR	NR	253	489	ng/m3	Poly bag 1035	NA	NA	Headspace	Toys	Scooter and toy bucket	97
1210	Property 2	Residential	5/17/2016	14:40	NR	NR	NR	NR	NR	44	67	ng/m3	Poly bag 1036	NA	NA	Headspace	Toys	Board games	114
1210	Property 2	Residential	5/17/2016	14:44	NR	NR	NR	NR	NR	15	32	ng/m3	Poly bag 1037	NA	NA	Headspace	Miscellaneous	Air conditioner	113
1210	Property 2	Residential	5/17/2016	14:31	NR	NR	NR	NR	NR	69	96	ng/m3	Poly bag 1038	NA	NA	Headspace	Flooring	Carpet and chains	106
1210	Property 2	Residential	5/17/2016	14:55	NR	NR	NR	NR	NR	4020	7500	ng/m3	Poly bag 1039	NA	NA	Headspace	Toys	Board games	110
1210	Property 2	Residential	5/17/2016	14:58	NR	NR	NR	NR	NR	467	565	ng/m3	Poly bag 1040	NA	NA	Headspace	Kitchen Items	Pots and pans	108
1210	Property 2	Residential	5/17/2016	15:00	NR	NR	NR	NR	NR	32	45	ng/m3	Poly bag 1041	NA	NA	Headspace	Electronics	Printer	93
1210	Property 2	Residential	5/17/2016	15:04	NR	NR	NR	NR	NR	132	189	ng/m3	Poly bag 1042	NA	NA	Headspace	Miscellaneous	Box of assorted items	98
1210	Property 2	Residential	5/17/2016	15:39	NR	NR	NR	NR	NR	95	106	ng/m3	Poly bag 1043	NA	NA	Headspace	Miscellaneous	Office files	96
1210	Property 2	Residential	5/17/2016	15:55	NR	NR	NR	NR	NR	854	1201	ng/m3	Poly bag 1044	NA	NA	Headspace	Miscellaneous	Cleaning items	92
1210	Property 2	Residential	5/17/2016	15:59	NR	NR	NR	NR	NR	16000	>50000	ng/m3	Poly bag 1045	NA	NA	Headspace	Shoes	NR	113

NA- Not Applicable
NR- Not Recorded
R - Standard Deviation

Appendix G: Lumex Screening Results Summary Table
Greenleafe Drive Mercury Response Site
Baldwinsville, Onondaga County, New York

Serial Number	Property Number	Land Use	Date	Time	Screeining-1	Screeining-2	Screeining-3	Average Screening Result	R	Minimum	Maximum	Units	Location	Floor	Floor Cover	Height	Item Type	Description	Temperature (˚F)
1210	Property 2	Residential	5/17/2016	16:06	NR	NR	NR	NR	NR	665	705	ng/m3	Poly bag 1046	NA	NA	Headspace	Toys	Board games	100
1210	Property 2	Residential	5/17/2016	16:11	NR	NR	NR	NR	NR	765	857	ng/m3	Poly bag 1047	NA	NA	Headspace	Clothing	NR	120
1210	Property 2	Residential	5/17/2016	16:14	NR	NR	NR	NR	NR	101	124	ng/m3	Poly bag 1048	NA	NA	Headspace	Toys	Board games	124
1210	Property 2	Residential	5/17/2016	16:20	NR	NR	NR	NR	NR	987	1187	ng/m3	Poly bag 1049	NA	NA	Headspace	Towels	NR	98
1210	Property 2	Residential	5/17/2016	17:02	NR	NR	NR	NR	NR	328	493	ng/m3	Poly bag 1050	NA	NA	Headspace	Towels	NR	102
1210	Property 2	Residential	5/17/2016	NR	NR	NR	NR	NR	NR	36	42	ng/m3	Poly bag 1054	NA	NA	Headspace	Decorative	Pictures	91
491	Property 1	Residential	5/18/2016	9:04	NR	NR	NR	NR	NR	43	66	ng/m3	Poly Bag 714	NA	NA	Headspace	Towels	3 towels from dryer experiment	115
491	Property 1	Residential	5/18/2016	9:10	NR	NR	NR	NR	NR	3505	4008	ng/m3	Poly Bag 717	NA	NA	Headspace	Air compressor	1 air compressor	120
491	Property 1	Residential	5/18/2016	9:21	NR	NR	NR	NR	NR	127	263	ng/m3	Garage	NR	NR	Headspace	Tool box	Tools	94
491	Property 1	Residential	5/18/2016	9:25	NR	NR	NR	NR	NR	128	147	ng/m3	Garage	NR	NR	Headspace	Tool box	Tools/ nails/ screws	103
491	Property 1	Residential	5/18/2016	9:36	NR	NR	NR	NR	NR	1022	1640	ng/m3	Backyard	NA	NA	Headspace	Yard items	Misc yard items	106
491	Property 1	Residential	5/18/2016	9:40	NR	NR	NR	NR	NR	157	184	ng/m3	Backyard	NA	NA	Headspace	Yard items	Misc athletic gear	97
491	Property 1	Residential	5/18/2016	9:54	NR	NR	NR	NR	NR	192	319	ng/m3	Backyard	NA	NA	Headspace	Yard item	Yoga mat	105
491	Property 1	Residential	5/18/2016	9:56	NR	NR	NR	NR	NR	1980	3863	ng/m3	Backyard	NA	NA	Headspace	Hat	Camo hat	112
491	Property 1	Residential	5/18/2016	10:02	NR	NR	NR	NR	NR	282	372	ng/m3	Backyard	NA	NA	Headspace	Yard items	Misc athletic gear	113
491	Property 1	Residential	5/18/2016	10:05	NR	NR	NR	NR	NR	1735	3563	ng/m3	Backyard	NA	NA	Headspace	Yard item	Reflective vest	120
491	Property 1	Residential	5/18/2016	10:08	NR	NR	NR	NR	NR	1847	2147	ng/m3	Backyard	NA	NA	Headspace	Yard item	Lacrosse shoulder pads	115
491	Property 1	Residential	5/18/2016	10:10	NR	NR	NR	NR	NR	3111	4487	ng/m3	Backyard	NA	NA	Headspace	Yard items	Lacrosse stick and bag	138
491	Property 1	Residential	5/18/2016	10:18	NR	NR	NR	NR	NR	176	189	ng/m3	Backyard	NA	NA	Headspace	Yard item	Snow shovel	106
1210	Property 1	Residential	5/18/2016	11:00	NR	NR	NR	NR	NR	88	169	ng/m3	Backyard	NA	NA	Headspace	Tool chest	Tool chest	95
1210	Property 1	Residential	5/18/2016	11:20	NR	NR	NR	NR	NR	93	345	ng/m3	Dryer	NA	NA	Headspace	Dryer bottom	Dryer bottom	95
1210	Property 1	Residential	5/18/2016	11:24	NR	NR	NR	NR	NR	1168	1320	ng/m3	Garage	NR	NR	Headspace	Tools	Various tools from tool chest	118
1210	Property 1	Residential	5/18/2016	13:25	NR	NR	NR	NR	NR	1500	3368	ng/m3	Poly bag TBD	NA	NA	Headspace	Bike	Electric dirt bike	114
1210	Property 1	Residential	5/18/2016	13:33	NR	NR	NR	NR	NR	101	126	ng/m3	Poly bag TBD	NA	NA	Headspace	Dehumidifier	Dehumidifier	121
1210	Property 1	Residential	5/18/2016	13:40	NR	NR	NR	NR	NR	5512	7355	ng/m3	Poly bag TBD	NA	NA	Headspace	Compressed air tank	Compressed air tank (wiped down)	101
491	Property 1	Residential	5/18/2016	13:50	NR	NR	NR	NR	NR	3900	11750	ng/m3	Rug	NA	NA	Headspace	Antique rug	NE corner	113
491	Property 1	Residential	5/18/2016	13:50	NR	NR	NR	NR	NR	3900	19860	ng/m3	Rug	NA	NA	Headspace	Antique rug	SE corner	113
491	Property 1	Residential	5/18/2016	13:50	NR	NR	NR	NR	NR	3900	14300	ng/m3	Rug	NA	NA	Headspace	Antique rug	Center	115
491	Property 1	Residential	5/18/2016	13:50	NR	NR	NR	NR	NR	3900	5400	ng/m3	Rug	NA	NA	Headspace	Antique rug	West (center)	115
491	Property 2	Residential	5/18/2016	15:43	NR	NR	NR	NR	NR	63	82	ng/m3	W1	NA	NA	Headspace	NR	Center walkway	93
491	Property 2	Residential	5/18/2016	15:46	NR	NR	NR	NR	NR	226	296	ng/m3	W2	NA	NA	Headspace	NR	Center walkway	93
491	Property 2	Residential	5/18/2016	15:49	NR	NR	NR	NR	NR	74	115	ng/m3	W3	NA	NA	Headspace	NR	Soil on side of walkway	78
491	Property 2	Residential	5/18/2016	15:51	NR	NR	NR	NR	NR	166	191	ng/m3	W4	NA	NA	Headspace	NR	Soil on side of walkway	84
491	Property 2	Residential	5/18/2016	15:53	NR	NR	NR	NR	NR	87	103	ng/m3	W5	NA	NA	Headspace	NR	Soil on side of walkway	91
491	Property 2	Residential	5/18/2016	15:56	NR	NR	NR	NR	NR	146	209	ng/m3	W6	NA	NA	Headspace	NR	Soil on side of walkway	81
491	Property 2	Residential	5/18/2016	15:57	NR	NR	NR	NR	NR	102	207	ng/m3	W7	NA	NA	Headspace	NR	Soil on side of walkway	61
491	Property 2	Residential	5/18/2016	16:00	NR	NR	NR	NR	NR	144	264	ng/m3	W8	NA	NA	Headspace	NR	Soil on side of walkway	78
491	Property 2	Residential	5/18/2016	16:01	NR	NR	NR	NR	NR	217	324	ng/m3	W9	NA	NA	Headspace	NR	Soil on side of walkway	80
491	Property 2	Residential	5/18/2016	16:03	NR	NR	NR	NR	NR	45	62	ng/m3	W10	NA	NA	Headspace	NR	Soil on side of walkway	96
491	Property 2	Residential	5/18/2016	16:07	NR	NR	NR	NR	NR	49	55	ng/m3	W11	NA	NA	Headspace	NR	Soil on side of walkway	83
491	Property 2	Residential	5/18/2016	15:33	NR	NR	NR	NR	NR	147	230	ng/m3	ND1	NA	NA	Headspace	NR	Soil north side of driveway	91
491	Property 2	Residential	5/18/2016	15:36	NR	NR	NR	NR	NR	102	142	ng/m3	ND2	NA	NA	Headspace	NR	Soil north side of driveway	94
491	Property 2	Residential	5/18/2016	15:37	NR	NR	NR	NR	NR	111	132	ng/m3	ND3	NA	NA	Headspace	NR	Soil north side of driveway	108
491	Property 2	Residential	5/18/2016	15:38	NR	NR	NR	NR	NR	39	56	ng/m3	ND4	NA	NA	Headspace	NR	Soil north side of driveway	98
491	Property 2	Residential	5/18/2016	16:46	NR	NR	NR	NR	NR	568	615	ng/m3	W1b	NA	NA	Headspace	NR	Center walkway	70
491	Property 2	Residential	5/18/2016	16:50	NR	NR	NR	NR	NR	282	351	ng/m3	W2b	NA	NA	Headspace	NR	Center walkway	72
491	Property 2	Residential	5/18/2016	16:55	NR	NR	NR	NR	NR	52	70	ng/m3	W3b	NA	NA	Headspace	NR	Soil on side of walkway	65
491	Property 2	Residential	5/18/2016	16:56	NR	NR	NR	NR	NR	38	46	ng/m3	W4b	NA	NA	Headspace	NR	Soil on side of walkway	66
491	Property 2	Residential	5/18/2016	16:57	NR	NR	NR	NR	NR	114	131	ng/m3	W5b	NA	NA	Headspace	NR	Soil on side of walkway	62
491	Property 2	Residential	5/18/2016	16:58	NR	NR	NR	NR	NR	55	77	ng/m3	W6b	NA	NA	Headspace	NR	Soil on side of walkway	73
491	Property 2	Residential	5/18/2016	17:00	NR	NR	NR	NR	NR	48	80	ng/m3	W7b	NA	NA	Headspace	NR	Soil on side of walkway	72
491	Property 2	Residential	5/18/2016	17:01	NR	NR	NR	NR	NR	381	413	ng/m3	W8b	NA	NA	Headspace	NR	Soil on side of walkway	78
491	Property 2	Residential	5/18/2016	17:05	NR	NR	NR	NR	NR	39	54	ng/m3	W9b	NA	NA	Headspace	NR	Soil on side of walkway	89
491	Property 2	Residential	5/18/2016	17:07	NR	NR	NR	NR	NR	23	29	ng/m3	W10b	NA	NA	Headspace	NR	Soil on side of walkway	80
491	Property 2	Residential	5/18/2016	17:08	NR	NR	NR	NR	NR	24	31	ng/m3	W11b	NA	NA	Headspace	NR	Soil on side of walkway	70
491	Property 2	Residential	5/18/2016	16:24	NR	NR	NR	NR	NR	53	56	ng/m3	ND1b	NA	NA	Headspace	NR	Soil north side of driveway	83
491	Property 2	Residential	5/18/2016	16:25	NR	NR	NR	NR	NR	29	40	ng/m3	ND2b	NA	NA	Headspace	NR	Soil north side of driveway	71
491	Property 2	Residential	5/18/2016	16:26	NR	NR	NR	NR	NR	57	69	ng/m3	ND3b	NA	NA	Headspace	NR	Soil north side of driveway	75
491	Property 2	Residential	5/18/2016	16:28	NR	NR	NR	NR	NR	10	19	ng/m3	ND4b	NA	NA	Headspace	NR	Soil north side of driveway	68
491	Property 2	Residential	5/18/2016	17:11	NR	NR	NR	NR	NR	186	231	ng/m3	ND1c	NA	NA	Headspace	NR	Soil north side of driveway	77
491	Property 2	Residential	5/18/2016	17:12	NR	NR	NR	NR	NR	632	967	ng/m3	ND2c	NA	NA	Headspace	NR	Soil north side of driveway	71
491	Property 2	Residential	5/18/2016	17:13	NR	NR	NR	NR	NR	117	130	ng/m3	ND3c	NA	NA	Headspace	NR	Soil north side of driveway	78
491	Property 2	Residential	5/18/2016	17:14	NR	NR	NR	NR	NR	372	591	ng/m3	ND4c	NA	NA	Headspace	NR	Soil north side of driveway	76
1210	Property 2	Residential	5/18/2016	14:17	NR	NR	NR	NR	NR	45	105	ng/m3	Poly bag 1051	NA	NA	Headspace	Miscellaneous	Yellow salt bag	93
1210	Property 2	Residential	5/18/2016	14:43	NR	NR	NR	NR	NR	37	70	ng/m3	Poly bag 1052	NA	NA	Headspace	Linens	Cleaning cloths	105
1210	Property 2	Residential	5/18/2016	14:22	NR	NR	NR	NR	NR	55	72	ng/m3	Poly bag 1053	NA	NA	Headspace	Pet Care	Dog cage	106
1210	Property 2	Residential	5/18/2016	14:26	NR	NR	NR	NR	NR	1570	1920	ng/m3	Poly bag 1039	NA	NA	Headspace	Toys	Board games and assorted toys	92
1210	Property 2	Residential	5/18/2016	14:30	NR	NR	NR	NR	NR	29	34	ng/m3	Poly bag 1054	NA	NA	Headspace	Miscellaneous	Garbage bags and storage wipes	110
1210	Property 2	Residential	5/18/2016	14:32	NR	NR	NR	NR	NR	62	101	ng/m3	Poly bag 1055	NA	NA	Headspace	Miscellaneous	Assorted magazines	92
1210	Property 2	Residential	5/18/2016	14:34	NR	NR	NR	NR	NR	1618	3849	ng/m3	Poly bag 1056	NA	NA	Headspace	Pet Care	Green bag of dog food	124
1210	Property 2	Residential	5/18/2016	14:37	NR	NR	NR	NR	NR	48	59	ng/m3	Poly bag 1057	NA	NA	Headspace	Miscellaneous	Makeup from Room 3	140
1210	Property 2	Residential	5/18/2016	14:40	NR	NR	NR	NR	NR	68	175	ng/m3	Poly bag 1058	NA	NA	Headspace	Pet Care	Red bag of dog food	118
1210	Property 2	Residential	5/18/2016	14:49	NR	NR	NR	NR	NR	24	29	ng/m3	Poly bag 1059	NA	NA	Headspace	Decorative	Blinds and a filter	99
1210	Property 2	Residential	5/18/2016	14:53	NR	NR	NR	NR	NR	172	313	ng/m3	Poly bag 1060	NA	NA	Headspace	Clothing	Son's clothes	106
1210	Property 2	Residential	5/18/2016	14:56	NR	NR	NR	NR	NR	37	52	ng/m3	Poly bag 1061	NA	NA	Headspace	Toys	NR	93
1210	Property 2	Residential	5/18/2016	15:05	NR	NR	NR	NR	NR	30	42	ng/m3	Poly bag 1062	NA	NA	Headspace	Storage	Green cooler	98
1210	Property 2	Residential	5/18/2016	15:08	NR	NR	NR	NR	NR	68	75	ng/m3	Poly bag 1062.a	NA	NA	Headspace	Miscellaneous	Garage items	110
1210	Property 2	Residential	5/18/2016	15:11	NR	NR	NR	NR	NR	21	32	ng/m3	Poly bag 1063	NA	NA	Headspace	Miscellaneous	Garage items	97
1210	Property 2	Residential	5/18/2016	15:15	NR	NR	NR	NR	NR	1574	1863	ng/m3	Poly bag 1064	NA	NA	Headspace	Furniture	Mattress	104
1210	Property 2	Residential	5/18/2016	15:17	NR	NR	NR	NR	NR	273	430	ng/m3	Poly bag 1065	NA	NA	Headspace	Furniture	Mattress	106
1210	Property 2	Residential	5/18/2016	15:20	NR	NR	NR	NR	NR	53	136	ng/m3	Poly bag 1000	NA	NA	Headspace	Furniture	Mattress	105
1210	Property 2	Residential	5/18/2016	15:27	NR	NR	NR	NR	NR	30	42	ng/m3	Poly bag 1066	NA	NA	Headspace	Miscellaneous	Hangers	92
1210	Property 2	Residential	5/18/2016	15:31	NR	NR	NR	NR	NR	615	1235	ng/m3	Poly bag 1067	NA	NA	Headspace	Decorative	Glass	93
1210	Property 2	Residential	5/18/2016	15:35	NR	NR	NR	NR	NR	42	83	ng/m3	Poly bag 1068	NA	NA	Headspace	Decorative	Glass	101
1210	Property 2	Residential	5/18/2016	15:38	NR	NR	NR	NR	NR	174	334	ng/m3	Poly bag 1069	NA	NA	Headspace	Decorative	Glass	95

NA- Not Applicable
NR- Not Recorded
R - Standard Deviation

Appendix G: Lumex Screening Results Summary Table
Greenleafe Drive Mercury Response Site
Baldwinsville, Onondaga County, New York

Serial Number	Property Number	Land Use	Date	Time	Screening-1	Screening-2	Screening-3	Average Screening Result	R	Minimum	Maximum	Units	Location	Floor	Floor Cover	Height	Item Type	Description	Temperature (˚F)
1210	Property 2	Residential	5/18/2016	15:45	NR	NR	NR	NR	NR	307	385	ng/m3	Poly bag 1070	NA	NA	Headspace	Decorative	Glass	110
1210	Property 2	Residential	5/18/2016	15:51	NR	NR	NR	NR	NR	33000	>50000	ng/m3	Poly bag 1071	NA	NA	Headspace	Shoes	Red boots	104
1210	Property 2	Residential	5/18/2016	15:58	NR	NR	NR	NR	NR	13470	15800	ng/m3	Poly bag 1072	NA	NA	Headspace	Shoes	Red sneakers	108
1210	Property 2	Residential	5/18/2016	16:00	NR	NR	NR	NR	NR	17890	28710	ng/m3	Poly bag 1073	NA	NA	Headspace	Shoes	Blue shoes	122
1210	Property 2	Residential	5/18/2016	16:04	NR	NR	NR	NR	NR	25480	44110	ng/m3	Poly bag 1074	NA	NA	Headspace	Shoes	Beige boots	95
1210	Property 2	Residential	5/18/2016	16:07	NR	NR	NR	NR	NR	4000	>50000	ng/m3	Poly bag 1075	NA	NA	Headspace	Shoes	Brown boots	108
1210	Property 2	Residential	5/18/2016	16:14	NR	NR	NR	NR	NR	50000	>50000	ng/m3	Poly bag 1076	NA	NA	Headspace	Shoes	Black and white sneakers	111
1210	Property 2	Residential	5/18/2016	16:16	NR	NR	NR	NR	NR	8623	17150	ng/m3	Poly bag 1077	NA	NA	Headspace	Shoes	Rokker skates	105
1210	Property 2	Residential	5/18/2016	16:20	NR	NR	NR	NR	NR	>50000	>50000	ng/m3	Poly bag 1078	NA	NA	Headspace	Shoes	Brown heeled boots	110
1210	Property 2	Residential	5/18/2016	16:23	NR	NR	NR	NR	NR	>50000	>50000	ng/m3	Poly bag 1079	NA	NA	Headspace	Shoes	Black heeled boots	107
1210	Property 2	Residential	5/18/2016	16:25	NR	NR	NR	NR	NR	>50000	>50000	ng/m3	Poly bag 1080	NA	NA	Headspace	Shoes	Brown suede boots	101
1210	Property 2	Residential	5/18/2016	16:27	NR	NR	NR	NR	NR	>50000	>50000	ng/m3	Poly bag 1081	NA	NA	Headspace	Shoes	Black boots	102
1210	Property 2	Residential	5/18/2016	16:29	NR	NR	NR	NR	NR	27050	29980	ng/m3	Poly bag 1082	NA	NA	Headspace	Pet Care	Dog leash	111
1210	Property 2	Residential	5/18/2016	16:32	NR	NR	NR	NR	NR	>50000	>50000	ng/m3	Poly bag 1083	NA	NA	Headspace	Shoes	Black lace-up boots	100
1210	Property 2	Residential	5/18/2016	16:49	NR	NR	NR	NR	NR	145	386	ng/m3	Poly bag 1084	NA	NA	Headspace	Decorative	Decorations from Room 2	96
1210	Property 2	Residential	5/18/2016	16:52	NR	NR	NR	NR	NR	189	243	ng/m3	Poly bag 1085	NA	NA	Headspace	Decorative	Miscellaneous items from Room 2	99
1210	Property 2	Residential	5/18/2016	16:54	NR	NR	NR	NR	NR	124	159	ng/m3	Poly bag 1086	NA	NA	Headspace	Electronics	DVDs	100
1210	Property 2	Residential	5/18/2016	16:57	NR	NR	NR	NR	NR	63	78	ng/m3	Poly bag 1087	NA	NA	Headspace	Toys	NR	104
1210	Property 2	Residential	5/18/2016	16:59	NR	NR	NR	NR	NR	36	62	ng/m3	Poly bag 1088	NA	NA	Headspace	Electronics	DVDs	92
1210	Property 2	Residential	5/18/2016	17:02	NR	NR	NR	NR	NR	77	111	ng/m3	Poly bag 1089	NA	NA	Headspace	Toys	NR	113
491	Property 2	Residential	5/19/2016	13:30	NR	NR	NR	NR	NR	38	54	ng/m3	Mini Cooper	NA	NA	Breathing Zone	NR	Head level	116
491	Property 2	Residential	5/19/2016	13:35	NR	NR	NR	NR	NR	1900	3800	ng/m3	Mini Cooper	NA	NA	Floor	Floor mat	Driver seat floor mat	90
491	Property 2	Residential	5/19/2016	13:38	NR	NR	NR	NR	NR	1900	2226	ng/m3	Nissan SUV	NA	NA	Breathing Zone	NR	Head level	102
491	Property 2	Residential	5/19/2016	13:40	NR	NR	NR	NR	NR	1400	2200	ng/m3	Nissan SUV	NA	NA	Floor	Floor mat	Driver seat floor mat	105
491	Property 2	Residential	5/19/2016	15:17	NR	NR	NR	NR	NR	NR	295	ng/m3	Nissan SUV	NA	NA	Breathing zone	NR	Head level	102
491	Property 2	Residential	5/19/2016	15:18	NR	NR	NR	NR	NR	300	595	ng/m3	Nissan SUV	NA	NA	Floor	NR	Passenger floor	137
491	Property 2	Residential	5/19/2016	15:19	NR	NR	NR	NR	NR	185	282	ng/m3	Nissan SUV	NA	NA	Floor	NR	Driver seat floor	137
491	Property 2	Residential	5/19/2016	15:20	NR	NR	NR	NR	NR	213	266	ng/m3	Nissan SUV	NA	NA	Floor	NR	Backseat floor	102
491	Property 2	Residential	5/19/2016	8:32	NR	NR	NR	NR	NR	11	19	ng/m3	Poly bag 1090	NA	NA	Headspace	Furniture	Wooden shelves from the office	107
491	Property 2	Residential	5/19/2016	8:38	NR	NR	NR	NR	NR	15	24	ng/m3	Poly bag 1091	NA	NA	Headspace	Furniture	Wooden shelves from the office	91
491	Property 2	Residential	5/19/2016	8:42	NR	NR	NR	NR	NR	18	21	ng/m3	Poly bag 1092	NA	NA	Headspace	Toys/Electronics	Legos and laptop case	96
491	Property 2	Residential	5/19/2016	8:48	NR	NR	NR	NR	NR	22	30	ng/m3	Poly bag 1093	NA	NA	Headspace	Furniture	Wooden shelves	97
491	Property 2	Residential	5/19/2016	8:52	NR	NR	NR	NR	NR	46	51	ng/m3	Poly bag 1094	NA	NA	Headspace	Lighting	Miscellaneous lamps	101
491	Property 2	Residential	5/19/2016	8:56	NR	NR	NR	NR	NR	20	25	ng/m3	Poly bag 1095	NA	NA	Headspace	Books	Cook Books	114
491	Property 2	Residential	5/19/2016	8:59	NR	NR	NR	NR	NR	14	18	ng/m3	Poly bag 1096	NA	NA	Headspace	Pet Care	Cat shelf	93
491	Property 2	Residential	5/19/2016	9:02	NR	NR	NR	NR	NR	49	62	ng/m3	Poly bag 1097	NA	NA	Headspace	Furniture	Miscellaneous shelving	99
491	Property 2	Residential	5/19/2016	9:06	NR	NR	NR	NR	NR	25	32	ng/m3	Poly bag 1098	NA	NA	Headspace	Electronics	Wii games	106
491	Property 2	Residential	5/19/2016	9:09	NR	NR	NR	NR	NR	75	129	ng/m3	Poly bag 1099	NA	NA	Headspace	Decorative	Assorted school art	97
491	Property 2	Residential	5/19/2016	9:12	NR	NR	NR	NR	NR	51	79	ng/m3	Poly bag 1100	NA	NA	Headspace	Toys	NR	104
491	Property 2	Residential	5/19/2016	9:17	NR	NR	NR	NR	NR	18	20	ng/m3	Poly bag 1101	NA	NA	Headspace	Toys	NR	101
491	Property 2	Residential	5/19/2016	9:19	NR	NR	NR	NR	NR	12	15	ng/m3	Poly bag 1102	NA	NA	Headspace	Books	Comic books	98
491	Property 2	Residential	5/19/2016	9:22	NR	NR	NR	NR	NR	29	35	ng/m3	Poly bag 1103	NA	NA	Headspace	Electronics	Internet router	103
491	Property 2	Residential	5/19/2016	9:25	NR	NR	NR	NR	NR	71	78	ng/m3	Poly bag 1104	NA	NA	Headspace	Toys	Wooden blocks	101
491	Property 2	Residential	5/19/2016	9:30	NR	NR	NR	NR	NR	47	58	ng/m3	Poly bag 1105	NA	NA	Headspace	Toys	Wooden blocks	94
491	Property 2	Residential	5/19/2016	9:34	NR	NR	NR	NR	NR	107	266	ng/m3	Poly bag 1106	NA	NA	Headspace	Pet Care	Pet mats	109
491	Property 2	Residential	5/19/2016	9:37	NR	NR	NR	NR	NR	39	46	ng/m3	Poly bag 1107	NA	NA	Headspace	Toys/Books	Children's books and toys	111
491	Property 2	Residential	5/19/2016	9:39	NR	NR	NR	NR	NR	39	44	ng/m3	Poly bag 1108	NA	NA	Headspace	Toys	NR	103
491	Property 2	Residential	5/19/2016	9:42	NR	NR	NR	NR	NR	152	277	ng/m3	Poly bag 1109	NA	NA	Headspace	Miscellaneous	Paper and pens	100
491	Property 2	Residential	5/19/2016	9:45	NR	NR	NR	NR	NR	36	48	ng/m3	Poly bag 1110	NA	NA	Headspace	Miscellaneous	Shovel and garage items	108
491	Property 2	Residential	5/19/2016	9:51	NR	NR	NR	NR	NR	30	38	ng/m3	Poly bag 1111	NA	NA	Headspace	Furniture	Wooden toy chest	93
491	Property 2	Residential	5/19/2016	9:54	NR	NR	NR	NR	NR	19	23	ng/m3	Poly bag 1112	NA	NA	Headspace	Furniture	Bed frame	96
491	Property 2	Residential	5/19/2016	10:03	NR	NR	NR	NR	NR	78	120	ng/m3	Poly bag 1113	NA	NA	Headspace	Toys	Blue ping pong table	97
491	Property 2	Residential	5/19/2016	10:09	NR	NR	NR	NR	NR	44	68	ng/m3	Poly bag 1114	NA	NA	Headspace	Toys	Blue ping pong table	96
491	Property 2	Residential	5/19/2016	10:50	NR	NR	NR	NR	NR	227	300	ng/m3	Poly bag 1115	NA	NA	Headspace	Furniture	White corner shelf	93
491	Property 2	Residential	5/19/2016	10:52	NR	NR	NR	NR	NR	43	50	ng/m3	Poly bag 1116	NA	NA	Headspace	Pet Care	Cat playground	93
491	Property 2	Residential	5/19/2016	10:54	NR	NR	NR	NR	NR	269	466	ng/m3	Poly bag 1117	NA	NA	Headspace	Athletics	Athletic gear	101
491	Property 2	Residential	5/19/2016	10:57	NR	NR	NR	NR	NR	31	49	ng/m3	Poly bag 1118	NA	NA	Headspace	Furniture	Wooden dresser	103
491	Property 2	Residential	5/19/2016	11:00	NR	NR	NR	NR	NR	13	17	ng/m3	Poly bag 1119	NA	NA	Headspace	Furniture	Wooden cabinet	104
491	Property 2	Residential	5/19/2016	11:02	NR	NR	NR	NR	NR	17	22	ng/m3	Poly bag 1120	NA	NA	Headspace	Furniture	Wooden cabinet	93
491	Property 2	Residential	5/19/2016	11:11	NR	NR	NR	NR	NR	94	122	ng/m3	Poly bag 1121	NA	NA	Headspace	Furniture	King mattress	113
491	Property 2	Residential	5/19/2016	11:09	NR	NR	NR	NR	NR	85	220	ng/m3	Poly bag 1122	NA	NA	Headspace	Furniture	Grey mattress	104
491	Property 2	Residential	5/19/2016	11:13	NR	NR	NR	NR	NR	48	74	ng/m3	Poly bag 1123	NA	NA	Headspace	Furniture	Beige box spring	101
491	Property 2	Residential	5/19/2016	13:50	NR	NR	NR	NR	NR	105	135	ng/m3	Poly bag 1124	NA	NA	Headspace	Furniture	Full size mattress	110
491	Property 2	Residential	5/19/2016	13:52	NR	NR	NR	NR	NR	36	46	ng/m3	Poly bag 1125	NA	NA	Headspace	Furniture	Wooden desk	110
491	Property 2	Residential	5/19/2016	13:54	NR	NR	NR	NR	NR	51	77	ng/m3	Poly bag 1126	NA	NA	Headspace	Furniture	Wooden chair with cushion	130
491	Property 2	Residential	5/19/2016	13:56	NR	NR	NR	NR	NR	420	1154	ng/m3	Poly bag 1127	NA	NA	Headspace	Car Items	Mini Cooper floor mats	124
491	Property 2	Residential	5/19/2016	14:00	NR	NR	NR	NR	NR	50	50	ng/m3	Poly bag 1128	NA	NA	Headspace	Car Items	Nissan floor mats	129
491	Property 2	Residential	5/19/2016	14:02	NR	NR	NR	NR	NR	261	333	ng/m3	Poly bag 1129	NA	NA	Headspace	Toys	NR	103
491	Property 2	Residential	5/19/2016	14:04	NR	NR	NR	NR	NR	101	269	ng/m3	Poly bag 1130	NA	NA	Headspace	Toys	NR	132
491	Property 2	Residential	5/19/2016	14:06	NR	NR	NR	NR	NR	163	406	ng/m3	Poly bag 1131	NA	NA	Headspace	Clothing	NR	103
491	Property 2	Residential	5/19/2016	14:10	NR	NR	NR	NR	NR	162	206	ng/m3	Poly bag 1132	NA	NA	Headspace	Clothing	NR	112
491	Property 2	Residential	5/19/2016	14:20	NR	NR	NR	NR	NR	29	36	ng/m3	Poly bag 1133	NA	NA	Headspace	Furniture	Large wood cabinet	93
491	Property 2	Residential	5/19/2016	14:43	NR	NR	NR	NR	NR	34	59	ng/m3	Poly bag 1134	NA	NA	Headspace	Furniture	Twin box spring	91
491	Property 2	Residential	5/19/2016	14:45	NR	NR	NR	NR	NR	37	44	ng/m3	Poly bag 1135	NA	NA	Headspace	Furniture	Twin box spring	101
491	Property 2	Residential	5/19/2016	14:25	NR	NR	NR	NR	NR	88	95	ng/m3	Poly bag 1136	NA	NA	Headspace	Furniture	King mattress	130
491	Property 2	Residential	5/19/2016	14:27	NR	NR	NR	NR	NR	25	44	ng/m3	Poly bag 1137	NA	NA	Headspace	Furniture	Twin box spring	101
701	Property 2	Residential	5/19/2016	14:47	NR	NR	NR	NR	NR	27	33	ng/m3	Poly bag 1138	NA	NA	Headspace	NR	King box spring	102
701	Property 1	Residential	5/19/2016	15:30	NR	NR	NR	NR	NR	35	93	ng/m3	Toyota Highlander	NA	NA	Breathing Zone	NR	Breathing Air	103
701	Property 1	Residential	5/19/2016	15:31	NR	NR	NR	NR	NR	350	800	ng/m3	Toyota Highlander	NA	NA	Floor	NR	Passenger Floor	93
701	Property 1	Residential	5/19/2016	15:32	NR	NR	NR	NR	NR	NR	1600	ng/m3	Toyota Highlander	NA	NA	Floor	NR	Rear driver floor	93
701	Property 1	Residential	5/19/2016	15:33	NR	NR	NR	NR	NR	NR	290	ng/m3	Toyota Highlander	NA	NA	Floor	NR	Rear passenger floor	93
701	Property 1	Residential	5/19/2016	15:34	NR	NR	NR	NR	NR	52	64	ng/m3	Toyota Camry	NA	NA	Breathing Zone	NR	Breathing Air	100
701	Property 1	Residential	5/19/2016	15:35	NR	NR	NR	NR	NR	90	250	ng/m3	Toyota Camry	NA	NA	Floor	NR	Passenger Floor	91
701	Property 1	Residential	5/19/2016	15:36	NR	NR	NR	NR	NR	95	125	ng/m3	Toyota Camry	NA	NA	Floor	NR	Driver floor	91
701	Property 1	Residential	5/19/2016	15:37	NR	NR	NR	NR	NR	130	492	ng/m3	Toyota Camry	NA	NA	Floor	NR	Rear floor	91

NA- Not Applicable
NR- Not Recorded
R - Standard Deviation

Appendix G: Lumex Screening Results Summary Table
Greenleafe Drive Mercury Response Site
Baldwinsville, Onondaga County, New York

Serial Number	Property Number	Land Use	Date	Time	Screeining-1	Screeining-2	Screeining-3	Average Screening Result	R	Minimum	Maximum	Units	Location	Floor	Floor Cover	Height	Item Type	Description	Temperature (˚F)
701	Property 1	Residential	5/19/2016	15:45	NR	NR	NR	NR	NR	124	204	ng/m4	Poly bag 1139	NA	NA	Headspace	Car Items	Highlander floor mats	116
701	Property 1	Residential	5/19/2016	15:49	NR	NR	NR	NR	NR	545	570	ng/m5	Poly bag 1140	NA	NA	Headspace	Blankets	Blanket from the Highlander	110
701	Property 1	Residential	5/19/2016	15:51	NR	NR	NR	NR	NR	135	231	ng/m6	Poly bag 341	NA	NA	Headspace	Electronics	iHome speaker (Re-test)	115
701	Property 1	Residential	5/19/2016	15:53	NR	NR	NR	NR	NR	534	901	ng/m7	Poly bag 1142	NA	NA	Headspace	Car Items	Camry floor mats	120
491	Property 2	Residential	5/20/2016	8:45	NR	NR	NR	NR	NR	170	409	ng/m3	Poly bag 1143	NA	NA	Headspace	Clothing	Son's clothes	107
491	Property 2	Residential	5/20/2016	8:50	NR	NR	NR	NR	NR	338	375	ng/m3	Poly bag 1144	NA	NA	Headspace	Clothing	Women's jackets	106
491	Property 2	Residential	5/20/2016	8:52	NR	NR	NR	NR	NR	217	311	ng/m3	Poly bag 1145	NA	NA	Headspace	Clothing	Women's clothes	99
491	Property 2	Residential	5/20/2016	8:56	NR	NR	NR	NR	NR	108	129	ng/m3	Poly bag 1146	NA	NA	Headspace	Clothing	Jackets	116
491	Property 2	Residential	5/20/2016	9:00	NR	NR	NR	NR	NR	110	126	ng/m3	Poly bag 1147	NA	NA	Headspace	Clothing	Kids and women's clothing	120
491	Property 2	Residential	5/20/2016	9:10	NR	NR	NR	NR	NR	333	360	ng/m3	Poly bag 1148	NA	NA	Headspace	Clothing	Son's clothes	114
491	Property 2	Residential	5/20/2016	9:19	NR	NR	NR	NR	NR	35	78	ng/m3	Poly bag 1149	NA	NA	Headspace	Clothing	Son's clothes	102
491	Property 2	Residential	5/20/2016	9:34	NR	NR	NR	NR	NR	20	86	ng/m3	Poly bag 1150	NA	NA	Headspace	Clothing	Kids and women's clothing	105
701	Property 2	Residential	5/20/2016	9:38	NR	NR	NR	NR	NR	52	171	ng/m3	Poly bag 1151	NA	NA	Headspace	Toys	Pony toy and basket	115
701	Property 2	Residential	5/20/2016	9:43	NR	NR	NR	NR	NR	74	105	ng/m3	Poly bag 1152	NA	NA	Headspace	Clothing	Women's clothes	127
701	Property 2	Residential	5/20/2016	9:46	NR	NR	NR	NR	NR	83	130	ng/m3	Poly bag 1153	NA	NA	Headspace	Clothing	Kids and women's clothing	123
701	Property 2	Residential	5/20/2016	9:48	NR	NR	NR	NR	NR	975	1063	ng/m3	Poly bag 1154	NA	NA	Headspace	Clothing/Bedding	Jackets and blankets	118
701	Property 2	Residential	5/20/2016	9:50	NR	NR	NR	NR	NR	555	674	ng/m3	Poly bag 1155	NA	NA	Headspace	Toys	NR	120
701	Property 2	Residential	5/20/2016	9:54	NR	NR	NR	NR	NR	206	255	ng/m3	Poly bag 1156	NA	NA	Headspace	Clothing	NR	118
701	Property 2	Residential	5/20/2016	9:58	NR	NR	NR	NR	NR	42	66	ng/m3	Poly bag 1157	NA	NA	Headspace	Toys	Board games	116
701	Property 2	Residential	5/20/2016	10:03	NR	NR	NR	NR	NR	219	251	ng/m3	Poly bag 1158	NA	NA	Headspace	Clothing	NR	108
701	Property 2	Residential	5/20/2016	10:07	NR	NR	NR	NR	NR	140	178	ng/m3	Poly bag 1159	NA	NA	Headspace	Clothing	NR	109
701	Property 2	Residential	5/20/2016	10:11	NR	NR	NR	NR	NR	238	300	ng/m3	Poly bag 1160	NA	NA	Headspace	Clothing	NR	111
701	Property 2	Residential	5/20/2016	10:13	NR	NR	NR	NR	NR	940	1636	ng/m3	Poly bag 1161	NA	NA	Headspace	Clothing	NR	110
701	Property 2	Residential	5/20/2016	10:17	NR	NR	NR	NR	NR	219	382	ng/m3	Poly bag 1162	NA	NA	Headspace	Clothing	NR	115
701	Property 2	Residential	5/20/2016	10:20	NR	NR	NR	NR	NR	5000	6195	ng/m3	Poly bag 1163	NA	NA	Headspace	Clothing	Son's jackets	122
701	Property 2	Residential	5/20/2016	10:25	NR	NR	NR	NR	NR	71	89	ng/m3	Poly bag 1164	NA	NA	Headspace	Toys	Board games	115
701	Property 2	Residential	5/20/2016	10:28	NR	NR	NR	NR	NR	181	208	ng/m3	Poly bag 1165	NA	NA	Headspace	Clothing	Winter apparel	109
701	Property 2	Residential	5/20/2016	10:32	NR	NR	NR	NR	NR	1144	1167	ng/m3	Poly bag 1166	NA	NA	Headspace	Clothing	NR	113
701	Property 2	Residential	5/20/2016	11:16	NR	NR	NR	NR	NR	95	106	ng/m3	Poly bag 1167	NA	NA	Headspace	Decorative	Glass	120
701	Property 2	Residential	5/20/2016	11:22	NR	NR	NR	NR	NR	1131	1524	ng/m3	Poly bag 1168	NA	NA	Headspace	Cleaning Supplies	Shop vaccuum	125
701	Property 2	Residential	5/20/2016	11:25	NR	NR	NR	NR	NR	1677	1905	ng/m3	Poly bag 1169	NA	NA	Headspace	Miscellaneous	Loose items	125
701	Property 2	Residential	5/20/2016	11:28	NR	NR	NR	NR	NR	14	16	ng/m3	Poly bag 1170	NA	NA	Headspace	Kitchem Items	Keurig Coffee Machine	112
701	Property 2	Residential	5/20/2016	11:37	NR	NR	NR	NR	NR	2132	4227	ng/m3	Poly bag 1171	NA	NA	Headspace	Bedding	Blankets	108
701	Property 2	Residential	5/20/2016	11:41	NR	NR	NR	NR	NR	200	238	ng/m3	Poly bag 1172	NA	NA	Headspace	Clothing	Winter apparel	115
701	Property 2	Residential	5/20/2016	11:46	NR	NR	NR	NR	NR	39	40	ng/m3	Poly bag 1173	NA	NA	Headspace	Miscellaneous	Plates, arrow, basket	125
701	Property 2	Residential	5/20/2016	13:20	NR	NR	NR	NR	NR	350	494	ng/m3	Poly bag 1174	NA	NA	Headspace	Storage	Cooler	105
701	Property 2	Residential	5/20/2016	13:35	NR	NR	NR	NR	NR	295	440	ng/m3	Poly bag 1175	NA	NA	Headspace	Miscellaneous	Batteries in a bin	122
701	Property 2	Residential	5/20/2016	13:39	NR	NR	NR	NR	NR	21	26	ng/m3	Poly bag 1176	NA	NA	Headspace	Lighting	Lamp	110
701	Property 2	Residential	5/20/2016	13:41	NR	NR	NR	NR	NR	11	14	ng/m3	Poly bag 1177	NA	NA	Headspace	Lighting	Lamp	99
701	Property 2	Residential	5/20/2016	13:43	NR	NR	NR	NR	NR	1735	2137	ng/m3	Poly bag 1178	NA	NA	Headspace	Toys	Board games	142
701	Property 2	Residential	5/20/2016	13:49	NR	NR	NR	NR	NR	19	21	ng/m3	Poly bag 1179	NA	NA	Headspace	Clothing	Mittens	111
701	Property 2	Residential	5/20/2016	13:52	NR	NR	NR	NR	NR	127	156	ng/m3	Poly bag 1180	NA	NA	Headspace	Clothing	NR	122
701	Property 2	Residential	5/20/2016	13:54	NR	NR	NR	NR	NR	800	947	ng/m3	Poly bag 1181	NA	NA	Headspace	Clothing	Mittens	115
701	Property 2	Residential	5/20/2016	14:00	NR	NR	NR	NR	NR	269	317	ng/m3	Poly bag 1182	NA	NA	Headspace	Clothing	Son's hat	116
701	Property 2	Residential	5/20/2016	14:02	NR	NR	NR	NR	NR	226	337	ng/m3	Poly bag 1183	NA	NA	Headspace	Clothing	Son's hat	120
701	Property 2	Residential	5/20/2016	14:10	NR	NR	NR	NR	NR	8300	10460	ng/m3	Poly bag 1184	NA	NA	Headspace	Clothing	Jackets	114
701	Property 2	Residential	5/20/2016	14:16	NR	NR	NR	NR	NR	3295	4666	ng/m3	Poly bag 1185	NA	NA	Headspace	Clothing	Fleece pants	116
701	Property 2	Residential	5/20/2016	14:21	NR	NR	NR	NR	NR	149	159	ng/m3	Poly bag 1186	NA	NA	Headspace	Clothing	NR	135
701	Property 2	Residential	5/20/2016	14:25	NR	NR	NR	NR	NR	31	36	ng/m3	Poly bag 1187	NA	NA	Headspace	Clothing	Blue jeans	131
701	Property 2	Residential	5/20/2016	14:28	NR	NR	NR	NR	NR	49	54	ng/m3	Poly bag 1188	NA	NA	Headspace	Clothing	NR	128
701	Property 2	Residential	5/20/2016	14:36	NR	NR	NR	NR	NR	223	241	ng/m3	Poly bag 1189	NA	NA	Headspace	Miscellaneous	Ski goggles	126
701	Property 2	Residential	5/20/2016	14:55	NR	NR	NR	NR	NR	54	57	ng/m3	Poly bag 1190	NA	NA	Headspace	Clothing	NR	124
701	Property 2	Residential	5/20/2016	15:00	NR	NR	NR	NR	NR	27	34	ng/m3	Poly bag 1191	NA	NA	Headspace	Clothing	NR	104
701	Property 2	Residential	5/20/2016	15:02	NR	NR	NR	NR	NR	101	120	ng/m3	Poly bag 1192	NA	NA	Headspace	Clothing	NR	105
701	Property 2	Residential	5/20/2016	15:05	NR	NR	NR	NR	NR	720	830	ng/m3	Poly bag 1193	NA	NA	Headspace	Miscellaneous	Wood	93
701	Property 2	Residential	5/20/2016	17:16	NR	NR	NR	NR	NR	54	107	ng/m3	Poly bag 1194	NA	NA	Headspace	Car Items	Mini Cooper car mats	106
701	Property 2	Residential	5/20/2016	17:22	NR	NR	NR	NR	NR	1101	1249	ng/m3	Poly bag 1195	NA	NA	Headspace	Shoes	Suede boots	117
701	Property 2	Residential	5/20/2016	17:33	NR	NR	NR	NR	NR	4122	5009	ng/m3	Poly bag 1196	NA	NA	Headspace	Car Items	Car mats	96
701	Property 2	Residential	5/20/2016	17:58	NR	NR	NR	NR	NR	52	69	ng/m3	Poly bag 1197	NA	NA	Headspace	Clothing	NR	126
701	Property 2	Residential	5/20/2016	18:01	NR	NR	NR	NR	NR	4796	6754	ng/m3	Poly bag 1198	NA	NA	Headspace	Car Items	Car mats	112
701	Property 2	Residential	5/21/2016	8:47	NR	NR	NR	NR	NR	849	1183	ng/m3	Poly bag 1199	NA	NA	Headspace	Car Items	Nissan floor mat	105
701	Property 2	Residential	5/21/2016	8:50	NR	NR	NR	NR	NR	1636	2740	ng/m3	Poly bag 1200	NA	NA	Headspace	Car Items	Nissan floor mat	94
701	Property 2	Residential	5/21/2016	8:54	NR	NR	NR	NR	NR	397	1556	ng/m3	Poly bag 1201	NA	NA	Headspace	Shoes	Suede boot	104
701	Property 2	Residential	5/21/2016	8:58	NR	NR	NR	NR	NR	871	1166	ng/m3	Poly bag 1202	NA	NA	Headspace	Shoes	Mocassin	108
701	Property 2	Residential	5/21/2016	9:17	NR	NR	NR	NR	NR	87	155	ng/m3	Poly bag 1203	NA	NA	Headspace	Towels	After remediation	110
701	Property 2	Residential	5/21/2016	9:20	NR	NR	NR	NR	NR	545	1128	ng/m3	Poly bag 1204	NA	NA	Headspace	Towels	After remediation	93
701	Property 2	Residential	5/21/2016	9:23	NR	NR	NR	NR	NR	48	59	ng/m3	Poly bag 1205	NA	NA	Headspace	Towels	After remediation	114
701	Property 2	Residential	5/21/2016	9:30	NR	NR	NR	NR	NR	886	1045	ng/m3	Poly bag 1206	NA	NA	Headspace	Miscellaneous	Bat and a shovel	106
701	Property 2	Residential	5/21/2016	9:35	NR	NR	NR	NR	NR	136	153	ng/m3	Poly bag 1207	NA	NA	Headspace	Toys	Plastic toys	103
701	Property 2	Residential	5/21/2016	9:36	NR	NR	NR	NR	NR	740	1320	ng/m3	Poly bag 1208	NA	NA	Headspace	Toys	Scooter and skateboard	98
701	Property 2	Residential	5/21/2016	9:40	NR	NR	NR	NR	NR	955	1204	ng/m3	Poly bag 1209	NA	NA	Headspace	Miscellaneous	Umbrellas	101
701	Property 2	Residential	5/21/2016	9:45	NR	NR	NR	NR	NR	280	371	ng/m3	Poly bag 1210	NA	NA	Headspace	Cleaning Supplies	Mop, broom, etc.	107
701	Property 2	Residential	5/21/2016	9:47	NR	NR	NR	NR	NR	100	115	ng/m3	Poly bag 1211	NA	NA	Headspace	Miscellaneous	Scooter and bucket	97
701	Property 2	Residential	5/21/2016	10:06	NR	NR	NR	NR	NR	42	51	ng/m3	Poly bag 1212	NA	NA	Headspace	Pet Care	Dog crate	99
701	Property 2	Residential	5/21/2016	10:09	NR	NR	NR	NR	NR	111	163	ng/m3	Poly bag 1213	NA	NA	Headspace	Athletics	Lacrosse and hockey stick	109
701	Property 2	Residential	5/21/2016	10:12	NR	NR	NR	NR	NR	405	744	ng/m3	Poly bag 1214	NA	NA	Headspace	Flooring	Floor mat for bathroom	100
701	Property 2	Residential	5/21/2016	10:36	NR	NR	NR	NR	NR	2199	3286	ng/m3	Poly bag 1215	NA	NA	Headspace	Blankets	Blue felt blanket	98
701	Property 2	Residential	5/21/2016	10:41	NR	NR	NR	NR	NR	90	111	ng/m3	Poly bag 1216	NA	NA	Headspace	Towels	After separating some out	101
701	Property 2	Residential	5/21/2016	12:01	NR	NR	NR	NR	NR	608	1265	ng/m3	Poly bag 1217	NA	NA	Headspace	Pet Care	Dog leash	101
701	Property 2	Residential	5/21/2016	12:05	NR	NR	NR	NR	NR	2541	14500	ng/m3	Poly bag 1218	NA	NA	Headspace	Shoes	Brown camo boots	104
701	Property 2	Residential	5/21/2016	12:15	NR	NR	NR	NR	NR	363	378	ng/m3	Poly bag 1219	NA	NA	Headspace	Toys	Roller blades	107
701	Property 2	Residential	5/21/2016	12:28	NR	NR	NR	NR	NR	6250	10850	ng/m3	Poly bag 1220	NA	NA	Headspace	Shoes	Black and white sneakers	94
701	Property 2	Residential	5/21/2016	12:31	NR	NR	NR	NR	NR	1202	2350	ng/m3	Poly bag 1221	NA	NA	Headspace	Shoes	Leather heeled boots	95
701	Property 2	Residential	5/21/2016	12:36	NR	NR	NR	NR	NR	2611	4461	ng/m3	Poly bag 1222	NA	NA	Headspace	Shoes	Suede boots	102
701	Property 2	Residential	5/21/2016	12:41	NR	NR	NR	NR	NR	3799	5300	ng/m3	Poly bag 1223	NA	NA	Headspace	Shoes	Tan work boots	126

NA- Not Applicable
NR- Not Recorded
R - Standard Deviation

Appendix G: Lumex Screening Results Summary Table
Greenleafe Drive Mercury Response Site
Baldwinsville, Onondaga County, New York

Serial Number	Property Number	Land Use	Date	Time	Screeining-1	Screeining-2	Screeining-3	Average Screening Result	R	Minimum	Maximum	Units	Location	Floor	Floor Cover	Height	Item Type	Description	Temperature (˚F)
701	Property 2	Residential	5/21/2016	12:43	NR	NR	NR	NR	NR	404	875	ng/m3	Poly bag 1224	NA	NA	Headspace	Shoes	Black and red sneakers	99
701	Property 2	Residential	5/21/2016	12:46	NR	NR	NR	NR	NR	3860	5100	ng/m3	Poly bag 1225	NA	NA	Headspace	Shoes	Black heeled boots	121
701	Property 2	Residential	5/21/2016	12:51	NR	NR	NR	NR	NR	48	94	ng/m3	Poly bag 1226	NA	NA	Headspace	Miscellaneous	Shovel and bat after merc wipes	98
701	Property 2	Residential	5/21/2016	12:56	NR	NR	NR	NR	NR	74	91	ng/m3	Poly bag 1227	NA	NA	Headspace	Toys	Scooter and skateboard after merc wipes	97
491	Property 2	Residential	5/21/2016	16:43	NR	NR	NR	NR	NR	851	1961	ng/m3	Poly bag 1228	NA	NA	Headspace	Shoes	Roller blade insoles after remediation	118
491	Property 2	Residential	5/21/2016	16:58	NR	NR	NR	NR	NR	NR	650	ng/m3	Poly bag 1229	NA	NA	Headspace	Shoes	Loafers	103
491	Property 2	Residential	5/21/2016	17:01	NR	NR	NR	NR	NR	NR	840	ng/m3	Poly bag 1230	NA	NA	Headspace	Shoes	Sneakers	114
491	Property 2	Residential	5/21/2016	17:08	NR	NR	NR	NR	NR	1980	2062	ng/m3	Poly bag 1231	NA	NA	Headspace	Shoes	Suede boots	118
491	Property 2	Residential	5/21/2016	17:05	NR	NR	NR	NR	NR	NR	738	ng/m3	Poly bag 1232	NA	NA	Headspace	Shoes	Leather boots	106
491	Property 2	Residential	5/22/2016	11:14	NR	NR	NR	NR	NR	437	513	ng/m3	Poly Bag 1233	NA	NA	Headspace	Clothing	Women's maternity clothes	106

NA- Not Applicable
NR- Not Recorded
R - Standard Deviation

Appendix H

Chemical-Specific Health Consultation for Joint EPA/ATSDR
National Mercury Cleanup Policy Workbook

Chemical-Specific Health Consultation

for
Joint EPA/ATSDR National Mercury Cleanup Policy Workgroup

Action Levels
For Elemental Mercury Spills

March 22, 2012

Prepared by

Division of Toxicology and Environmental Medicine

Prevention, Response and Medical Support Branch

Emergency Response Team

ATSDR Chemical Specific Health Consultation – Mercury

Executive Summary

In 2000, the Agency for Toxic Substances and Disease Registry (ATSDR) provided tables of action level guidelines for indoor air concentrations of elemental or metallic mercury in response to a request from both the U.S. Environmental Protection Agency (EPA) and the state of Michigan. The action levels had been previously developed for individual sites and situations, but the tables summarized these guidelines in a succinct package for use by field personnel. The request was prompted by several small spills in homes caused by replacing or relocating natural gas regulators containing mercury. The homes affected included those serviced by utility companies in both Chicago and Detroit. The guidelines were designed to help risk managers at spill scenes in homes or other locations make decisions regarding cleanup, relocation, etc. Throughout the years, these action level guidelines have been widely disseminated by users. A workgroup has been formed jointly by EPA and ATSDR to develop consistent cleanup guidance for mercury spills, including not only public health actions but also cleanup and sampling methods. As part of that joint effort, EPA has requested that ATSDR update the 2000 guidelines to be included in a more comprehensive guidance. This health consultation is intended to provide that update.

The health consultation provides detailed justifications for action levels based on the ATSDR Chronic Minimal Risk Level and EPA Reference Concentration. The recommended action levels for mercury in residential settings remain 1 ug/m^3 for normal occupancy and 10 ug/m^3 for isolation (e.g., evacuation, limited access, etc.) of the residents from exposure to the mercury. Action levels for settings other than residential are based on residential levels and adjusted for the condition based on the presumed exposure. Sections that describe when action levels should be adjusted to meet site specific conditions are included. The most useful features of the 2000 tables have been retained; new sections have been added that address issues related to the tables that have recurred during the past 11 years. Additional information to help on-scene risk managers communicate risk is provided. Technological advances in detecting environmental mercury are also considered.

ATSDR Chemical Specific Health Consultation – Mercury

Table of Contents

Executive Summary

1.0 Introduction
- 1.1 Background
- 1.2 Health Implications
- 1.3 Health Guidance Values

2.0 Discussion
- 2.1 "Visible" Mercury
- 2.2 Residential Settings
  - 2.2.1 Normal Occupancy
  - 2.2.2 Isolation/Relocation
  - 2.2.3 Personal Belongings
  - 2.2.4 Conditions when other concentrations apply
- 2.3 Commercial and Occupational Settings
  - 2.3.1 Workplaces covered by OSHA's Hazard communications standard
  - 2.3.2 Workplaces not covered by OSHA's Hazard communications standard
  - 2.3.3 Conditions when other concentrations apply
- 2.4 Schools and Educational Settings
- 2.5 Vehicles

3.0 Conclusions
4.0 Recommendations
5.0 Appendices
6.0 References

ATSDR Chemical Specific Health Consultation – Mercury

1.0 Introduction

1.1 Background: Elemental, also called metallic, mercury is common in our environment due in part to its unique properties and multiple uses in our daily lives [Baughman 2006; Gochfeld 2003; Risher 2007; Song 2009]. Mercury in its elemental state can pose a hazard to humans. The hazard for any person is based on how sensitive that person is to the effects of mercury, how long that person is exposed to mercury, and how much mercury is present, among other factors. These factors as they pertain to mercury spills are discussed below. Mercury is persistent in the environment, and is considered a hazard primarily under chronic exposure scenarios under most conditions. Mercury cleanups are difficult and pose substantial challenges [MacLehose 2001] to risk managers, such as the U.S. Environmental Protection Agency's (EPA) On-scene Coordinators (OSC). Throughout the years, various EPA Regions have established guidance for conducting these cleanups. EPA's Office of Emergency Management convened a National Workgroup to harmonize this guidance and invited the Agency for Toxic Substances and Disease Registry (ATSDR) to join the Workgroup [EPA 2011]. Many of the guidance documents developed by the various regional offices included "Suggested Action Levels for Indoor Mercury Vapors in Homes or Businesses with Indoor Gas Regulators". This guidance was developed by ATSDR for public health and environmental professionals in 2000 [ATSDR 2000]. The National Workgroup requested that ATSDR revise these action levels to reflect advances in technology and knowledge gained through experiences since ATSDR provided them. EPA and ATSDR staff formed a Subgroup of the National Workgroup. The Subgroup determined that an ATSDR chemical-specific health consultation would be the most effective way to accomplish this task. The health consultation will be included in the National Policy upon finalization of that policy. The Subgroup requested that the list of action levels be expanded to include other exposure settings such as schools and vehicles such as school buses.

Mercury is a conductive metal and a liquid at room temperature, physical properties that make the substance a unique asset in many industrial and consumer applications [HSDB 2005]. Mercury is also used in some of the rituals and practices of certain religious sects [Alison Newby 2006; Garetano 2006, 2008; Rogers 2007, 2008]. When spilled, mercury's viscosity is similar to that of water—it flows and collects in the same way and locations that water would if spilled. However, mercury is unusually dense compared with water; a milliliter (mL)of mercury weighs more than 13 grams (g) while a milliliter of water weighs only 1 gram. Mercury has a low vapor pressure at standard temperature and pressure, so the liquid vaporizes slowly at room temperatures [HSDB 2005; NIOSH 2007]. Elemental mercury may combine with oxygen to form a mercuric oxide skin on its outer surface. Mercuric oxide does not vaporize, but the shell formed in this manner is fragile. The slightest movement can break this oxide shell and free the elemental mercury contained inside [EPA 2005]. Mercury amalgamates with other metals and is attracted to sulfur-based compounds [Yamamoto 2007]. Mercury is unusual in the number and properties of other compounds it forms. This health consultation evaluated metallic mercury (elemental mercury or quicksilver) only. Other forms of mercury have different properties and different hazards that are not addressed here except as they relate to metallic mercury. In American homes with no known mercury spill, concentrations in the 0.01–0.1 ug/m^3 range have been reported, with typical ambient (outside air) concentrations approximately a factor of 10 less than that [Carpi 2001; Garetano 2008; Johnson 2003].

1.2 Health Implications: The primary route of exposure to metallic mercury is inhalation of its colorless and odorless vapors [ATSDR 1999; Bose-O'Reilly 2008; Lee 2009]. Ingested elemental mercury can be absorbed poorly through the intestinal walls. Dermal exposure or absorption of metallic mercury through the skin is considered a minor exposure route [ATSDR 1999; Ellis 2009]. Some case studies report dermal irritation after prolonged contact with mercury [De Capitani 2009], however, this dermal irritation does not seem to cause greater absorption.

The organ or organ system in humans most sensitive to all forms of mercury changes somewhat over our life spans. For a developing fetus or young child, the most sensitive endpoint is considered to be the developing central nervous system (CNS) [Abbaslou 2006; Baughman 2006; Bensefa-Colas 2010; Bose-O'Reilly 2008, 2010; Grant 2010]. While data about humans are limited, several animal studies report CNS effects in offspring after maternal exposure to mercury (see Section 2.2.1.6 of the ATSDR Toxicological Profile) [ATSDR 1999; Morgan 2002]. As humans mature, our CNS system completes its development and we become less sensitive to the effects of mercury on our CNS. That is, a greater exposure (i.e., either higher concentration, more frequent exposure events, or longer duration of exposure events) is required to produce effects on the CNS. For this reason, our most sensitive populations are young children and developing fetuses; women who are confirmed or suspected to be pregnant also require consideration as a sensitive population to protect the fetus. The age at which young children become less sensitive to the CNS effects of mercury is unclear but the concern is usually for pre-school children. Individuals that have matured beyond this window of greater vulnerability for the CNS may experience effects on the kidneys before the effects on the CNS become evident.

Consequently, the next human organ most sensitive to the effects of mercury tends to be the kidney; inorganic forms of mercury are excreted almost exclusively through the kidneys [Baughman 2006; Bensefa-Colas 2010; Franko 2005; Opitz 1996; Samir 2011]. Generally speaking, the concentration of mercury that may pose a CNS threat to the young is less than the concentration that could affect the kidneys in older children or adults under the same conditions of exposure. In animals, acute mercury exposures (as long as 14 days in duration) of approximately 0.05 mg/m^3 may cause significant CNS effects; exposures in the 0.5–0.86 mg/m^3 range more commonly cause significant CNS effects. Typically, acute exposures of ~3 mg/m^3 affect the kidneys (see Figure 1A) [ATSDR 1999]).

1.3 Health Guidance Values: Both ATSDR and EPA have developed health guidance values (HGVs) for inhaled mercury vapors, based on a 1983 study of workplace exposures [Fawer 1983]. The workers in the study were exposed in their workplace to mercury vapors. The workers in the Fawer cohort came from three different types of workplaces: fluorescent tube manufacture; chloralkali plants; and acetaldehyde production. The authors reported a Lowest Observed Adverse Effect Level (LOAEL) of 26 ug/m^3 of exposure averaged over a period of 15 years [Fawer 1983]. As discussed below, the effect noted in the study was a slight tremor in the hands. ATSDR has defined a Minimal Risk Level (MRL) for chronic exposures (more than 365 days) to mercury of 0.2 ug/m^3. In developing the MRL, the workplace average from Fawer was adjusted from a 40-hour to a 168-hour exposure per week (i.e., 24 hours/day, 7 days/week), and then divided by an uncertainty factor of 30 (3 for

use of a minimal LOAEL and 10 for human variabliliy) to account for the LOAEL and individual sensitivities. {It should perhaps be noted that the concentration in the Fawer study as well as many other occupational studies was averaged over a typical workday and their results may not be completely representative of continuous or significantly longer durations of exposure such as may be found in a residential setting.} Thus, an MRL is an estimate of the level of daily exposure to a hazardous substance (in this case, metallic mercury), sustained through a specific route and duration of exposure, that is unlikely to cause measurable risk for adverse, noncancerous health effects (metallic mercury is not considered carcinogenic [cancer causing]) [ATSDR 1999]. EPA used the same study as their primary reference to develop a Reference Concentration (RfC) of 0.3 ug/m^3 using slightly different assumptions and somewhat different justifications for the same uncertainty factors. EPA also cites other supporting studies in a weight of evidence approach [EPA 1995]. Please see the IRIS record available at www.epa.gov/iris for the details of their derivation. The RfC is an estimate (with uncertainty spanning perhaps an order of magnitude) of a daily inhaled exposure of the human population (including sensitive subgroups) that is unlikely to cause an appreciable risk of harmful effects during a lifetime. For further information, see Section 2.5, Chapter 7, and Appendix A of the ATSDR Toxicological Profile for Mercury and the EPA's Integrated Risk Information System (IRIS) on the Internet at www.epa.gov/iris/. ATSDR considers the RfC and the MRL for chronic exposures to be within the uncertainties of the derivations and the same value for all practical purposes.

Within the limits of this health consultation, an *action level* is an indoor air concentration of mercury vapor that should prompt public health and environmental officials to consider implementing response actions. The various suggested action levels provided in this document are intended as recommendations, not as regulatory values or cleanup values, although some of the recommended action levels may correspond to present or future values adopted by regulatory authorities. The following discussion is intended to confirm that these action levels should not be considered as "bright line" indicators of toxicity or predictors of adverse health effects. These action levels are provided primarily to prevent adverse health effects by identifying environmental concentration associated with any level of toxicity. The secondary purpose is to identify when precautions should be implemented to prevent adverse health effects and when such precautions may be stopped with a reasonable expectation of no adverse effects. Risk managers, such as EPA OSCs and their state and local counterparts, should determine whether a recommended response action is necessary based on the actual conditions and circumstances they encounter at the exposure site.

2.0 Discussion

In the course of this discussion, the reader may find it useful to refer to Tables 1 and 2 found towards the end of this consultation. In the tables, the sections of this consultation that bear on the development of the recommended action levels are provided in the right hand column. As the discussion progresses, there are 4 key elements in this approach to bear in mind; these elements are adjusted to the assumed conditions of exposure in each scenario. These elements are explained in the various sections and summarized here:

- Visible mercury cannot be left readily accessible after a clean up is complete (Section 2.1);
- Experience has shown concentrations of 6 ug/m^3 or above are usually associated with the presence of liquid mercury that may not have been discovered (Section 2.1);

- Urinary levels in some humans begin to increase at environmental concentrations as low as 10 ug/m^3; this consult treats exposure to that concentration, if not terminated, as a threshold that could cause effects in some people (Section 2.2.2) ;
- The benefits to human health of cleaning transient spills to a concentration below 1 ug/m3 under most conditions typically do not outweigh the potential consequences to overall quality of life for individuals in that environment (Section 2.2.1).

2.1 "Visible" Mercury: Because of metallic mercury's unique properties and appearance, it has long attracted the attention of humans of all ages. Liquid mercury is shiny and flows easily over the hand. It flows together to make large beads and splits apart to make smaller beads—the beads can take any shape. It feels heavy to the touch, but splatters readily. For all these reasons, liquid mercury may be kept, shared, and distributed by non-professional persons who are not aware of the hazard. If visible mercury is not contained appropriately, it is a likely hazard because it may fall into the hands of our most sensitive population [Hudson 1987]. Visible mercury should therefore be considered an attractive nuisance [Azziz-Baumgartner 2007; Baughman 2006; CDC 2005; Johnson 2004; MacLehose 2001; Nickle 1999; Risher 2003].

ATSDR is often asked how much mercury is required for it to become visible to humans. While visual acuity (i.e., how well one sees objects) varies by individuals, it must be remembered that the air concentrations of mercury associated with the HGVs discussed in section 1.3 are small and mercury is very dense. In a room that is 3 meters (roughly 10 feet) square with a 3 meter [m] ceiling, approximately 5 micrograms [ug] of vaporized mercury would elevate the air concentration of mercury in the room to the ATSDR MRL (3 m x 3 m x 3 m = 27 m^3 x 0.2 ug/m^3 = 5.4 ug). Five micrograms equates to less than a nanoliter of liquid mercury (5 x 10^{-6} g x 1 mL/13.5 g = 3.7 x 10^{-7} mL or ~0.4 nL). For comparison, the most popular brand of oral thermometer in the United States contains approximately 0.3 milliliters of mercury, or about 4 grams (4,000,000 micrograms) of liquid mercury. A nanoliter (nL) of liquid would be 6 orders of magnitude or 1 million times smaller than the volume in a thermometer and effectively invisible to most humans. Therefore, if an uncontained bead of mercury can be seen in most indoor spaces, it is possible that enough vapors are present in that space for the concentration to be greater than the HGV described previously. Multiple factors such as relative humidity, surface area of the liquid, barometric pressure, and temperature can influence vaporization of a liquid. Many of these factors can change over time and by location. During an indoor release, most of these factors would likely be fairly constant in a state that would promote vaporization. Because mercury is much denser than air, stable conditions are likely to stratify (layer) the mercury vapors in a confined space like the room described previously. In addition, different materials likely to be found in indoor environments may have different affinities for mercury vapors, which can also affect how much mercury is available in the indoor air. The actual concentration at any given point in a room at any given time would be expected to vary [Lui 2011; EPA 2005; Winter 2003]. Air-monitoring instruments are required to determine the existence of, and often to find the source of, mercury in a room [CDC 2005]. The experience of EPA staff has been that concentrations as low as 6 ug/m^3 typically indicate that liquid mercury is present in a room [Nickle 1999; Nold 2011].

Because mercury is an attractive nuisance fascinating to many people and even a microscopic amount of it can contaminate many individual spaces, the initial criteria for all mercury cleanup actions must be that no visible mercury remains. This is indicated in both tables 1 and 2 in the 2 columns on the right. Removing the liquid mercury also reduces the source of the vapors in the space, meaning that any residual vapor concentrations in the area should decrease over time after the source is removed [Azziz-Baumgartner 2007; Baughman 2006; CDC 2005; Cizdziel 2011; Risher 2007; Tominack 2002]. All of the action levels [i.e., usually less than 1 or less than 3 ug/m^3 in Tables 1 and 2]. recommended here that terminate cleanup actions as opposed to implementing protective measures assume that all visible mercury has been removed from the location of the spill. The importance of this key action in protecting public health cannot be overemphasized.

2.2 Residential Settings

2.2.1 Normal Occupancy: Because elemental mercury is primarily an inhalation hazard, any cleanup should be focused on minimizing this exposure pathway. Cleaning any area in a typical residential setting to make the indoor air concentration meet the MRL or RfC would require removing virtually every nanoliter of liquid mercury from that area. This exacting task could lead to difficult risk-management decisions, such as the considerable loss of personal property that is contaminated to the extent that cleanup is not feasible (e.g., the cleaning process would destroy the property or exceed the cost of replacing the article with similar articles). This loss of property could be severe enough to cause a substantial lifestyle change that could increase the potential for adverse health outcomes [Nickle 1999]. ATSDR prefers that no person be exposed to a concentration of a toxic substance greater than the recommended HGVs, such as the RfC or MRL. However, given the extraordinary measures required to remove enough liquid mercury to reach the HGV concentrations, the human health benefit of such a removal action may not always be warranted by the threat [ATSDR 2008; CDC 1995; Nickle 1999; Risher 2003].

The principal study (i.e, Fawer, 1983) upon which both of the HGVs for mercury discussed in section 1.3 was based used a very sensitive method of measuring the adverse health effect in the workers. Tremor reported in the study could only be measured when a small weight was suspended from the study worker's hand. The tremor did not cause debilitating harm or contribute in any way to a lower quality of life for the workers. Because many of the participants worked in the facilities in the study before adequate protective emission controls were in place, the long-term workers likely may have been exposed to much higher levels of mercury than was reported in the study. However, the workers clearly had been exposed to sufficient mercury to cause a measurable tremor in their hands, which represents a systemic effect.

The lowest concentration of mercury reported in the scientific literature considered to be the most significant by ATSDR in the ATSDR Toxicological Profile (Table 1; ATSDR 1999) associated with adverse human health effects is 10 ug/m^3 [Ngim 1992]. This study was essentially a survey of symptoms among dentists, nurses, and aides who worked with dental amalgams that contained mercury for 8–10 hours per day during a 6-day work week. The authors of the study simulated preparing the amalgams, measured the concentration in the breathing zone, and reported the concentration from the simulation

as the exposure of the survey participant. How accurately the simulation reflected both historical conditions and current practices is unknown. While both EPA and ATSDR chose to use other studies to develop their respective HGVs, both agencies agree that Ngim [1992] is an essential supporting study [ATSDR 1999; EPA 1995; Ngim 1992].

Although ATSDR and EPA have established HGVs with no appreciable risk of human harm, a range of uncertainty exists regarding the concentration at which a person may actually experience health effects. The closer air levels are to the RfC or the MRL, the less likely any exposure is to cause adverse health effects. The closer air levels are to the lowest concentrations known to cause any level of harm to humans (the lowest toxic concentration level for humans [TCLo]), the more likely any exposure is to cause harm. In many cases, response action will be initiated quickly enough to recover the liquid mercury and stop exposures in short order. Applying HGVs, such as the RfC or MRL, that are intended for chronic exposures to situations involving shorter term exposures could be overly conservative in many cases. Historically, ATSDR has recommended 1 ug/m^3 as the residential level requiring cleanup. This concentration is a factor of 10 lower than the human TCLo [Ngim 1992], and a factor of 26 lower than the concentration which is the point of departure for the HGV of both ATSDR and EPA [Fawer 1983]. {It should be noted that the concentrations in these studies were averaged over a typical workday and their results may not be completely representative of continuous or significantly longer durations of exposure such as a residential setting.} This concentration is within a factor of 10 of the HGV concentrations described earlier. This concentration is also approximately 100 times that expected to be seen from the many other sources of mercury in our environment [ATSDR 1999; Cairns 2011; Carpi 2001; Cizdziel 2011; Garetano 2008; Johnson 2003; Lyman 2009; Song 2009]. Studies indicate that 1 ug/m^3 is approximately an order of magnitude lower than the concentration (i.e., 10 ug/m3) where results of urinary levels of mercury appear tobegin to increase in concentration.. [Hryhorczuk 2006; Tsuji 2003]. Experience in previous removal actions by EPA has shown an action level of 1 ug/m^3 generally causes significantly less disruption of lifestyles and fewer potential consequences for individuals or families involved in the spill event [Nickle 1999]. ATSDR's standard practice has been to recommend this value (1 ug/m^3) unless the exposed population is particularly susceptible to the effects of mercury (e.g., a mercury spill in a neonatal intensive care unit or a dialysis center).

2.2.2 Isolation/Relocation: ATSDR is often asked at what level of mercury in indoor air persons should be isolated from the exposure to mercury. Isolation in this sense may include, but not be limited to:

- reducing the time persons spend in a particular area;
- closing the ventilation system connections leading to and from a specific portion of a building;
- reducing the emission rate of vapors from the source; or,
- relocating some or all of the persons who normally occupy the building.

All of these isolation techniques have some negative implications, whether relatively minor, such as reducing the time spent in a given room, or potentially significant, such as

persons leaving their home entirely. To complicate matters further, it is common for the persons involved to be uncertain as to when the release occurred. Before isolating an area and incurring those negative implications, ATSDR suggests that, in most cases, the threat to the persons involved should be certain. Due to uncertainty about the duration of exposure before the spill was discovered, continued exposure to mercury levels that could be harmful should be minimized [Azziz-Baumgartner 2007]. Some studies have indicated that urinary levels of mercury in humans begin to increase at mercury concentration levels 10 ug/m^3 or higher. [Hryhorczuk 2006; Tsuji 2003]. Based on this and the Ngim study discussed above, ATSDR will consider the mercury concentration level of 10 ug/m^3 as the TCLo in humans for this health consultation. At the TCLo, adverse effects are possible for susceptible persons, depending on the duration of exposure [ATSDR 1999; Cherry 2002; Hryhorczuk 2006; Ngim 1992; Tsuji 2003]. Therefore, ATSDR usually recommends risk managers consider the need to isolate humans from the spill when a concentration level ≥10 ug/m^3 is determined.

As with the other action levels described in Tables 1 and 2, conditions at the scene may indicate that a higher, or rarely a lower, concentration than 10 ug/m^3 is acceptable before isolation measures are truly required. In addition, the risk manager at the scene (e.g., an EPA OSC) may have reasons to seek relocation of residents other than mercury contamination, such as physical hazards caused by removal techniques or necessary curing of sealants.

2.2.3 Personal Belongings: The hazardous state for this form of mercury is predominantly a vapor; therefore, it can be highly mobile in the indoor environment. Both the liquid and the vapor may collect in porous materials, such as fabric, rubber, and home furnishings. The mercury may invade cracks and crevasses of appliances, flooring, and electronics. In many settings, these belongings represent a substantial investment on the part of the owner who will have an understandable desire to salvage whatever is possible. The challenge of determining what can be saved and what must be disposed of lies in the uncertainties associated with the exposure. For instance, how much time does a child spend sleeping with a favorite stuffed animal and breathing whatever vapors their companion emits? How often does a refrigerator cycle on or off, and who is normally nearby and affected by that heating? How large is the room where the home computer is off-gassing mercury? We do not have the data to answer these kinds of questions and to address all of the possible permutations without analyzing specific conditions and personal habits at a site. This level of detailed analysis, which could change from person to person or structure to structure, is not feasible for a non-site–specific health consultation. We must either dispose of everything contaminated or evaluate the potential risk of the contamination.

The ultimate goal of evaluating a contaminated belonging would be to ensure that the mercury concentration in the breathing zone of the person using the contaminated items under normal use patterns will not exceed 1 ug/m^3 for a time sufficient to cause harm. The preferred method to assess the amount of contamination is to bag small-to-medium items, heat the bag to what might be reasonably anticipated to be maximum temperatures of normal use, and take headspace readings within the bag [Baughman 2006; Nickle 1999]. Large items, such as couches, recliners, and mattresses, with porous surfaces that

come in contact with mercury can raise the vapor concentrations more than smaller items in the same room. For larger items, such as appliances and electronics, typically the vapors from the cooling vents have been measured for mercury concentrations. These concentrations would normally be much higher than the readings after the vapors have dispersed into the room. The higher readings would be observed because the same number of molecules of vapor would be contained in a smaller space (e.g., at the point of emission at the vent or contained within a bag).

The suggested action levels developed in 2000 recommended that the elevated readings in the headspace or the point of emission should be less than 10 ug/m^3 [ATSDR 2000]. Because ATSDR wanted to ensure that the belongings had actually been contaminated before they were deemed a threat, that suggested level was based primarily on the human TCLo and the technical limitations of the survey instruments available at the time. Extensive field testing by EPA's Environmental Response Team has demonstrated that newer instruments are both more sensitive and less prone to yielding false positives due to interferences. Therefore, measurements can now detect lower concentrations with the same level of confidence as higher levels that were measured previously [EPA 2005].

Generally speaking, EPA's experience has shown that when liquid mercury comes in direct contact with porous objects or objects that generate heat under normal operation, those objects are not recoverable. ATSDR recommends that such objects be disposed of appropriately [Nickle 1999].

The recommended action level for the residential setting is ≤1 ug/m^3; the 10 ug/m^3 suggested in 2000 has generally worked well in reducing the vapors from belongings in a home (when belongings have been exposed only to mercury vapors) to support this action level [Nickle 1999]. When an unusually large object, such as a freezer, is used in a small room, such as a typical utility room, the contamination level in the room may exceed the 1 ug/m^3 limit even when the freezer does not exceed the 10 ug/m^3 limit for personal belongings. Likewise, when several items, such as clothing, that do not exceed the 10 ug/m^3 headspace limit are placed in a small room, such as a second bedroom in a mobile home, the home may exceed the 1 ug/m^3 limit. Obviously, appliances not in use when tested may exceed the action level during normal use.

The site risk manager's professional judgment determines when a lower action level is necessary. EPA's experience has shown that concentrations in the 1–3 ug/m^3-range in the headspace/vent emission usually will allow levels in even smaller rooms to remain at or below 1 ug/m^3. Experience has also shown that these action-level concentrations indicate that minimal or no contact between the contaminated item and liquid mercury has occurred. Finally, EPA's experience has also shown that concentrations >6 ug/m^3 in indoor air usually indicate the presence of liquid mercury that may not have been discovered [Nickle 1999; Nold 2011]. Therefore, ATSDR recommends headspace readings for belongings that may have been contaminated byvapors from a mercury spill that are in the range of 3-6 ug/m3 be considered protective of human health

2.2.4 Conditions when other concentrations should apply: Under some conditions, ATSDR will consider concentrations in non-occupational settings above 1 ug/m3 as safe

for human health [ATSDR 2008]. Examples of these conditions are when other mechanisms can be put into place to reduce exposure durations for sensitive persons, or when a population is less sensitive (e.g., healthy adults). These conditions usually occur when the methods required to achieve lower concentrations may possibly cause more harm (e.g., increased property damage and potential harmful lifestyle changes as described earlier) than would the short duration of exposure to slightly higher mercury levels (when the source of the mercury vapors has been controlled [e.g., removal of visible mercury]). Conditions vary from site to site, which may suggest the need for modification; however, ATSDR has never considered an exposure level in a residential setting at a concentration >10 ug/m^3 as acceptable for long-term use. Again, use of these higher levels normally implies that all visible mercury has been removed, indicating that all point sources are removed or isolated. Subsequently, with no mercury source to continue vaporizing levels are expected to decline with time.

Persons in whom the CNS is developing (e.g., fetuses, infants, and young children) are the population considered most sensitive to mercury exposure and, thus, require greater protection [Bensefa-Colas 2010; Bose-O'Reilly 2008; Opitz 1996]. No evidence indicates that persons with deteriorating nervous systems are more susceptible to the effects of mercury than healthier adults; however, a person's underlying conditions may mask the more subtle effects of mercury. Prolonged exposure to mercury also affects the kidneys [ATSDR 1999; Baughman 2006; Bensefa-Colas 2010; Franko 2005; Opitz 1996; Samir 2011]. Under almost all conditions, removing visible mercury from the indoor environment until a residual concentration of 1 ug/m^3 is reached would be protective of even the most sensitive population.

If a person has an underlying condition that makes them more susceptible to the effects of mercury than healthier persons, a concentration less than 1 ug/m^3 mercury in a residential setting may be considered necessary. An invalid with poorly functioning kidneys who normally lives in a space where mercury has been spilled is an example of this situation. An infant born prematurely who is struggling to complete its development may be more susceptible to mercury contamination than an infant born at full term. When OSCs are faced with similar unusual conditions, consulting with public health officials and the healthcare provider for the person is warranted.

Inhaling elemental mercury from a spill may contribute to the overall body burden of mercury. Persons with already high systemic levels of mercury may be more susceptible to adverse effects due to the contribution of the new exposure [Goldman 2001; CDC 2001]. Persons likely to have high systemic levels of mercury include those who work with mercury in occupational settings. Other persons likely in this category are those who routinely eat more than the recommended two meals of fish per week [EPA/FDA 2004]. These persons should be advised to consult their personal healthcare provider regarding the additional exposure to mercury due to the spill. Risk managers may need to consider isolating these persons at a lower concentration of mercury than suggested in section 2.2.2 earlier. No adverse effect would be expected at the normal occupancy level suggested in section 2.2.1.

2.3 Commercial and Occupational Settings

2.3.1 Workplaces covered by the Occupational Safety and Health Administration regulations in Subpart Z: Occupational settings where mercury exposure is anticipated are addressed by various occupational standards. The Occupational Safety and Health Administration (OSHA) does not have a specific standard for mercury in Title 29 of the Code of Federal Regulations (29 CFR). However, general requirements, such as the Hazard Communications Standard (29 CFR 1910.1200), Respiratory Protection Standards (29 CFR 1910.134), and a health and safety program for workers who might be exposed to a "Subpart Z" hazard (29 CFR 1910.1000, Table Z-2), do apply. See http://www.osha.gov/SLTC/mercury/index.html for a complete list of standards applicable to mercury exposure. Industrial hygiene recommendations and best practices by the American Conference of Governmental and Industrial Hygiene (ACGIH), the National Institute for Occupational Safety and Health (NIOSH), and OSHA include periodic monitoring of the workplace air, biological exposure indices to monitor worker's individual body burdens, periodic medical monitoring, and engineering controls to reduce mercury concentration at any given workstation [HSDB 2005]. See http://www.osha.gov/SLTC/healthguidelines/mercuryvapor/recognition.html for these guidelines. In addition, workers are presumed to be healthy adults with exposure durations of 40-hour workweeks for 40 years. Under these conditions, which obviously include responders and others workers subject to the requirements of OSHA's Hazardous Waste Site Operations and Emergency Response Standard [29 CFR 1910.120]), the occupational standards would be expected to protect human health. OSHA established the Permissible Exposure Limit (PEL), the only legally enforceable federal U.S. standard, as a ceiling (i.e., level not to be exceeded) value of 100 ug/m^3 (actual standard is 1 mg/10 m^3). NIOSH set a Recommended Exposure Limit (REL) of 50 ug/m^3 as a 10-hour, time-weighted average. The American Conference of Governmental and Industrial Hygienists (ACGIH) recommended the most recent occupational exposure standard as the Threshold Limit Value–Time Weighted Average (TLV-TWA) of 25 ug/m^3. ACGIH has also recommended biological exposure indices (BEI) in both urine and blood [ACGIH 2008; HSDB 2005].

2.3.2 Workplaces not covered by Subpart Z: In some occupational settings, such as many commercial retail settings, medical offices, and schools, exposure to mercury is not an expected hazard. Which settings are covered by the various requirements in Subpart Z vary from standard to standard. For example, to quote the hazard communications standard 29 CFR 1910.1200(b)(2)), the HazComm standard applies to "…any chemical which is known to be present in the workplace in such a manner that employees may be exposed under normal conditions of use or in a foreseeable emergency." A mercury spill in an occupational setting is not likely to be a normal condition and, if the mercury is not used in the normal work at the setting, it would be unlikely to be a foreseeable emergency. A more detailed list of exemptions in 29 CFR 1910.1200(b)(6)(ii) specifically excludes any setting "…when the hazardous substance is the focus of remedial or removal action being conducted under CERCLA in accordance with the Environmental Protection Agency regulations."

In these settings, the protections associated with the occupational standards and recommended guidelines described earlier (e.g., medical monitoring, engineering controls, hazard communications) are not typically available [Risher 2003]. Without

these additional protective measures, applying the occupational standards to these situations is inappropriate. However, the exposure duration in most workplaces would be roughly the same. Therefore, the underlying assumption for residential exposures (exposure for 24 hours, 7 days a week, for non-employed persons living in the home or 16 hours, 7 days a week for persons employed outside the homes and school-aged children not being homeschooled) would not reasonably apply. Adjusting the 1 ug/m^3 residential action level discussed earlier from a 168-hour exposure (24/7) or a 112-hour exposure (16/7) to a 40-hour exposure, which is more typical in a commercial or public workplace, would yield an equivalent protection in the 3–4 ug/m^3-range (i.e., 168 hours is about 4 times longer than 40 hours and 112 is about 3 times longer). The exposure for non-employees, such as customers or clients in businesses or students in a school, would be even more transient. Although these non-employees could be more susceptible than presumably healthy adult workers, a concentration in this 3–4 ug/m^3-range should be safe for them as well [CDC 1995; Nickle 1999; Ratcliffe 1996].

2.3.3 Conditions when other concentration may apply: The interaction between mercury and the developing CNS is poorly understood. Therefore, mercury exposures should be minimized for workers in all settings who are confirmed or suspected to be pregnant, or may become pregnant. In commercial settings, such as maternity wards, dialysis clinics, pre-kindergarten daycare, and pediatric intensive care units, susceptible populations reasonably may be expected to spend prolonged periods of time. In those cases, minimizing mercury exposures or lowering the acceptable residual concentration should be considered.

When considering response operations during a mercury spill, balancing the risks associated with specific settings may be necessary. For instance, if a mercury spill occurs in a commercial setting that provides essential life-saving services to a community and is the sole source for those services, disrupting these services may cause greater harm than exposure to the mercury. Exposure to mercury at levels as high as occupational levels for only a few hours is not likely to cause serious harm to a person, whereas missing a scheduled dialysis treatment may cause significant harm. The risk manager at the scene should consult with public health authorities in the community if this kind of circumstance is suspected.

2.4 Schools and Educational Settings: Schools can pose a significant challenge during mercury cleanup. First, schools commonly provide a community setting in which many children could be exposed to a single source of liquid mercury discovered in or brought to the school. Second, the school environment can actually be a source of mercury—the fascinating chemical and physical properties of mercury can make it seem a useful teaching tool. Other potential exposure locations in a school include utility rooms and ventilation spaces where mercury may be used in temperature or pressure controls. Third, school areas, such as buses, gyms, cafeterias, and hallways, are commonly used by many people; they may walk through spilled mercury and spread contamination to other areas. Fourth, schools have multiple appliances (e.g., classroom computers and computer labs) that can produce heat. A classroom with 1–5 computers not in use may be safe; however, 5 computers turned on and producing their normal amount of heat in the air may generate enough mercury vapors in the room from a spill to pose a risk to staff and students [ATSDR 1997; CDC 1995, 2005; EPA 2010; Gordon 2004; Mercury in Schools 2004;

Nickle 1999; Taueg 1992; Tominack 2002]. Additionally, the length of exposure duration may be too short to likely harm the seemingly most sensitive population (i.e., the students).

Many school systems have programs to remove hazards, including mercury, in their schools. However, students can bring mercury to the school and share it with their fellow students, a contingency that school officials must recognize and address.

The exposure scenario at most schools, even with after-school programs, is typically much closer to a workday type of exposure (i.e., 7–10 hours) than a residential setting; however, the longest time most students will spend in any given school building will be commonly 3–5 years. Some private schools may offer more extended instructional opportunities, both in the number of hours per day and in the number of years (i.e., number of grade levels taught). Staff at these schools may be in the same setting for a considerably longer time (e.g., a 40-year work lifetime; 10–12 hour days), depending on their personal habits and regional turnover rates. Students or staff could be pregnant. Risk managers should be aware of the potential for these unique circumstances within a school.

Consideration should be given to closing or isolating areas of schools with mercury concentrations of $\geq$10 ug/m^3, depending on the exposures, pending removal of the hazard. Given the variables associated with exposures in educational settings, ATSDR recommends a range $\leq$3 ug/m^3 before resuming normal operations of the school. This recommendation is based on the residential action levels discussed earlier and adjusted for a normal school day. Presuming all visible mercury in the setting has been removed, this action level is considered appropriate.

2.5 Vehicles

The scenario for persons exposed to mercury while in vehicles is challenging to estimate because it depends on many factors. The purpose of the vehicle (e.g., a school bus versus a family van), the habits of the individual users (e.g., how much time does Mom spend in the car in a hot parking lot waiting for the kids to get out of school?), the sensitivity of the individual passengers (e.g., is Mom in the previous example pregnant?), and the number of passengers routinely in the vehicle are probably the biggest considerations. However, the intended use in any given period may greatly influence the potential hazard posed by mercury in a vehicle. For instance, a spill in a family vehicle that is used soon after for a prolonged vacation may cause more intense exposure than otherwise might be expected. Given all the possible variables, the most sensitive anticipated use of a vehicle should determine the action level for that vehicle.

For family vehicles, the exact exposure scenario depends on the habits of the principle drivers, but some exposure to most of the family is possible at some point. The duration of exposure on any given day is likely to be only a small fraction of the 24-hour period, but this could be offset by much longer duration exposures for transient periods (e.g., the family vacation). Because most of the family could be exposed while in the vehicle, the entire spectrum of sensitivities must be considered. The vehicle itself will be a fairly confined space with variable air-change rates (e.g., use of the air conditioner compared to open windows). Other than the transient exposure scenario of the family vacation, the length and intensity of the exposure duration should allow a higher spectrum of action levels than has been discussed up to this point.

For work vehicles, the exposure scenario can be either a vehicle that is used primarily to commute to a work location with a duration equal to a fraction of a full day (e.g. similar to the family vehicle above), or a vehicle that, for all intents and purposes, is the work location with a duration closer to an normal workday (e.g., sales and service vehicles, some construction equipment). In this instance, the population being exposed can be assumed to be a healthy adult. The occupied working area of the vehicle would be similar to a family vehicle or smaller and could be relatively open to the environment (e.g., an operator's seat on a piece of construction equipment), or closed similar to the family vehicle (e.g., the service van). For closed vehicles, concentrations higher than that of a family car would be acceptable generally. Without engineering controls and recommendations for settings protection when mercury is a known hazard, the acceptable concentration in these vehicles should not approach the occupational standards.

For multi-passenger vehicles, such as school buses or church vans, the exposure scenario would depend upon the underlying purpose of the vehicle. In other words, most passengers in a school bus would be students, and the characteristics of the population would be similar to that described earlier for the school being served. Population characteristics of the passengers in a city bus or a church van would be closer to that of the general population. For common carrier vehicles, such as airplanes or trains, the exposure duration would be relatively short for the passengers but closer to a workplace exposure for the crew. While space for individual persons may be limited, the interior of the multi-passenger vehicle over all would tend to be more spacious than other vehicle types. Air-change rates would vary significantly depending on the status and type of the vehicle. Given the high variability in the sensitivity of the population being transported, acceptable concentrations would be lower than most commercial or work vehicles. Exposure duration for most multi-passenger vehicle would be relatively short (e.g., measured in hours); however, exposure duration in a common carrier would vary over a fairly broad spectrum.

Visible mercury should not be present in any vehicle for all the reasons cited earlier in section 2.1, but primarily because it could be tracked into other settings. The risk manager should be mindful that, even in a vehicle, higher concentrations mean a source of liquid mercury is likely present. If concentrations inside the vehicle do not decline significantly with cleaning and removing potential sources, a source of liquid mercury is especially likely. Concentrations >6 ug/m^3 should raise concerns about the presence of liquid mercury in the vehicle.

Given all of these variables and concerns, ATSDR recommends an action level in the range of 3–6 ug/m^3. This is based on concerns similar to the commercial setting (such as schools and retail establishments), adjusted for the shorter and transient exposure in the vehicles, and avoidance of tracking and the nuisance hazard of liquid mercury. Pregnant women and very young children should spend the minimum time possible in a vehicle contaminated with mercury. For a transient exposure of prolonged duration, alternative transportation should be considered for sensitive persons in the family.

3.0 Conclusion:

For the given scenarios requested by the Action Level Subgroup, ATSDR considers the action levels in this health consultation and summarized in the following tables appropriate to protect public health. If

the action levels are exceeded, the risk managers on scene should consider appropriate response actions to protect the health of persons most likely to be exposed or more sensitive to the effects of mercury.

Before selecting any specific action level or course of action, risk managers should consider the assumptions and limitations described in this health consultation as they apply to the situation encountered when responding to a release. Risk managers should consider consulting with ATSDR staff or EPA risk assessors when unusual situations or unusually sensitive persons are involved.

In all cases where cleanup actions are terminated under these schemes, the action levels recommended are based on the assumption that all liquid mercury has been removed from the scene of the exposure.

4.0 Recommendations:

In removal actions, ATSDR recommends that any liquid mercury at the scene be isolated and removed as expeditiously as possible to avoid tracking the mercury to other locations.

Each site may have site-specific concerns that should be considered before selecting an appropriate action level. Risk managers at the scene of a spill should consider consulting with regional risk assessors or public health officials at ATSDR, the State, or local authorities regarding unusual circumstances that they encounter.

ATSDR recommends the liberal use of field screening devices and methods to detect the presence of mercury in areas where a spill is suspected and to monitor the progress of cleanup. Environmental samples analyzed in a laboratory are generally unnecessary until all visible mercury is removed and confirmation is required that response activity is complete.

Samples to confirm final cleanup should be collected and analyzed in a manner equivalent to the modified NIOSH 6009 method. ATSDR considers readings from a properly calibrated Lumex Mercury Vapor Analyzer, that are representative of 8 hours of exposure at the point of sampling, as comparable to the NIOSH 6009 method in the range of 0.1-10 ug/m^3 [Singhvi, 2003] and will accept these in lieu of laboratory analysis.

Application of the action levels provided in this health consultation should be modified as necessary to reflect actual conditions at the site of a mercury release. At the request of the lead agency, ATSDR is available to review site-specific situations and assist in making any decision to modify the application at the site.

The conclusions and recommendations provided in this health consultation are based on the information available to ATSDR as of the date of the document. New or additional information may necessitate a modification of our conclusions and recommendations.

5.0 Appendices

Table 1: Suggested Action Levels for Residential Settings
Table 2: Suggested Action Levels for Other Locations.
Figure 1A, B, C: ATSDR Toxicological Profile (Figure 2-1)

6.0 References

Abbaslou P, Zaman T. 2006. A Child with elemental mercury poisoning and unusual brain MRI findings. Clin Toxicol. 44; 1: 85-88

ACGIH 2008. TLVs and BEIs. Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices. American Conference of Governmental and Industrial Hygienists. Cincinnati, OH

Alison Newby C, Riley D, Leal-Almeraz T. 2006. Mercury use and exposure among Santeria practitioners; religious vs. folk practice in Northern New Jersey, USA. Ethn Health. Aug. 2006 11; 3: 287-306

ATSDR/EPA, 1997 National Alert for Mercury. Available at http://www.atsdr.cdc.gov.

ATSDR, 1999. Agency for Toxic Substances and Disease Registry. Toxicological Profile for Mercury. Atlanta: U.S. Department of Health and Human Services.

ATSDR, 2000. Suggested Action Levels for Indoor Mercury Vapors in Homes or Businesses with Indoor Gas Regulators. Letter consultation from ATSDR to Mr. Brendan Boyle, Michigan Health, and Mr. Ralph Dollhopf, EPA Region V. December 2000

ATSDR, 2008. Health Consultation for the McAlester Mercury Site. Letter to CDR Patrick Young. Jan. 2008

Azziz-Baumgartner E, Luber G, Schurz-Rogers H, Backer L, Belson M, Kieszak S, Caldwell K, Lee B, Jones R, Todd R, Rubin C. 2007. Exposure assessment of a mercury spill in a Nevada school -- 2004. *Clin Toxicol*. May 2007. 45; 4: 391-395

Baughman TA. 2006. Elemental mercury spills. Environ Health Perspect. Feb 2006. 114; 2: 147-152.

Bensefa-Colas L, Andujar P, Descatha A. 2010. Mercury poisoning. Rev Med Interne. Jun 2010 [electronic publication before print].

Bose-O'Reilly S, Lettmeier B, Gothe RM, Beinhoff C, Siebert U, Drasch G. 2008. Mercury as a serious health hazard for children in gold mining areas. *Environ Res*. Mar 2008. 107; 1: 89-97

Bose-O'Reilly S, McCarty K, Steckling N, Lettmeier, B. 2010. Mercury exposure and children's health. *Curr Probl Pediatr Adolesc Health Care.* Sep 2010. 40; 8: 186-215

Cairns E, Tharumakulasingam K, Athar M, Yousaf M, Cheng I, Huang Y, Lu J, Yap D. 2011. Source, concentration, and distribution of elemental mercury in the atmosphere in Toronto, Canada. *Environ Pollut* Jan 2011 [electronic publication before print].

Carpi A, Chen Y. 2001. Gaseous elemental mercury as an indoor air pollutant. *Environ Sci Technol*. Nov 2001. 35; 21: 4170-4173

CDC, 1995. Centers for Disease Control and Prevention. Mercury exposure in a residential community--Florida, 1994. Atlanta: U.S. Department of Health and Human Services. *MMWR*. Jun 1995. 44; 23: 436-437, 443.

CDC, 2001. Centers for Disease Control and Prevention. Blood and hair mercury levels in young children and women of childbearing age – US, 1999. Atlanta: U.S. Department of Health and Human Services *MMWR*. Mar 2001. 50; 8: 140-143.

CDC, 2005. Centers for Disease Control and Prevention. Measuring exposure to an elemental mercury spill--Dakota County, Minnesota, 2004. Atlanta: U.S. Department of Health and Human Services. *MMWR*. Feb 2005. 54; 6: 146-149

Cherry D, Lowry L, Velez L, Cotrell C, Keyes D. 2002. Elemental mercury poisoning in a family of seven. *Fam Community Health*. Jan 2002. 24; 4: 1-8

Cizdziel J and Jiang Y. 2011 Concentrations of gaseous elemental mercury in ambient air within an academic chemistry building. *Bull Environ Contam Toxicol*. Apr 2011. 86; 4: 419-422.

De Capitani EM, Souza EM, Vieira RJ, Madureira PR. 2009. Contact dermatitis to elemental mercury with distant lesion. *An Bras Dermatol*. Jan-Feb 2009. 84; 1: 75-77

Ellis L, Mullins M, Galvin N, Scalzo A. 2009. Detection of elemental mercury in abdominal wall soft tissue. *J Med Toxicol*. Dec 2009. 5; 4: 205-208

EPA. 1995. US Environmental Protection Agency. IRIS summary for elemental mercury. U.S. Environmental Protection Agency, Washington, DC. Available from: http://www.epa.gov/iris/. June 1995

EPA. 2005. US Environmental Protection Agency. Ritualistic use of mercury simulation: a preliminary investigation of metallic mercury vapor fate and transport in a trailer. U.S. Environmental Protection Agency. Edison, NJ . January 2005. Available from http://www.epa.gov/.

EPA, 2010. US Environmental Protection Agency. Mercury in schools website. U.S. Environmental Protection Agency. Washington, DC. Available from: http://www.epa.gov.

EPA, 2011. US Environmental Protection Agency. National mercury cleanup policy workgroup charter. U.S. Environmental Protection Agency. Washington, DC [as transmitted via electronic mail (e-mail) by J. Kelly, EPA to R. Nickle, ATSDR on 03/04/2011 at 1:18 pm.]

EPA/FDA, 2004. US Environmental Protection Agency and the Food and Drug Administration. Advice for women who might become pregnant, women who are pregnant, nursing mothers, and young children. U.S. Environmental Protection Agency and U.S. Department of Health and Human Services, Washington, DC. EPA-823-R-04-00. Available from: http://www.fda.gov.

Fawer R, DeRibaupierre U, Guillemin M, Berode M, and Lobe, M. 1983. Measurement of hand tremor induced by industrial exposure to metallic mercury. *Br J Ind Med*. 40:204–208.

Franko A, Budihna MV, Dodic-Fikfak M 2005. Long-term effects of elemental mercury on renal function in miners of the Idrija Mercury Mine. *Ann Occup Hyg*. Aug 2005. 49; 6: 521-527.

Garetano G, Stern AH, Robson M, Gochfeld M. 2008 Mercury vapor in residential building common areas in communities where mercury is used for cultural purposes versus a reference community. *Sci Total Environ*. Jul 2008. 1; 397: 131-139.

Garetano G, Gochfeld M, Stern A. 2006 Comparison of indoor mercury vapor in common areas of residential buildings with outdoor levels in a community where mercury is used for cultural purposes. *Environ Health Perspect*. Jan 2006. 114; 1: 59-62

Gochfeld M. 2003. Cases of mercury exposure, bioavailability, and absorption. *Ecotoxicol Environ Saf*. Sep 2003. 56; 1: 174-179

Goldman L and Shannon M. 2001. Technical report: mercury in the environment: implications for pediatricians. *Pediatrics*. Jul 2001. 108; 1: 197-205.

Gordon A. 2004. Short-term elemental mercury exposures at 3 Arizona schools; public health lessons learned. *J T Clin Toxicol*. 42;2:179–187.

Grant C. Lalor G, Fletcher H, Potter T Vutchkov M, Reid M. 2010. Elements in human placentae in Jamaica. *West Indian Med J*. Oct 2010. 59; 5: 479-485.

Hudson P, Vogt R, Brondum J, Witherell L, Myers G, Paschal D. 1987. Elemental mercury exposure among children of thermometer plant workers. *Pediatrics*. Jun 1987. 79; 6: 935-938.

Hryhorczuk D, Persky V, Piorkowski J, Davis J, Moomey C, Krantz A, Runkle K, Saxer T, Baughman T, McCann K. 2006. Residential mercury spills from gas regulators. *Environ Health Perspect*. Jun 2006. 114; 6: 848-852.

HSDB, 2005. Mercury. Hazardous Substance Databank. Toxicology Data Network. National Library of Medicine. National Institutes of Health. Bethesda, MD 2005

Johnson C. 2003. Letter Report to EPA Region II. Mercury vapor levels in dwellings in close proximity to the World Trade Center Site.

Johnson C. 2004 Mercury in the environment: sources, toxicity, and prevention of exposure. *Pediatr Ann*. Jul 2004. 33; 7: 437-442.

Lee R, Middleton D, Caldwell K, Dearwent S, Jones S, Lewis B, Monteilh C, Mortensen ME, Nickle R, Orloff K, Reger M, Risher J, Rogers HS, Watters M. 2009. A review of events that expose children to elemental mercury in the United States. *Environ Health Perspect*. Jun 2009. 117; 6: 871-878.

Liu J, Cheney M, Wu F, Li M. 2011. Effects of chemical functional groups on elemental mercury adsorption on carbonaceous surfaces. *J Hazard Mater*. Feb. 2011. 186; 1: 108-113.

Lyman S, Gustin M. 2009. Determinants of atmospheric mercury concentrations in Reno, Nevada, U.S.A. *Sci Total Environ*. December 2009. 408; 2: 431-438.

MacLehose R, Pitt G, Will S, Jones A, Duane L, Flaherty S, Hannant D, Stuttard B, Silverwood A, Snee K, Murray V, Syed Q, House I, Bellis MA. 2001 Mercury contamination incident. *J Public Health Med*. March 2001 23; 1: 18-22.

Mercury in Schools, 2004 Webpage; supported by the University of Wisconsin at http://www.mercuryinschools.uwex.edu/

Morgan D, Chanda S, Price M, Fernando R, Liu J, Brambila E, O'Connor R, Beliles R, Barone S. 2002. Disposition of inhaled mercury vapor in pregnant rats: maternal toxicity and effects on developmental outcomes. *Toxicol Sci*. April 2002. 66; 2: 261-273.

Ngim CH, Foo SC, Boey KW, et al. 1992. Chronic neurobehavioural effects of elemental mercury in dentists. British Journal of Industrial Medicine. 49;11:782-790.

Nickle R. 1999 Mercury: Top of the hit parade for eight years. *Drug Chem Toxicol*. February 1999. 22; 1: 129-142.

NIOSH, 2007. NIOSH Guide to Chemical Hazards. US Department of Health and Human Services. Centers for Disease Control and Prevention. National Institute for Occupational Safety and Health. Cincinnati, OH Sept. 2007. DHHS (NIOSH) Publication Number 2005-149. Available at http://www.cdc.gov/niosh/npg/.

Nold E, Adams G, Nickle R. 2011. Email between the authors re: levels of mercury in air associated with the presence of liquid mercury. Electronic mail string dated 7/5/2011 at 1103 am.
Opitz H, Schweinsberg F, Grossmann T, Wendt-Gallitelli M, Meyermann R 1996. Demonstration of mercury in the human brain and other organs 17 years after metallic mercury exposure. *Clin Neuropath*. May-June 1996. 15; 3: 139-144.

Orloff K, Ulirsch G, Wilder L, Block A, Fagliano J, Pasqualo J 1997 Human exposure to elemental mercury in a contaminated residential building. *Arch Environ Health*. May-June 1997. 52; 3: 169-172.

Ratcliffe H, Swanson G, Fischer L 1996. Human exposure to mercury: a critical assessment of the evidence of adverse health effects. *J Toxicol Environ Health*. October 1996. 49; 3: 221-270.

Risher J, Nickle R, Amler S. 2003. Elemental mercury poisoning in occupational and residential settings. *Int J Hyg Environ Health*. August 2003. 206; 4-5: 371-379.

Risher J, De Rosa C. 2007. Inorganic: the other mercury. *J Environ Health*. Nov. 2007. 70; 4: 9-16.

Rogers HS, McCullough J, Kiesak S, Caldwell K, Jones RL, Rubin C. 2007 Exposure assessment of young children living in Chicago communities with historic reports of ritualistic use of mercury. *Clin Toxicol*. 45; 3: 240-247.

Rogers, HS, Jeffrey N, Kiesak S, Fritz P, Spliethoff H, Palmer C, Kass D, Caldwell K, Eadon G, Rubin C. 2008. Mercury exposure in young children living in New York City. Journal of Urban Health. Jan. 2008. 85;. 1: 39-51.

Samir A and Aref W. 2011. Impact of occupational exposure to elemental mercury on some antioxidative enzymes among dental staff. *Toxicol Ind Health*. March 2011. [Electronic Print ahead of Publication].

Singhvi R, Turpin R, Kalnicky D, and Patel J. 2001. Comparison of field and laboratory methods for monitoring metallic mercury vapor in indoor air. J Hazard Materials 83(1-2):1-10.

Singhvi R, Kalnicky D, Patel J, and Mehra Y. 2003. Comparison of Real-Time and Laboratory Analysis of Mercury Vapor in Indoor Air: Statistical Analysis Results. Proceedings of the Pittsburg Conference. 2003

Song X, Cheng I, Lu J. 2009. Annual atmospheric mercury species in downtown Toronto, Canada. *J Environ Monit*. March 2009. 11; 3: 660-669.

Taueg C, Sanfilippo D, Rowens B, Szejda J, Hesse JL: 1992. Acute and chronic poisoning from residential exposures to elemental mercury--Michigan, 1989-1990. J Toxicol Clin Toxicol. 1992 30; 1: 63-67.
.
Tominack R, Weber J, Blume C, Madhok M, Murphy T, Thompson M, Scalzo A. 2002. Elemental mercury as an attractive nuisance: multiple exposures from a pilfered school supply with severe consequences. *Pediatr Emerg Care*. April 2002. 18; 2: 97-100.

Tsuji J, Williams P, Edwards M, Allamneni K, Kelsh M, Paustenbach D, Sheehan P 2003. Evaluation of mercury in urine as an indicator of exposure to low levels of mercury vapor. *Environ Health Perspect*. April 2003. 111; 4: 623-630.

Winter T. 2003 The evaporation of a drop of mercury. American Journal of Physics. 71; 8: 783-786.

Yamamoto M, Charoenraks T, Pan-Hou H, Nakano A, Apilux A, Tabata M. 2007 Electrochemical behaviors of sulfhydryl compounds in the presence of elemental mercury. Chemosphere. Sep. 2007. 69; 4: 534-539.
.

Table 1: Suggested Action Levels for Residential Setting

Action Level (ug/m^3)	Use of Action Level	Rationale for Action Level	Sampling Suggestions and other Considerations	Consult Section
Less than 1	Acceptable level for normal occupancy for most sensitive persons. No further response action needed	Experience has shown that response actions to reach levels lower than 1 ug/m^3 can be disruptive enough to cause more harm than benefit. 1 ug/m^3 is within an order of magnitude of health guidance values and indoor background levels. This concentration is 25 times lower than the concentrations referenced in the development of health guidance values.	No visible mercury; highest quality data.* Sampling in breathing zone of most sensitive person under normal conditions for use.	See Sections 2.1 and 2.2.1
3–6	Acceptable level for unrestricted use of family vehicles under most conditions.	Exposure duration in most vehicles is short compared with other settings, allowing a higher concentration as the "floor" of this range. Requirement for no visible mercury means the source of vapors has been removed and concentrations should continue to fall The "ceiling" of the range is based on the presumption that liquid mercury may still be present but not yet discovered.	No visible mercury; highest quality data.* Sampling in the passenger compartment under normal use conditions. Unusual use of the vehicle in this case would be extended family vacations.	See Sections 2.1 and 2.5
3–6	Acceptable level to allow personal belongings to remain in owner's possession.	The sampling point suggested in the column to the right tends to concentrate the vapors higher than typical exposure conditions. Exposure frequency should be intermittent and the duration should be short. The 6 ug/m^3 is based on the possibility that liquid mercury i is present but may not have been discovered.	Survey instrument data generally acceptable.+ Readings should be at the vents of appliances or headspace of bags. Bags should be warmed passively to ambient conditions and appliances/ electronics should be at operating temperatures.	See Section 2.2.3
Greater than 10	Isolation of contamination from residents or evacuation of residents	Indications are that 10 ug/m^3 may be the concentration at which urinary levels of mercury begin to increase. Other studies indicate this concentration may be the lowest toxic concentration (TCLo) for humans. Continued exposure may be harmful.	Survey instrument data acceptable. + Exposure to contaminant should be minimized.	See Section 2.2.2

***Highest quality data is NIOSH 6009 analytic results or equivalent (e.g., Lumex reading averaged over 8 hours)**
+Survey instrument data is considered any real-time monitoring equipment (e.g., Jerome, MVI, VM 300)

Table 2: Suggested Action Level for Other Locations

Action Level (ug/m^3)	Use of Action Level	Rationale for Action Levels	Sampling Suggestions and other Considerations	Consult Section/ Reference
Less than 3	Normal Occupancy for commercial settings where mercury exposure is not expected in normal course of work. (e.g., 29 CFR 1910 Subpart Z does not apply)	Concentration is based on residential action level of 1 ug/m^3 adjusted for a work day (i.e., 24/7 exposure reduced to 8/5 or 40 hour workweek). Persons exposed in these settings would not expect the presence of mercury as part of their normal employment.	No visible mercury; highest quality data.* Taken in breathing zone of most sensitive person under normal conditions for use. Pregnant workers should be offered alternate worksite.	See Section 2.1 and 2.3.2
1–3	Acceptable level for schools to resume normal operations.	Concentration is based on residential action level of 1 ug/m^3 adjusted for a typical school day.	No visible mercury; highest quality data.* Taken in breathing zone of most sensitive person under normal conditions for use. Pregnant workers and students should be offered temporary alternatives to working or attending the school..	See Section 2.1 and 2.4
3–6	Acceptable level for unrestricted use of vehicles under most conditions.	Exposure duration in most vehicles is short compared with other settings, allowing a higher concentration as the "floor" of this range. Requirement for no visible mercury means the source of vapors has been removed and concentrations should continue to fall The "ceiling" of the range is based on the [illegible]	No visible mercury; highest quality data.* Sampling in passenger compartment under normal use conditions. Unusual use of the vehicle in this case would be situations where the vehicle is the workplace.	See Sections 2.1 and 2.5
Greater than 10	Isolation of contamination or evacuation of workers not covered by a health and safety program addressing exposure to mercury.	Indications are that 10 ug/m^3 may be the concentration at which urinary levels of mercury begin to increase. Other studies indicate this concentration may be the lowest concentration toxic to humans.	Survey instrument data acceptable.+ Exposure to contaminant should be minimized.	See Section 2.3.2
25	Normal Occupancy for industrial settings where mercury exposure is expected in normal course of work. (e.g., 29 CFR 1910 Subpart Z does apply).	Based on the 1996 ACGIH TLV. Assumes hazard communications programs as required by OSHA; engineering controls as recommended by NIOSH; and medical monitoring as recommended by NIOSH and ACGIH are in place.	Survey instrument data acceptable.+ Workers in these settings should be subject to OSHA standards for mercury (e.g., medical records, Subpart Z, HCS, HAZWOPER).	See Section 2.3.1
25	Upgrade responder protective ensemble to Level C during uncontrolled releases of mercury	For response, workers subject to requirements of 29 CFR 1910.120, based on the ACGIH TLV, as recommended by the 1987 NIOSH/OSHA/USCG/EPA Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities (the" 4 agency guidance manual").	Survey instrument data acceptable.+ Uncontrolled release refers to the absence of positive engineering controls on the material.	Occupational Safety and Health Guidance Manual for Hazardous Waste Site

* - Highest quality data would be NIOSH 6009 analytic results or equivalent (e.g., Lumex reading averaged over 8 hours)

\+ - Survey instrument data would be considered any real time monitoring equipment (e.g., Jerome, MVI, VM 300, etc)

Figure 1A: ATSDR Toxicological Profile Figure 2-1 Acute Exposures (Annotated)

Developmental effects in animals

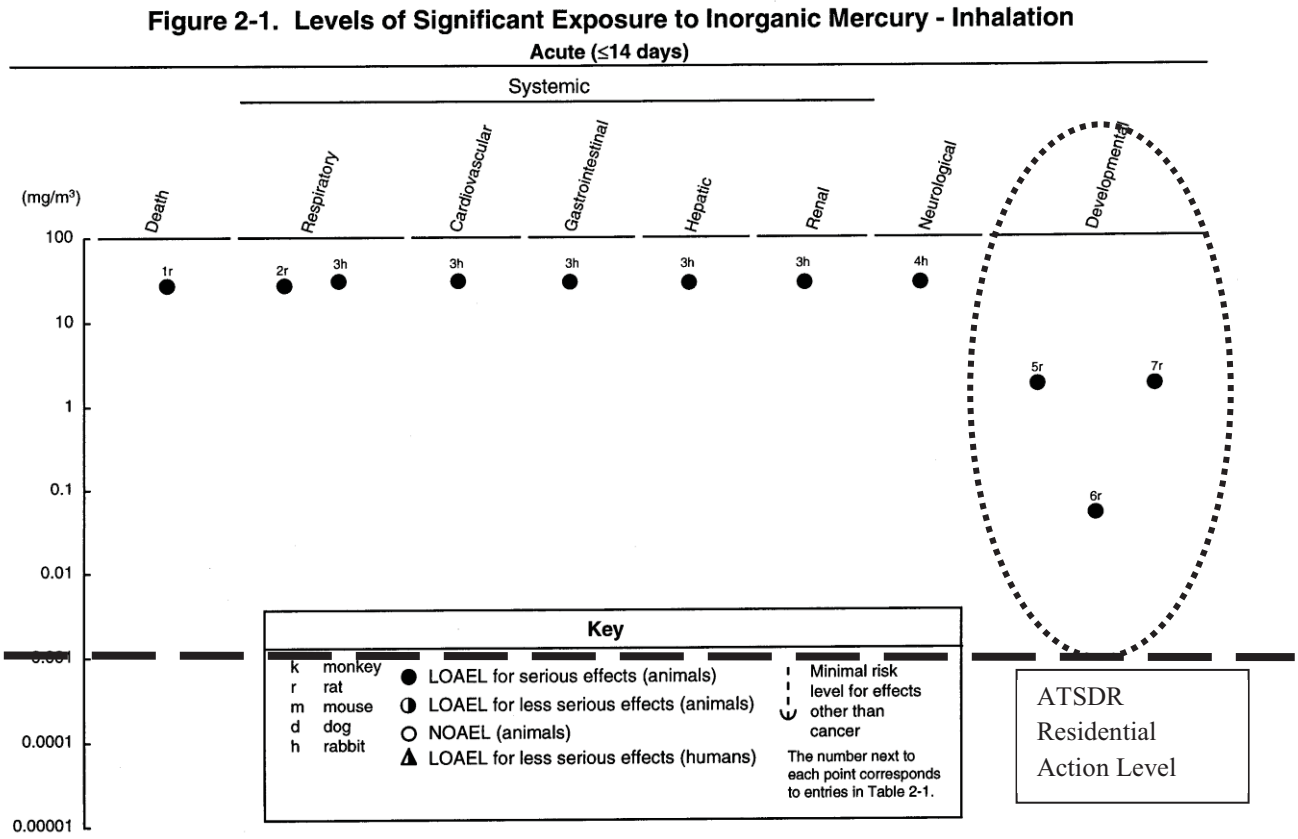


Figure 1A. Annotated insert of Figure 2-1 from the ATSDR Toxicological Profile graphing the significant inhalation studies of inorganic mercury by health effect and concentration for exposure durations of ≤14 days. Dashed line represents the ATSDR Residential Action Level recommended in this health consultation. This figure illustrates most clearly the reason for considering developmental effects as the most sensitive endpoint.

Figure 1B: ATSDR Toxicological Profile Figure 2-1 Intermediate Exposures (Annotated)

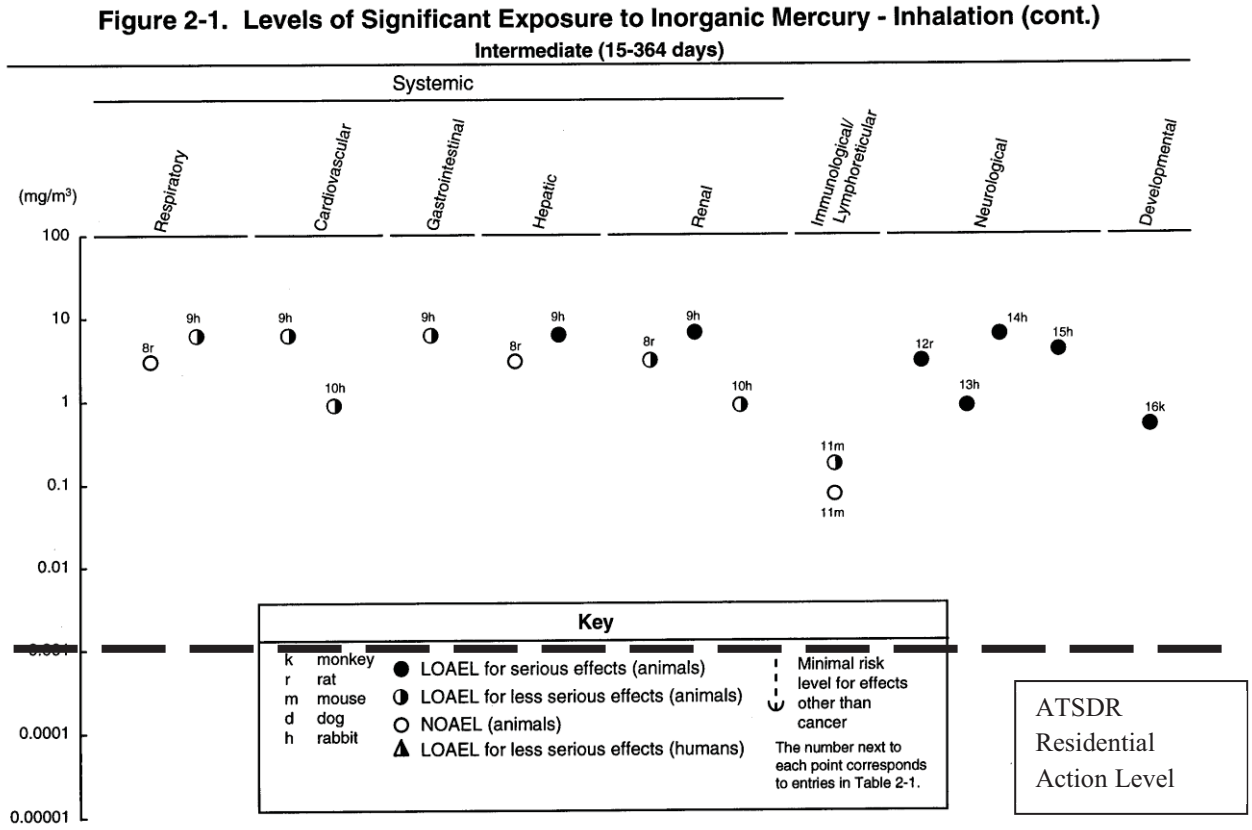


Figure 1B. Annotated insert of Figure 2-1 from the ATSDR Toxicological Profile graphing the significant inhalation studies of inorganic mercury by health effect and concentration for exposure durations of 15–364 days. Dashed line represents the ATSDR Residential Action Level recommended in this health consultation.

Figure 1C: ATSDR Toxicological Profile Figure 2-1 Chronic Exposures (Annotated)

Human Studies considered significant by ATSDR

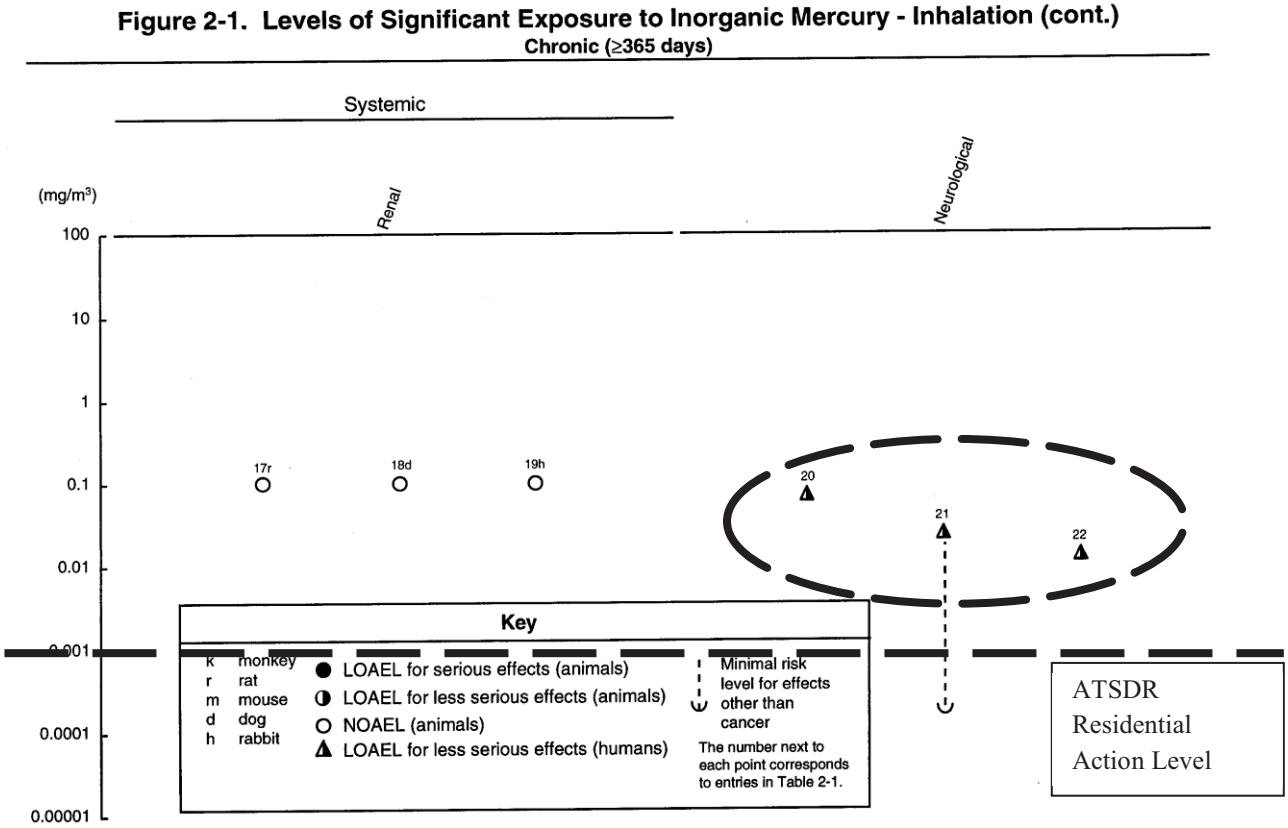


Figure 1C. Annotated insert of Figure 2-1 from the ATSDR Toxicological Profile graphing the significant inhalation studies of inorganic mercury by health effect and concentration for exposure durations of ≥365 days. Dashed line represents the ATSDR Residential Action Level recommended in this health consultation. This dotted circle indicates the three studies of humans in occupational settings that ATSDR considers most significant.

Appendix I

Draft National Mercury Response Guidebook

National Mercury Response Guidebook

DRAFT

November 20, 2014

This page intentionally left blank.

Table of Contents

1 Introduction 1

1.1 Purpose of Guidebook 1

1.2 Intended Audience 1

1.3 History of Action Level Development, Chemical-Specific Health Consultation for Joint EPA/ ATSDR National Mercury Cleanup Policy Workgroup: Action Levels for Elemental Mercury Spills, March 22, 2012 2

1.4 Forms of Mercury 2

1.4.1 Mercury Diffusion in the Indoor Environment 3

1.5 Description, Physical Properties and Classification of Elemental Mercury 4

1.6 Sources and Uses of Mercury 5

1.6.1 Sources of Elemental Mercury 5

1.6.2 Uses of Elemental Mercury 5

1.6.3 Mercury in Products Raising Public Concern 6

1.6.3.1 Skin Cream 6

1.6.3.2 Compact Fluorescent Light Bulbs (CFLs) 7

1.6.3.3 Rubberized Gym Floors 7

2 Human Health Effects 7

2.1 Pathways of Exposure 7

2.2 Symptoms of Exposure 8

2.2.1 Acute Health Effects 8

2.2.2 Chronic Health Effects 9

2.2.3 Health Effects for Pregnant Women and Children 10

2.3 Physical Damage from Exposure 10

2.4 Sampling for Exposure 10

2.5 First Aid for Exposure 10

3 Initiation of the Response 11

3.1 Investigating Agency 11

3.2 Role of Public Health Department 11

3.3 EPA Response Authority to Mercury Spills 11

3.4 Request for EPA Assistance 12

4 OSC Initial Response 12

4.1 Before Leaving the Office 12

4.1.1 Initial Coordination 12
4.1.2 Other Response Support Sources 13
4.1.3 Other Appropriate Response Resources 13
4.2 Arriving at Spill Location 14
4.2.1 Conduct Responding State/Local Agency Debrief and Interview Property Owner 14
4.2.2 Obtain Signed Access Agreement 14
4.2.3 EPA Accounting Practices 15
4.2.4 EPA Enforcement Considerations 15
4.2.5 Public Outreach and Information 16
5 Initial Assessment and Screening/Sampling of Air with a Handheld MVA 16
5.1 MVA Startup and Performance 21
5.2 Initial Screening 22
5.2.1 Residential 23
5.2.2 Non-Residential 24
5.2.3 Vehicle 25
5.2.4 Outdoors 25
5.3 Screening of Potentially Contaminated Items 25
5.4 Monitoring throughout all Stages of the Response 26
5.5 Clearance Screening/Sampling 26
6 Additional Media Screening, Sampling and Analytical Methods 27
6.1 General Discussion 27
6.2 Solids 27
6.2.1 Bulk Solids (soil, sediment, sludge, etc.) 28
6.2.1.1 Field Screening with MVA 28
6.2.1.1.1 In Situ Screening 28
6.2.1.1.2 Sampling and Field Screening 28
6.2.1.2 Sampling and Field Screening with Lumex RP-19C Attachment 29
6.2.1.3 Sampling and Laboratory Analysis 29
6.2.2 Residue (surface dust/film) 30
6.3 Liquids (groundwater, surface water, etc.) 31
6.3.1 Sampling and Field Screening with MVA 31
6.3.2 Sampling and Field Screening with Lumex RP-91 Attachment 31
6.3.3 Sampling and Laboratory Analysis 32

6.4 Investigation-Derived Waste 33
6.4.1 Solid Wastes 33
6.4.2 Liquid Wastes 34
7 Exposure Limits 35
7.1 Mercury Inhalation Exposure and Vapor Limits 36
7.1.1 NIOSH 36
7.1.2 OSHA 36
7.1.3 ACGIH 36
7.1.4 ATSDR 37
7.1.5 EPA 37
7.2 Ingestion Exposure 37
7.3 Dermal Exposure 37
8 Relocation of Residents 38
8.1 Relocation Options 38
8.2 EPA Relocation Program 38
8.3 Release of Residential Clothing and Household Items 39
8.4 Site Security 40
9 Cleanup Process 40
9.1 Pre-Decontamination Procedures 41
9.1.1 Pre-Decontamination Documentation 41
9.1.2 House Tracking Database 42
9.2 Establishing Work Zones and Containment Operations 42
9.2.1 Establish Control Zones and Ingress / Egress Routes 42
9.2.2 Establish Ventilation / Air Management 43
9.2.3 Isolate Impacted Areas 43
9.2.4 Establish a Waste Water Management Plan 44
9.3 Specialized Products and Cleanup Tools 44
9.3.1 Mercury Response Products 44
9.3.1.1 Mercury Indicator Powder 45
9.3.1.2 Mercury Vapor Absorbent 45
9.3.1.3 Merconvap™ 45
9.3.1.4 Merconwipes™ 45
9.3.1.5 Hg Absorb™ 45

9.3.1.6 HgX® 46
9.3.1.7 DeconGel™ 46
9.3.1.8 Mercury Magnate™ Amalgamation Spill Powder 46
9.3.1.9 Powdered Sulfur 46
9.3.1.10 Shampoos 46
9.3.1.11 Products to Avoid 47
9.3.2 Mercury Cleanup Tools 47
9.3.2.1 Mercury Spill Kits 47
9.3.2.2 Mercury Vacuums 47
9.3.2.3 Mercury Hand Pumps 47
9.3.2.4 Small Spill Cleanup Tools 48
9.4 Removal Procedures 48
9.4.1 Screening Residential Clothing and Household Items 48
9.4.2 Removal of Mercury from Hard Surfaces 51
9.4.2.1 Physical Removal 51
9.4.2.2 Residual Treatment and Wash 52
9.4.2.3 Heat/Ventilation Cycles 53
9.4.2.4 Screen Interior Air Space 55
9.4.2.5 Optional Steps 56
9.4.3 Removal of Mercury from Carpeted Surfaces 57
9.4.4 Removal of Mercury from Wooden Floors 58
9.4.5 Removal of Mercury from Personal Items 59
9.4.5.1 Alternative Decontamination Methods for Porous Items 60
9.4.6 Removal of Mercury from Washers and Dryers 62
9.4.7 Removal of Mercury from Vehicles 62
9.4.8 Removal of Mercury in Plumbing 63
9.4.9 Removal of Dermal Mercury Contamination from Humans and Animals 63
9.4.10 Removal of Mercury from Soils and Other Outdoor Surfaces 64
9.4.11 Removal of Mercury Containers 68
9.4.12 Removal of Contaminated Soils and Sediments on Industrial Sites 68
9.5 Post-Cleanup Procedures 68
9.5.1 Air Sampling and Confirmation of Cleanup 69
9.5.2 Confirmation of Cleanup in Soils 69

9.6 Best Practices and Recommendations 69
9.7 Avoiding Common Mistakes 70
9.8 Regional Mercury Contacts 70
10 Disposal 71
10.1 Hazardous Waste versus Non-Hazardous Waste 71
10.1.1 Characteristically Hazardous Wastes 71
10.1.2 Household Hazardous Waste 72
10.1.3 Universal Waste 72
10.1.4 Non-Hazardous Waste 72
10.1.5 Listed Hazardous Wastes 72
10.2 RCRA Requirements 74
10.3 Transportation/Shipping 76
10.4 Disposal 76
10.5 Compliance with the Mercury Export Ban Act (MEBA) 78
11 Restoration, Replacement and Reimbursement 80
11.1 Restoration 81
11.1.1 Post Restoration Documentation 81
11.2 Replacement 81
11.3 Reimbursement 81
11.4 Demolition 82
12 Reoccupation 82
12.1 Obtaining Health Concurrence 82
12.2 De-List Letter from U.S. EPA 82
12.3 De-List Letter from Local Health Department 83
12.4 Assisting Residents in Reoccupying Homes 83
13 Responder Health and Safety 83
13.1 Personal Protective Equipment 84
13.1.1 Respirators 84
13.1.2 Gloves, Booties and Suits 86
13.2 Controlling Ingestion 86
13.3 Worker Exposure Levels 87
13.4 Health and Safety Plan 87
13.5 Responder Decontamination 88

Appendix A: ATSDR Chemical Specific Health Consultation and Suggested Action Levels 89
1.0 Introduction 89
2.0 Discussion 92
3.0 Conclusions 102
4.0 Recommendations 103
5.0 Appendices 104
Table 1: Suggested Action Levels for Residential Settings 104
Table 2: Suggested Action Levels for Other Locations 106
6.0 References 111
Appendix B: ERT SOP for Clearance Sampling 117
1.0 Scope and Application 118
2.0 Technical Approach 118
3.0 Responsibilities 120
4.0 Interferences 120
5.0 Equipment / Apparatus 121
6.0 Prerequisites: Pre-Operational Checks 121
7.0 Post-Remediation Procedure 122
8.0 Calculations 124
9.0 Quality Assurance / Quality Control (QA/QC) 125
10.0 Data Validation 125
11.0 Health and Safety 126
12.0 References 126
Appendix A: Hand-Held Mercury Vapor Analyzer Comparison Table 127
Appendix B: Mercury Spill Survey Testing Record 129
Appendix C: Mercury Spill Clearance Testing Record for SKC Hydrar Tube 131
Appendix D: Mercury Spill Clearance Testing Record for Direct-Reading Mercury Analyzer 133
Appendix C: Templates and Reference Documents 135
1. Action Levels for Evacuation of Work Zone Pending Reassessment of Conditions 135
2. Air Sampling Data Sheet 137
3. Air Sampling Decision Tree 138
4. Assessing Mercury Notifications: A Guide for OSCs 140
5. Consent for Entry and Access to Property 141
6. Contaminated Items Documentation Log 143

7. Daily Safety Meeting Record 144
8. Decontamination Plan Checklist 145
9. De-List Letter from Local Health Department 147
10. De-List Letters from U.S. EPA 148
a. Residence that was sampled but did not require decontamination 148
b. Residence that required decontamination 149
11. Equipment Supplies Checklist 150
12. Letter to Request U.S. EPA Assistance 152
13. Mercury Screening Form for Land or Structures 153
14. Post-Decontamination Team Checklist 155
15. Post-Evacuation Letter to Health Department 156
16. Public Outreach Documents 157
17. Residential Mercury Contamination Screening Checklist 161
18. Sample Relocation Letter 162
19. Mercury Specific Vacuum Comparison Table 163
Appendix D: Additional Mercury Resources 166
1. EPA 166
a. National Mercury Website 166
b. Regional Resources 166
c. Environmental Response Team (ERT) 167
d. Emergency Response Technical Group (ERTG) 167
e. Relocation Guidance 167
2. ATSDR 167
a. Chemical Specific Health Consultation and Suggested Action Levels 167
b. ATSDR Mercury Website 167
c. Toxic Substances Portal: Mercury 167
3. National Institute for Occupational Safety and Health (NIOSH) 167
4. Occupational Safety and Health Administration (OSHA) 168
5. American Conference of Government Industrial Hygienists (ACGIH) 168
6. Centers for Disease Control and Prevention (CDC) 168
7. Find a Recycling Center 168
8. Materials Safety Data Sheet (MSDS) for Mercury (Metal) 168
9. Companies that Recycle Mercury 168

10. Federal Hazardous Waste Regulations: 40 CFR 261.5(e) 168
11. Occupational Safety and Health Administration's Safety and Health Standard for protective gear: 29 CFR 1910.134 168
12. Comprehensive Environmental Response, Compensation Act's Reportable Quantities, Mercury Releases: 40 CFR 302.6 (b) 168
13. Mercury in Schools 169
Appendix E: Acronyms 171

Disclaimer

The U.S. Environmental Protection Agency (EPA) expects to update this Guidebook as needed to ensure that it reflects the most current available residential mercury cleanup technologies and best practices. While EPA will attempt to keep information in this Guidebook timely and accurate, the Agency makes no expressed or implied guarantees.

This Guidebook includes links to documents and information on non-EPA sites. Links to non-EPA sites and documents do not imply any official EPA endorsement of, or responsibility for, the opinions, ideas, data, or products presented at those locations, or guarantee the validity of the information provided. Links to non-EPA web sites and documents are provided solely as pointers to information on topics related to residential mercury cleanup that may be useful to EPA staff and cleanup contractors as well as state, county, and local responders.

1 Introduction

The United States (U.S.) Environmental Protection Agency's (EPA) National Mercury Workgroup was formed in 2011 with representatives from the Office of Emergency Management (OEM), all ten Regions, the Environmental Response Team (ERT), and the Agency for Toxic Substances and Disease Registry (ATSDR). Prior to the formation of this workgroup, several Regions and ERT had developed various types of mercury response guidance documents, including complete guidebooks with appendices, field guides, and fact sheets. Consistent with the National Approach to Response, the mission assigned to the National Mercury Workgroup was to develop a national residential mercury spill response guidebook for Federal On-Scene Coordinators (OSC) and EPA's Special Teams across the country.

1.1 Purpose of Guidebook

The National Mercury Guidebook is intended to be a nationally consistent, user-friendly guide that primarily addresses technical and administrative practices, specifically for EPA, for residential mercury responses, including:

- communicating with property owners and residents,
- identifying response resources,
- conducting initial assessment,
- determining the extent of contamination,
- conducting monitoring and sampling
- ascertaining action levels,
- determining mitigation options,
- establishing clearance/occupancy levels, and
- disposing of mercury waste.

The primary focus of the guide is residential response, though much of the information can be applied to mercury responses in schools and vehicles, as well as commercial mercury spills. There are also resources in the appendices for mercury cleanups of various types as well as links to mercury resources outside of EPA.

1.2 Intended Audience

The National Mercury Guidebook is designed for OSCs, but may also be used by state, county and local responders as well as cleanup contractors.

1.3 History of Action Level Development, Chemical-Specific Health Consultation for Joint EPA/ ATSDR National Mercury Cleanup Policy Workgroup: Action Levels for Elemental Mercury Spills, March 22, 2012

In 2000, ATSDR provided tables of action level guidelines for indoor air concentrations of elemental or metallic mercury in response to a request from both EPA and the state of Michigan. The action levels had previously been developed for individual sites and situations, but the tables summarized these guidelines in a succinct package for use by field personnel. The request was prompted by several small spills in homes caused by replacing or relocating natural gas regulators containing mercury. The guidelines were designed to help risk managers at spill scenes in homes or other locations specific to mercury gas regulators make decisions regarding cleanup, relocation, etc. A site-specific cleanup level for mercury gas regulators in residential settings was set at 1.0 $\mu g/m^3$ compared to the previously established "any use" residential action level of 0.3 $\mu g/m^3$. Since their publication in 2000, these guidelines have been widely disseminated by users. As mentioned above, the National Mercury Workgroup was formed by EPA to develop consistent cleanup guidance for mercury spills, including not only public health actions but also cleanup and sampling methods. As part of that effort, EPA requested that ATSDR update the 2000 guidelines to be included in a more comprehensive guidance. This health consultation, Chemical-Specific Health Consultation for Joint EPA/ATSDR National Mercury Cleanup Policy Workgroup: Action Levels for Elemental Mercury Spills, March 22, 2012, is hereafter referred to as the "health consultation."

The health consultation (found in Appendix A) provides detailed justifications for action levels based on the ATSDR Chronic Minimal Risk Level (MRL) and EPA Reference Concentration (RfC). The recommended action levels for mercury in residential settings were increased from 0.3 $\mu g/m^3$ to 1.0 $\mu g/m^3$ for normal occupancy and 10 $\mu g/m^3$ for isolation (e.g., evacuation, limited access) to limit or prevent exposure to the mercury. Action levels for settings other than residential (e.g., schools, vehicles) are also based on ATSDR and EPA toxicity factors and adjusted to account for specific conditions as well as the assumed frequency and duration of exposure. Sections that describe when action levels should be adjusted to meet site specific conditions are included. The most useful features of the 2000 tables have been retained; new sections have been added that address issues related to the tables that have recurred during the past 14 years. Additional information to help on-scene risk managers communicate risk is provided. Technological advances in detecting environmental mercury are also considered.

1.4 Forms of Mercury

There are three forms of mercury: elemental mercury (described below), inorganic, and organic mercury. Mercury and some types of mercury compounds are hazardous substances that can cause serious health problems. This guidebook focuses on elemental mercury rather than the potential hazards associated with inorganic and organic mercury compounds.

Elemental mercury, also referred to as metallic mercury, is a shiny, silver-white, odorless liquid that is used in thermometers and other medical and industrial instruments, thermostats, electrical switches, dental fillings, and is also used industrially to produce chlorine gas and caustic soda. Elemental mercury is also used in herbal and religious remedies associated within certain spiritual practices and folk remedies in Latin American, Caribbean, and Asian cultures.

Elemental mercury will volatilize at any temperature above -38°F and readily volatilizes at room temperature, creating an invisible odorless vapor. Since it volatilizes into the air, exposure to elemental mercury is mainly a concern for inhalation of vapors. This is of particular concern when elemental mercury is spilled in homes, where even a relatively small amount of mercury can result in the accumulation of high levels of mercury vapors in the indoor air. In addition, mercury can be easily tracked out to cause inhalation risks in other locations or to the environment.

As mentioned above, temperature has a profound effect on mercury vapor concentration. As a rough rule of thumb, mercury vapor pressures will double for every 10 degrees Celsius (°C) increase in temperature. As shown in Figure 1-1, the vapor pressure of mercury more than doubles between 50 degrees Fahrenheit (°F) and 68°F. If a structure where mercury was spilled were re-inhabited and heated to normal levels, mercury levels would increase to over 1 microgram per cubic meter (µg/m^3).

Figure 1-1: Properties of Mercury

Relative Vapor Density Air = 1	Freezing Point	Boiling Point	Vapor Pressure (mmHg)				
			0°C (32°F)	10°C (50°F)	20°C (68°F)	30°C (86°F)	40°C (104°F)
7	-38°F	674°F	0.000185	0.000490	0.001201	0.002777	0.006079

Source: CRC 1969

Key:
mmHg = millimeters mercury
°C = degrees Celsius
°F = degrees Fahrenheit

1.4.1 Mercury Diffusion in the Indoor Environment

Elemental mercury evaporates and spreads indoors in complex ways, which responders must understand in order to choose hypotheses and interpret measurements. First, responders must consider how much the mercury has been disturbed, since evaporation rate increases dramatically with increased disturbance (Figure 1-2). In addition, since mercury may not diffuse rapidly, detectors must be held close to surfaces that may contain mercury. Also, heating and ventilation will not effectively rid materials visibly contaminated with liquid mercury; a drop 3 millimeters (mm)

GENERAL RULE OF THUMB: *At temperatures above 60°F, the mercury concentration in the ambient air doubles for every 10 degrees of temperature increase.*

in diameter with a mass of 0.2 grams (g) would last at least three years indoors.

Figure 1-2: Effect of Disturbance on Evaporation of a Constant Total Volume of Elemental Mercury at 20°C

Number of Drops	Volume per Drop (cm^3)	Surface per Drop (cm^2)	Surface Total (cm^2)	Evaporation Rate (µg/h)
1	1	4.84	4.84	271
1,000	0.001	0.0484	48.4	2,710
10,000	0.0001	0.0104	104.2	5,835

Source: Euro Chlor 1998
Key:
cm^2 = centimeters squared
cm^3 = cubic centimeters
µg/h = micrograms per hour

In sum, elemental mercury can be challenging for responders because: (1) it is a liquid under conditions normally encountered and thus spreads and volatilizes rapidly, (2) it mixes with air slowly, and (3) relatively small temperature increases lead to relatively large increases in evaporation.

1.5 Description, Physical Properties and Classification of Elemental Mercury

Mercury (CAS# 7439-97-6, DOT# UN 2809, Hazard Class 8 (corrosive), chemical symbol Hg) is a metallic element. It is also known as quicksilver, azogue, or hydrargyrum. Mercury is a dense [13.534 grams per cubic centimeters (gms/c^3)], silver-white liquid at room temperature. Mercury droplets will not tarnish upon exposure to air at ordinary temperatures, but may have a thin black oxide or sulfide coating on the surface if exposed to heat. Unlike other metals, mercury can volatilize, having a vapor pressure under ambient conditions of 0.0012 millimeters (mm). This property presents the greatest hazard because mercury enters the human bloodstream more readily through inhalation of the vapor than through ingestion or skin contact.

Mercury vapor cannot be seen with the naked eye and is odorless to humans. **Please visit http://www.epa.gov/region7/mercury/educator_toolkit.htm and click on The Magic Metal by Ohio EPA (60-second version) to view a short video demonstrating mercury volatilization.** Small amounts of spilled mercury may produce enough vapors to reach hazardous levels in the immediate area of the spill. Liquid elemental mercury is insoluble in water by definition, however, it will continue to volatilize within the water column allowing for ecological and human uptake by ingestion. It is not flammable, but it may form toxic or explosive compounds at high temperatures. Mercury forms alloys, known as amalgams, with most metals except iron, often releasing large quantities of heat in the process.

Photograph 1-1

Due to the potential hazards posed by mercury, there are special regulatory requirements for the management and disposal of elemental mercury, mercury-containing devices, and items contaminated by mercury after a spill (see Chapter 10).

1.6 Sources and Uses of Mercury

Mercury is and has been used in a variety of manufactured products and manufacturing processes. Many applications have been discontinued in recent years because of the health hazards associated with using mercury.

Natural sources of mercury include volcanoes, hot springs, and ore minerals. Elemental mercury is rarely found in nature; most naturally occurring forms of mercury are organic or inorganic compounds. Industrial sources of mercury are present in industrial settings in the form of chemical intermediates and catalysts. It is used in chlor-alkali plants (chlorine and caustic soda manufacturing) and in the cement, ink, paper, pharmaceutical, leather, and textile manufacturing industries. Mercury is used in various mining operations, including gold extraction. Coal-fired power plants and copper and zinc smelters are significant sources of mercury releases to the atmosphere.

Fish and seafood are a significant source of ingested mercury, but this mercury almost always occurs as organic compounds.

1.6.1 Sources of Elemental Mercury

Metallic mercury is still used in household and workplace products including batteries, fluorescent bulbs, mercury arc lamps, and vapor lamps. Mercury lighting is used in advertising signs. Mercury can be used as a reflective coating for mirrors. Mercury is also used for motion-sensitive electrical switches such as those used for car alarms and light-up sneakers. Because these products are often discarded and disposed of as mixed waste, metallic mercury is also found in municipal incinerator ash, sludge, and landfill wastes.

1.6.2 Uses of Elemental Mercury

Many scientific and medical measuring devices use mercury gauges. These devices include thermometers, barometers, blood pressure measuring devices (sphygmomanometers), hydrometers, and pyrometers.

Mercury-containing instruments are found in hospitals and doctors' offices, industrial laboratories, and school laboratories. Some scientific instruments are equipped with mercury shutters. Mercury is also used in diffusion pumps and as a lubricant for turbines.

Although a variety of materials are now used for dental fillings, amalgam (mercury alloy) fillings are still common. These fillings release a small amount of mercury vapor into the mouth over a long period of

time. Dental workers bear a finite health risk because of their potential exposure to amalgam filling materials.

Mercury is also used in traditional religious practices and folk medicine, especially in certain areas of Mexico, the Caribbean, and in some Asian countries. Mercury is referred to as "azogue" in regions with Spanish-speaking populations. Within some Hispanic, Caribbean, and Asian communities in the United States, metallic mercury may be worn in sealed pouches, sprinkled in homes or automobiles, mixed with bath water or perfume, or placed in devotional candles to ward off evil spirits and bring good luck.

Use the following link for a list of companies that manufacture appliances (or components used in appliances) that contain mercury: https://imerc.newmoa.org/publicsearch/NEWMOA_IMERC.aspx#/CustomizedSearch. Use the following link for the Interstate Mercury Education and Reduction Clearinghouse (IMERC) mercury-added products database, which contains a summary of IMERC data for products, including legacy and novice products: http://www.p2rx.org/topichubs/index.cfm?page=subsection&hub_id=22&subsec_id=19.

1.6.3 Mercury in Products Raising Public Concern

As mentioned above, the focus of this guidebook is on residential mercury responses caused by liquid mercury. There are several other mercury sources causing public concern which OSCs are commonly asked to assist with. The three most notable are briefly described below and will not be addressed in detail in this guidebook. EPA has been asked to lend technical assistance in assessing these potential health concerns, but may not have the authority to go beyond assessment if the sources do not pose a threat to the environment. Other agencies may need to retain the lead on addressing potential health threats caused by these sources. A detailed discussion of EPA's authority to address mercury is provided in Section 3.3 of this guidebook.

1.6.3.1 Skin Cream

A growing number of referrals have been noted due to what is referred to as "skin lightening cream" that is generally imported into the United States. These creams generally have a high concentration of mercury that may cause an inhalation risk as well as the obvious dermal absorption risk. However, they are unlikely to cause a threat to the environment and may not be eligible to be addressed under CERCLA. For more information please visit the following websites: http://www.fda.gov/forconsumers/consumerupdates/ucm294849.htm

www.epaosc.org/Region9Training

www.epaosc.org/Hgcream

1.6.3.2 Compact Fluorescent Light Bulbs (CFLs)

The Energy Independence and Security Act of 2007 increased energy efficiency requirements (i.e., less energy use) for household light bulbs between 40 and 100 watts, leading to a significantly increase in the purchase of compact fluorescent light bulbs (CFLs) in the U.S. CFLs contain a small quantity of mercury and may initially cause an elevated concentration of mercury vapor in indoor air when broken. However, they are unlikely to cause a threat of release to the environment when broken indoors and may not be eligible to be addressed under CERCLA. For more information please visit: http://www2.epa.gov/cfl

1.6.3.3 Rubberized Gym Floors

Starting in the 1970s, rubberized material was commonly used in gym floors, tennis courts, multipurpose rooms, and playgrounds. Mercury was used in the polymerization process of these rubberized surfaces and as the flooring material weathers/ages, small concentrations of mercury vapor is released. The expected lifespan of these floors was generally considered to be 20-40 years. When those responsible for these floors began trying to remove and replace the worn material it was discovered that the material failed Toxicity Characteristic Leaching Procedure (TCLP) requiring it to be treated as a characteristic hazardous waste. EPA has provided technical assistance assessing rubberized floor removals over the years, but may not have the authority to conduct a removal action of the material as it generally does not pose a threat to the environment. For more information please visit:
http://www.atsdr.cdc.gov/HAC/pha/MilwaukeePublicSchool/MPSGymFloorMercuryHC12162010.pdf

2 Human Health Effects

Adverse human health effects can result from acute or chronic exposure to mercury. Even a small amount of mercury remaining in a room after a spill can continue to volatilize slowly over time, resulting in elevated concentrations of mercury vapor in the air, thus presenting the threat of chronic exposure. Refer to Appendix A for specific information from ATSDR's Chemical Specific Health Consultation.

2.1 Pathways of Exposure

Mercury can enter the body through three pathways: ingestion, dermal absorption, and inhalation. Inhalation of mercury vapor poses a great risk to health and safety because mercury is absorbed more rapidly through the lungs than through the digestive tract or skin. Metallic mercury is highly lipophilic (has a high affinity for body fat) and is absorbed almost completely by the lungs upon inhalation. Inhaled mercury enters the bloodstream, where it can accumulate and stay in the kidney and brain for weeks or months.

Dermal absorption is much slower than inhalation, but mercury exposure may produce skin irritations and allergic reactions. Absorption by ingestion is much slower than for inhalation. Ingested mercury does not enter the bloodstream easily, and is mostly expelled in the feces. Mercury is also expelled from the body via exhalation, saliva, bile, and sweat.

2.2 Symptoms of Exposure

Adverse human health effects can result from acute or chronic exposure to mercury. Mercury absorbed through the lungs, gastrointestinal tract, or the skin can accumulate in the brain and kidney, and it is excreted slowly from the body. Because mercury can accumulate in the kidneys, the kidneys are particularly sensitive to damage. Another danger posed by mercury spills is the contamination of soil, which volatilizes into the atmosphere and returns as rain that enters the water systems. This can contaminate water bodies, which will in turn increase the level of mercury in fish. Pets can also be affected by mercury exposure in ways similar to humans. They can also track mercury to humans, residences, and the environment. Veterinarians can provide additional information on health effects to pets resulting from mercury exposure.

2.2.1 Acute Health Effects

Acute mercury poisoning can produce a wide variety of symptoms. These include irritation and burning of the skin and eyes, skin allergies and hypersensitivity, including a condition known as acrodynia, or pink disease. Acrodynia is a syndrome characterized by red peeling skin, especially on the hands, feet, and nose. Exposure may also include symptoms such as weakness, fretfulness, sleeplessness, excessive salivation or sweating, itching, swelling, fever, memory loss, and elevated blood pressure. Exposure to mercury vapor may also produce kidney damage and symptoms of respiratory distress, including lung irritation with coughing, sore throat, chest pain or chest tightness, shortness of breath, pulmonary edema (excess fluid buildup in the lungs), which may later turn into bronchitis, and, after repeated high exposure, pneumonitis (scarring of the lungs). Mercury poisoning may lead to chemical pneumonia, which can be fatal. Acute mercury poisoning can also produce symptoms of neurological damage, including tremors, insomnia, headache, irritability, lassitude (weakness, exhaustion), sores inside the mouth (stomatitis), salivation, colic (stomach cramps), and disturbances in vision. Like many metals, mercury also concentrates in the kidneys and kills kidney cells. Victims may also experience a metallic taste, abdominal pain, diarrhea, nausea, and vomiting. In the most severe cases, mercury exposure can result in death.

2.2.2 Chronic Health Effects

Chronic mercury poisoning may develop gradually without conspicuous warning signs as mercury accumulates in body tissues. Symptoms of repeated exposure include anxiety, excessive shyness, anorexia (weight loss), insomnia, loss of appetite, irritability, fatigue, forgetfulness, tremors, changes in

vision and changes in hearing. The symptoms of acute and chronic mercury poisoning are listed in Figure 2-1.

Figure 2-1: General Symptoms of Mercury Poisoning

Acute Mercury Poisoning	Acute Mercury Vapor Poisoning	Chronic Mercury Poisoning
• Irritation & burning of the skin/eyes • Fever • Colic • Skin allergies & hypersensitivity • Memory loss • Disturbances in vision • Acrodynia • Elevated blood pressure • Metallic taste • Weakness • Tremors • Abdominal pain • Fretfulness • Insomnia • Diarrhea • Sleeplessness • Headache • Nausea • Excessive salivation/sweating • Irritability • Vomiting • Itching • Lassitude • Swelling • Stomatitis	• Kidney damage • Pulmonary edema • Lung irritation with coughing • Bronchitis • Sore throat • Pneumonitis • Chest pain or tightness • Shortness of breath	• Anxiety • Irritability • Changes in hearing • Excessive shyness • Fatigue • Weight loss • Forgetfulness • Insomnia • Tremors • Loss of appetite • Changes in vision

2.2.3 Health Effects for Pregnant Women and Children

Mercury exposure is of particular concern to pregnant women because mercury readily passes across the placenta and can accumulate in higher concentrations in the developing fetus. Young children are

also susceptible to the effects of mercury because it affects the central nervous system, which is still developing in the first few years of life. Even low levels of mercury exposure have been associated with learning problems in children.

2.3 Physical Damage from Exposure

Chronic and acute mercury poisoning can produce irreversible physical damage to the kidneys, lungs, spinal cord, and central nervous system. Mercury poisoning has not been shown to cause cancer in animals, but it produces a variety of other types of damage, often irreversible. Victims may experience digestive disturbances, skin irritation, eye damage, leg cramps, loss of sensation around the lips, ataxia (inability to control voluntary muscle movements), and/or tunnel vision.

2.4 Sampling for Exposure

Breath, tissue, or hair samples may be taken to assess mercury uptake. In the occupational setting, the ACGIH Biological Exposure Indices (BEI®) recommend the collection of blood or urine samples (biological sampling) if significant mercury exposure has or is presumed to have occurred. For workers exposed to mercury on the job, samples should be taken prior to exposure, if possible, to establish baseline values. Because the half-life of mercury in blood is 2 to 5 days, it is important to immediately monitor actual or suspected mercury exposures rather than waiting for the annual physical. If blood mercury levels exceed 15 µg/L, the responder should be removed from the work site and put on non-hazmat duty until medical supervision determines that the worker may return to duty. If it has been more than a few days since exposure to mercury, a 24-hour urine sample is generally considered a better sample for evaluation. It is essential to coordinate with and rely on experienced medical personnel to make biological sampling determinations.

2.5 First Aid for Exposure

It is important to move the mercury-exposed victims to fresh air. If necessary, call emergency medical services. The victim’s exposed skin should be washed thoroughly with soap and water. If the victim's eyes have been in contact with elemental mercury, the eyes should be flushed with water for at least 20 minutes. Consult health officials to determine if medical follow up is warranted. Victims may want to consult with their physician.

Rescuers are not directly at risk from individuals exposed to mercury vapor, although contaminated clothing can expose rescuers through direct contact or off-gassing of mercury vapor.

3 Initiation of the Response

3.1 Investigating Agency

The investigation phase of a mercury response is generally conducted by the agency first notified of the spill (often the local health department, state environmental protection agency, and/or EPA). Whenever possible, the local health department should be consulted and/or included in the initial investigation of a spill. However, local health departments do not always have the resources for extensive involvement in such efforts. In some cases, the environmental program of the state health department is better positioned to respond to environmental health issues such as mercury spills. County emergency management agencies and/or local fire departments may also be able to support mercury responses.

3.2 Role of Public Health Department

The role of the public health department is to determine: (1) if potentially exposed individuals should be referred for clinical assessment, (2) if biological testing should be conducted, and (3) whether to post a residence "Unfit for Human Habitation". The public health department can potentially arrange for biological and medical testing and interpret the results. The public health department may also assist in determining whether relocation is needed and should be consulted on cleanup levels. The health department may also conduct health education and outreach. Health departments at the Federal, state, and local levels will determine their respective roles in these tasks, as well as issue alerts and help to establish legal authority for actions when needed. Because they are best positioned to know and access local resources, the local health department should be informed of all activities and should be involved to the extent possible. Some local and state health departments have tools (e.g., mercury vapor analyzers) to conduct initial assessments at sites of suspected mercury spills.

3.3 EPA Response Authority to Mercury Spills

Authority under the National Contingency Plan provides that EPA can respond to a spill only when a release or threatened release to the outdoor environment is documented. When state or local resources are not available to fully address a mercury response, EPA can provide technical assistance and mobilize assets to support the response. EPA does not typically respond to breaks involving thermometers or thermostats; local or state assistance should be available for those situations. In general, small releases (e.g., broken thermometers and thermostats) can be addressed through technical advice to the resident, property owner, and/or responding agency/entity over the phone. The Duty Officer or EPA OSC should provide the spiller or responding agency/entity with information

EPA often receives phone calls regarding broken CFLs. EPA established a help guide for those situations that can be found at: www.epa.gov/cfl.

about the proper cleanup and disposal of mercury and mercury-contamination materials. This information can be found at www.epa.gov/mercury/spills. Many retail stores carry cleanup kits for small residential mercury spills.

An uncontained spill larger than one pound (approximately two tablespoons) that has gone off site requires a notification to the National Response Center (NRC), (800) 424-8802.

3.4 Request for EPA Assistance

When the investigating agency recognizes that the mercury situation likely poses a risk to human health and the environment, rapid assessment of the spill should be conducted. If EPA response is requested, the request for assistance should initially be made verbally. A documentation of request should follow and should be included in the Administrative Record when preparing an Action Memorandum if a removal action is to be conducted. Examples of request letters are provided in Appendix C.

4 OSC Initial Response

Suggested practices of responding OSCs include but are not limited to those described below. Each response is unique, and OSC practices are based on various plausible scenarios. When EPA is the lead, the OSC should serve as the liaison to the property owners during the entirety of the response.

Good communications with all parties is imperative. Information on the threats of mercury and its physical properties, explanation of access agreements, air monitoring results, and plans for a removal action should be discussed with the affected parties.

In advance of any action, EPA should advise local responders or the investigating agency of the following:

- Persons in the spill area should be advised not to remove any mercury from the spill site and, if possible, to isolate known impacted areas (close doors).
- Remove shoes if they are likely to be cross-contaminated.
- Do not attempt to clean up the mercury without expert support or guidance.
- Under no circumstances should anyone attempt to vacuum a mercury spill.

4.1 Before Leaving the Office

4.1.1 Initial Coordination

After gathering relevant situational information, the OSC or phone Duty Officer will initiate appropriate response measures, including coordination of internal and external notifications. If warranted, EPA will mobilize its Superfund Technical Assessment and Response Team (START) to assist in assessment,

monitoring and documentation. The OSC will coordinate the development of a site health and safety plan.

4.1.2 Other Response Support Sources

Technical assistance may also be provided by EPA Special Teams. Contact other response support sources if necessary:

1. ERT (24 hours/day) 732-321-6660
2. CDC 770-488-7100 (State that you are with EPA and ask to speak with the CDC Duty Officer, or contact your regional ATSDR representative)
3. State emergency response program/agency
4. County health department/emergency management agency
5. START
6. Emergency and Rapid Response Services (ERRS)
7. Other OSCs with mercury experience (please refer to the contact list under the documents link at http://www.epaosc.org/site/site_profile.aspx?site_id=6544)
8. Regional public affairs (Community Information Coordinator (CIC) or Press Officer)
9. U.S. Coast Guard Strike Team

4.1.3 Other Appropriate Response Resources

Although not inclusive, the following is a list of physical resources that may be needed:

1. Personal Protective Equipment (PPE): chemical protective clothing, booties, gloves, air purifying respirator (APR), Mercury vapor cartridges, and self-contained breathing apparatus (SCBA) air packs, in addition to your personal response gear bag. Refer to Section 13.1 for more information on PPE.

2. Monitoring equipment: mercury vapor analyzer, multi gas indicator, and radiation meter.

3. Cleanup equipment (partial list): flashlight, tents, chairs, tables, heaters, thermometers, thermo-gun temperature meter, and exhaust fans with filters, mercury vacuum, zinc or sulfur cleanup compounds. START and/or ERRS can supply this equipment.

4. Data management tools (e.g., spreadsheet for personal items, laptop, camera, video camera). These tools can be supplied by START.

5. Guidance and mercury-specific documents

4.2 Arriving at Spill Location

4.2.1 Conduct Responding State/Local Agency Debrief and Interview Property Owner

Ask questions to determine the following (this is not an exhaustive list):

1. How did the spill occur, including estimated volume and time since spill occurred?
2. Was a cleanup attempted?
3. How was the cleanup conducted?
4. What actions have been taken, including instruments used?
5. Who handled the spill or who was present during the spill?
6. Where did the mercury originate?
7. Where was the mercury detected?
8. Was the mercury taken to another location?
9. Was the mercury container opened or was the mercury handled anywhere else?
10. What is the number, ages, and ethnicities of people living in the home (understand sensitive populations: ATSDR will ask for this information if you call them)?
11. For businesses or schools, has a qualified environmental cleanup contractor been contacted? If so, does the contractor have mercury cleanup experience?

4.2.2 Obtain Signed Access Agreement

Photograph 4-1

Before EPA conducts an environmental reconnaissance or environmental sampling in the home, residents, including owners and tenants of the home, must grant access to EPA. Written agreements, signed by the residents, should be obtained whenever possible. Written agreements allow EPA and its contractor(s) to enter the residence or building and conduct air sampling to determine the extent of contamination. If cleanup becomes necessary, additional access agreements must be obtained.

Access agreements are typically obtained by EPA OSCs, CICs or Office of Public Affairs personnel. In some cases, state EPA representatives have assisted

in obtaining access agreement signatures. Sample EPA access agreements are provided in Appendix C. Depending on the scenario, there could be one access agreement for the assessment and a separate agreement for a removal, or there could be one access agreement that combines the assessment and removal.

4.2.3 EPA Accounting Practices

If the mercury spill is from a single source, EPA generally uses one accounting string. However, when multiple homes or schools are impacted and action levels are exceeded, individual Regions may decide to form multiple operational units. In this case, multiple site accounts would be established. When contractors are utilized, it is necessary to track individual spill locations regardless of EPA accounting strings.

4.2.4 EPA Enforcement Considerations

Under CERCLA, the owners of a contaminated property are considered responsible parties. In addition, residential spills are often caused by building occupants. Responsible parties are expected to take responsibility for the cleanup under EPA's "enforcement first" policies. There are three common situations that EPA encounters with indoor mercury responses related to enforcement (i.e., "who pays?"):

1. Spill in an active commercial building. Spills that occur where viable businesses exist are classic enforcement situations where the owners/operators in the building are expected to take action and/or hire a contractor to clean-up the spill. Often, EPA provides technical assistance to ensure proper safety and clean-up practices are conducted.

2. Spill in a residence where the occupants are renters. In owner/renter situations, EPA considers the owner of the building a responsible party and a viable business. As such, the owner should take responsibility for the cleanup. In some situations, the owner may claim to be non-viable and unable to fund the cleanup. EPA should then ensure all standard enforcement practices are conducted while addressing any emergency actions. This can be a challenging coordination situation, especially if the occupant of the dwelling caused the spill.

3. Spill in a residence where the occupants are the owners. When spills occur in homes that are owned by the occupants, enforcement coordination is straight-forward. In most cases, the spill was caused by the actions of the occupants. EPA's enforcement team should do a rapid review of the occupants "ability to pay". Usually, the occupants will demonstrate that they do not have the means to take on a cleanup that will cost tens of thousands of dollars. In these cases, EPA will fund the cleanup. The OSC should ensure that the occupants understand that EPA will do a thorough review of their ability to pay and may pursue reimbursement. In addition, the

OSC should inform the owners, when they are the responsible party, that the amount of replacement/reimbursement will be limited (see Chapter 11 for more information).

In all cases, insurance may be an option to fund a cleanup action. The OSC should discuss this possibility with the responsible parties. Most residential insurance policies specifically exclude spills of hazardous materials. However, in some cases the insurance companies take responsibility for their policy holders, even when hazardous materials exclusions exist.

4.2.5 Public Outreach and Information

Mercury spills often become newsworthy events, especially when schools are involved and where one spill results in multiple residences being affected. Even with small spills that may affect only one property or dwelling, if the media becomes aware, there is a good chance that news organizations will cover the story and reporters may appear on-scene. Responding OSCs should be prepared to engage community outreach support resources and ensure that Community Involvement Coordinators (CICs), and public affairs specialists are knowledgeable on the unique features of responding to elemental mercury spills.

For small spills, the OSC will often handle the community involvement responsibilities, if needed. For large, complex responses, CIC support is integral to ensure the public receives accurate information quickly. Integrating local emergency management and public health specialists is also important to assisting with outreach. In many cases, the source and extent of the mercury contamination may be unknown. A robust outreach approach may be the key to gathering information and ensuring all potentially contaminated properties are identified.

When a residential property is identified as being contaminated, it is critical to not only explain the details of the spill, threat, and cleanup; but, also to provide written information to the residents to ensure that they have and understand all of the details.

Finally, if media interest is high, the OSC should notify the Regional Public Affairs Office to discuss how it plans to approach and manage dissemination of public information.

Examples of public outreach documents can be found in Appendix C.

5 Initial Assessment and Screening/Sampling of Air with a Handheld MVA

There are currently several methods used to measure mercury concentrations in air including draeger tubes, air samples with laboratory analysis, passive samplers with laboratory analysis, indicator powders, and the hand-held mercury vapor analyzer (MVA). Most recently, the common method for EPA personnel and EPA contractors is using the MVA, followed up with confirmation air samples analyzed by NIOSH 6009 lab analytical. Recent technological advancements and extensive experiences with MVAs have led to laboratory equivalent results now being achieved with the handheld

instruments. Actions and decisions can be based solely on the MVA readings, as long as proper methods and procedures are followed. Within the past ten years, all EPA regions purchased Lumex 915+ MVAs, although several other MVAs are available and are in use in the Regions. See Figure 5-1 for a comparison of MVAs.

Figure 5-1: Comparison of Real-Time Monitoring Instruments

INSTRUMENT	JEROME 431	JEROME J505	NIPPON MERCURY/EMP-1	VM-3000	TRACKER 300IP	LUMEX RA-915+	LUMEX RA-915+ Light
Manufacturer	Arizona Instrument LLC	Arizona Instrument LLC	Nippon Instruments Corporation, Japan	Mercury Instruments GmBH, Germany	Mercury Instruments GmBH	Lumex, Russia	Lumex, Russia
Distributor	Arizona Instrument LLC	Arizona Instrument LLC	Brandt Instruments Inc., LA	ST2 Service Technologies, Inc., CO	ST2 Service Technologies, Inc., CO	Ohio Lumex Co., OH	Ohio Lumex Co., OH
Units	mg/m^3	ng/m^3, $\mu g/m^3$, or mg/m^3 user selectable	mg/m^3	$\mu g/m^3$	$\mu g/m^3$	ng/m^3	ng/m^3
Range	Zero to 0.999	0.05 - 500 $\mu g/m^3$	Zero to 0.999 1 to 5.00	Zero to 100 Zero to 1000 Zero to 2000	0.1 to 100 0.1 to 1000 0.1 to 2000	20 to 20000 (multi-path cell) 500 to 200000 (single-path cell)	
Methodology	Change in resistance of gold after mercury absorption	Atomic Fluorescence Spectroscopy (AFS)	Ultraviolet absorption “cold vapor measuring technique”	Ultraviolet absorption “cold vapor measuring technique”	Cold Vapor Atomic Absorption Spectroscopy (CVAAS)	Zeeman Atomic Absorption Spectrometry, High Frequency Modulation of Light Polarization	Zeeman Atomic Absorption Spectrometry, High Frequency Modulation of Light Polarization
Accuracy (%)	5	+/- 10% @ 1 $\mu g/m^3$	5		NA	+/-20%	
Detection Limit	0.003	0.01	0.001 (low range) 0.01 (high range)	0.1	0.1	2	
Response Time	10 seconds	28 sec (Standard Mode) 16 sec (Quick Mode) 1 sec (Search Mode)	Instantaneous and 5 minute averages	1 second	1 - 16 sec (programmable)	1 - 255 sec (programmable)	
Wavelength	Not applicable	254 nm	254 nm	253.7 nm	253.7 nm	254 nm	
UV Source	Not applicable	Info not available	Low pressure Hg discharge lamp	Electrodeless Hg low pressure lamp	Electrodeless Hg low pressure lamp	Glow discharge mercury lamp	
Stabilization	Not applicable	Info not available	Reference beam	Reference beam and thermal	Reference beam & thermal	light polarization	

INSTRUMENT	JEROME 431	JEROME J505	NIPPON MERCURY/EMP-1	VM-3000	TRACKER 300IP	LUMEX RA-915+	LUMEX RA-915+ Light
Optical cell	Not applicable	Info not available	Info not available	Fused silica, 25 cm long	Fused silica, 25 cm long	Multi-path cell, 10 meter equivalent	
Heating of cell	Not applicable	Info not available	Info not available	70°C	70°C	Info not available	
Pump	0.75 L/min	1 L/min	1.5 L/min	Membrane, 2 L/min	Membrane, 2 L/min	>15 L/min	
Filter	Yes	Info not available	Glass wool	PTFE, 1 µ, 47-50 mm diameter	PTFE 1: 47-50 mm diameter	Yes	
Calibration Method	Manual	Factory Calibrated	Automatic, using an absorber	Factory	Factory calibrated (using MC-3000 Mercury calibration). The operator can recall actual calibration factor and enter a new calibration	Factory calibrated. Calibration parameters inaccessible to users.	
Interferences and Correction		Chlorine, ammonia, humidity/ water vapor, gasoline			Benzene, Acetone, Carbon Tetrachloride, SO2, NO, NO2, Aromatic Hydrocarbons, Dust	Info not available	
Power	115 V or 230 V	12V DC Power Adaptor	None	230 V / 50/60 Hz or 110-120 V / 50/60 Hz optional	230 V/ 50/60 Hz or 110-120 V / 50/60 Hz optional	220 V, 50 Hz or 110V, 60 Hz, 20W	240/110 VAC, 50/60 Hz, 12 VDC
Battery	Internal Ni-Cd batteries, (5 hr capacity)	Internal Ni-Metal_Hydride (24 hr capacity)	Integrated rechargeable battery (11 hr capacity)	Integrated 12 V batteries, (6 hr capacity)	Internal Ni-Metal-Hydride (6 hr capacity)	Built-in 6V, 6-12V DC (optional)	
Weight	2.3 kg	6.5 lbs (3 Kg)	4.2 kg	Approx. 7 kg	15.5 lbs (7 Kg)	7.5kg	3.3 kg
Dimensions (L x W x H)	15.6 x 33.8 x 10.4 cm	30.5 x 15.8 x 21.3 cm	11.3 x 23.8 x 25.6 cm	45 x 15 x 35 cm	45 x 20 x 31 cm	46 x 21 x 11 cm	29 x 21 x 11 cm

INSTRUMENT	JEROME 431	JEROME J505	NIPPON MERCURY/EMP-1	VM-3000	TRACKER 300IP	LUMEX RA-915+	LUMEX RA-915+ Light
Communication Interface		USB		RS-232	RS-232	RS-232	
Data Logging Number of Readings		Internal 10000			Internal 15000	External with PC Control	

For simplicity, this chapter describes the field use of a Lumex 915+ MVA, from the initiation of a mercury spill response through post-cleanup final clearance of a contaminated area. These same methods and procedures should be followed regardless of which instrument is used. The chapter is broken down into the following sections:

- General Discussion
- Initial Screening
- Screening of Contaminated Items
- Monitoring During Cleanup
- Clearance Screening/Sampling

Some sections will be further broken down by location whether residential, non-residential, vehicle, or outdoors.

The purpose of using the Lumex and other MVAs is to measure the levels of mercury in air, and to use that data to make near real-time health-based decisions on the need for cleanup of property and possessions, or the relocation of occupants. The basis for comparison of the mercury levels in air is the ATSDR/EPA Health Consultation (see Appendix A) that established agreed upon action levels for elemental mercury spills.

5.1 MVA Startup and Performance

"Bump" Test: *A practice OSCs commonly use in the field to verify an instrument is responding to the presence of mercury. Response personnel that have mercury amalgam dental fillings can gently allow the MVA to test air from inside the mouth. Care should be taken when conducting a bump test to try not to saturate the instrument with humidity. A bump test should not replace the equipment manufacturer's calibration or internal test procedures.*

This section will describe common aspects of almost all mercury responses with respect to mercury vapor detection. Before using an MVA review the manufacturer's user guide, the EPA ERTG Equipment Operating Guide (EOG), and Quick Start Guide (QSG) for the appropriate model MVA. Generally speaking, there is a minimum warm up period for all MVAs which may vary by model. The warm up period may be shorter on a warm day and longer on a cold day. Proper field calibration or an internal test should be performed daily according to manufacturer's specifications. Results should be documented in the equipment logbook as well as the site logbook. For the Lumex 915+ MVA, there is a calibration "check" that is required prior to using the instrument. The calibration "check" is a test that can be performed in the field. The Lumex has a built-in mercury test cell which can be tested to ensure that the unit is operating properly. The test cell contains a mercury source, and if the relative deviation (R) of the measured value of the mercury vapor concentration in the test cell equals less than 25%, the device is ready for operation.

When performing this test, the results need to be recorded in the site logbook to document that the data being accumulated by the instrument are valid.

Environmental factors may affect the performance of instruments, including humidity and temperature. Although several manufacturers do not consider humidity an interference with their instrument, experience has shown that faulty readings (generally false positive readings) are common with high humidity levels or quick increases in humidity. Temperature is also not considered an interference by most manufacturers, but field experience demonstrates that erroneous readings related to temperature changes may occur. Erroneous readings can occur with quick changes in the temperature of the instrument itself, which is attributable to not allowing the instrument to acclimate to the desired temperature at which the instrument will be used. This commonly occurs during the summer months when an instrument has been sitting in a very warm vehicle and then is taken into an air conditioned building and is not given time for the delicate electronics to acclimate to the new temperature. It can also occur when background reading are taken outdoors at one temperature, and then the instrument is quickly moved indoors at another temperature resulting in a significantly different temperature of air (generally anything greater than 15°F difference) being drawn through the instrument. Readings should stabilize and provide accurate information within 15 minutes or less. Additional possible interferences that have been noted by experienced response personnel to cause erroneous readings are tobacco smoke, extremely dusty environments, pet litter boxes, and cleaning supplies under kitchen sinks and on storage shelves. These may be actual mercury detections or interferences but are unlikely to be attributable to any mercury releases that EPA would be responding to. It should also be noted that the carrying case and strap for most MVAs are porous and can easily become contaminated. Elevated readings could come from the carrying case and strap from a previous response and should be checked regularly.

During calibration testing of the Lumex 915+, if the instrument R(%) is not below 25%, the instrument should not be used for decision-making purposes. Check the manufacturers' recommendations and allow the instrument to continue warming up before trying to re-calibrate. It may be necessary to change out the multiple filters that are on the intake side of the instrument. If calibration testing continues to exceed 25% after several hours, it may be necessary to send the unit back to the manufacturer for calibration and checking of the internal optics.

5.2 Initial Screening

Prior to any initial screening, anyone with knowledge of the spill should be interviewed in detail so that as much information is known before entering the mercury contaminated area. This interview will also help estimate the magnitude of the spill and how far it has potentially spread so that a determination can be made as to whether additional personnel and equipment resources might be needed.

Initial entries are not intended to be full assessments of the spill but are intended to:

1. Verify that there is visible elemental mercury released,
2. Estimate whether the spill would be considered small, medium, or large and whether the extent of the spill is small or significant,
3. Measure the average concentration of breathing zone air to determine proper level of PPE and Health and Safety procedures
4. Determine whether relocation should be recommended, and
5. Verify that the spill has already or has the potential to be released to the outside environment (authority to conduct a removal action due to indoor mercury releases is explained in greater detail in Chapter 3).

5.2.1 Residential

After information gathering has been completed, the response team conducts an initial entry to verify conditions in the home. It is best if all occupants of the home, including free roaming pets, remain outside of the dwelling during the initial assessment.

In many mercury spill responses, the source, size, timing, and extent of the spill may already be known and all of these procedures may not be necessary (e.g., a known spill in a discrete room, a known thermostat release over a carpeted hallway). In general, temporary relocation should be recommended when the indoor air mercury vapor concentrations exceed 10 micrograms (µg)/cubic meter (m^3); EPA responders should upgrade from Level D when sustained readings exceed 25 µg/m^3. Action levels are fully described in Chapter 7 and Appendix A. If temporary relocation is recommended, refer to Chapter 8 for a detailed description of options; specifically, refer to Section 8.3 for immediate needs of the occupants.

Initial entry is almost always conducted in modified Level D (Level D with boot covers). It is highly recommended that all jewelry, especially gold jewelry, be removed before entering a potentially mercury-contaminated atmosphere. Boot covers should be used when entering the property to ensure that responders are not exacerbating the spill by tracking the mercury (and ensuring that dirt is not tracked into the residence). Experience has shown that mercury is one of the most easily tracked contaminants from foot traffic. Countless responders have spread mercury contamination by making hasty entries prior to establishing proper entry and exit routes and decontamination procedures. For initial assessments a dry decontamination process is recommended.

Document the instrument readings just outside the entry point and the initial readings when the door is first opened. Slowly proceed toward the suspected spill area, documenting readings in distinct living areas, until readings become elevated above a decision level (i.e., greater than 10 µg/m^3 for temporary relocation or greater than 25 µg/m^3 for upgrading from Level D to Level C PPE) or until visual confirmation of elemental mercury is made. At this point the five purposes of the initial screening listed above are generally accomplished.

NOTE: When assessing the mercury spill, DO NOT extend the intake of the MVA too close to the visible elemental mercury. There is no need to use the MVA to check the mercury vapor concentrations of visible mercury. The mercury vapor concentrations volatilizing from the elemental mercury can saturate the instrument and cause the instrument to operate improperly. This can cause internal contamination of the instrument and may result in having to send the unit back to the manufacturer for costly decontamination. Since near-surface measurements are used to estimate mercury on surfaces, responders must use consistent practices and consider all other factors that could influence the measurements (quantity of mercury on surface, temperature of surface, airflow between the surface and the instrument, and distance between the surface and the instrument).

Additional areas of focus during the initial assessment should include high potential contamination areas/items. These include high utilization areas (i.e., bedrooms, living rooms, etc.), trash cans, garbage cans, drains, washing machines and dryers, recently used footwear and shoe storage areas, and cleaning supplies such as vacuums, mops, and brooms. By the end of the initial screening, the OSC should be able to determine and establish the exclusion zone. This zone will change as the project progresses. If multiple homes or units are being assessed, the initial assessment may not include a detailed screening as described above; rather, a second entry team may conduct a more thorough characterization. Timing of this second screening is based on priority.

Ultimately it is important to know the concentration of mercury in the breathing zone; however, during an assessment and cleanup, it is generally best to monitor closer to the ground as mercury vapors are heavy and will hug the ground if undisturbed by air turbulence.

When the initial entry is complete leave the MVA in operating mode and screen uncontaminated ambient air outside of the hot zone. Compare the instrument's current readings with the pre-entry initial readings to verify whether instrument drift has occurred. A filter and/or tubing replacement may be necessary.

5.2.2 Non-Residential

Many initial screening aspects of non-residential mercury spill responses are conducted similarly to methods described in the residential section above. This section will focus on issues that need to be considered when addressing non-residential structures.

In many instances for a non-residential mercury spill, some form of cleanup may have already been attempted. It will be important to interview whoever conducted any cleanup attempts prior to conducting the initial entry.

Non-residential public buildings (i.e., schools, office buildings, etc.) tend to have higher foot traffic and even greater potential for contamination spread. Isolation of the spill area and anyone potentially affected as soon as possible will play a significant role in minimizing the spill area. Initial screening at a non-residential mercury spill will likely involve testing shoes and clothing of those that were potentially

impacted by the spill and probably isolated by the first responders. When screening shoes and clothes, each person's belongings should be placed into a separate plastic bag and labeled. Screening and custody of personal belongings is conducted as described in Sections 5.3 and 8.3. Alternative clothing or Tyvek® suits may need to be provided to people if clothing is contaminated. The team may need to contact employees and/or customers that may have cross-contaminated their vehicles or residences.

5.2.3 Vehicle

Initial screening of vehicles is generally conducted by placing the MVA hose into the breathing zone of the vehicle. If vapor readings show >3 – 6 μg/m^3, mercury beads are likely present in the vehicle (see Appendix A). If visible elemental mercury can be seen, a cleanup should be conducted. Once all visible mercury has been removed, shut all doors and windows in the vehicle for at least 30 minutes. The primary focus of a mercury spill in a vehicle is generally the seats and floor. Depending on the geographic location and season, it may be necessary to have the vehicle running with the heater 'on' in order to keep the inside temperature greater than 75°F so that any remaining mercury vapors can volatilize. If there is visible mercury, the mercury should be vacuumed and a mercury decontamination solution should be used to clean the floor and wipe down all other areas inside the car. The car should then be heated for 1 hour, vented for 1 hour, and then allowed to stabilize (vehicle turned 'off' with the windows closed) before re-screening with the MVA. The heating and venting cycle should be repeated if vapor levels are not below 3 – 6 μg/m^3.

5.2.4 Outdoors

If outdoor contamination is suspected or discovered, an initial visual survey should be conducted in the areas of interest. As with indoor spills, care should be taken not to spread the mercury by foot traffic. MVA use during outdoor spills is difficult due to many factors including temperature, wind, and mercury vapors not being confined and allowed to concentrate.

Historically, outdoor spills were assessed with an MVA by slowly and methodically walking the area with the MVA probe near the ground surface. Once elevated readings are discovered, samples should be collected in plastic bags and allowed to warm up in the sun. The headspace of each bag should then be analyzed with the MVA. This technique generally relies more on luck than science because vapors are not confined and can migrate in all directions. A more accurate and inexpensive technique for assessing the extent of an outdoor mercury release is using black plastic concrete mixing tubs (see photographs and description in Section 9.4.10).

5.3 Screening of Potentially Contaminated Items

As described above, potentially contaminated personal items will need to be screened to determine whether they require decontamination or they can be returned. The process of screening residential clothing and household items is described in Section 9.4.1.

Prior to initiating this process, a systematic approach to itemization, accountability, and photographic documentation should be developed as described in Section 9.1. This will ensure EPA is guarded against the loss or damage of personal items.

5.4 Monitoring throughout all Stages of the Response

There are two main purposes for frequent monitoring of mercury vapor concentrations throughout a response: (1) to verify that the correct level of PPE is being worn for the type of activities that are currently being conducted and (2) to identify remaining source areas or "hot spots." It should be noted that during a mercury spill cleanup, the physical process of moving elemental mercury and mercury contaminated material will significantly increase indoor air concentrations. For example, initial readings in a bathroom may have consistently read between 7 – 8 $\mu g/m^3$ leading one to think that Level D PPE would be sufficient. But in some cases, concentrations could easily increase to over 25 $\mu g/m^3$ during actual cleanup activities, which would warrant an upgrade in level of protection. It is common practice at many mercury cleanups to instigate engineering controls during the removal activities in order to alter the concentration of mercury in the breathing zone so that OSCs can downgrade from Level C to Level D PPE. The three most common ways are to: (1) significantly decrease the temperature in the area of contamination, (2) increase ventilation so that high-concentration indoor air is replaced with low-concentration outdoor air constantly (this is different than heating and venting techniques that are used as a final cleaning technique, which is discussed in Chapter 9), and (3) use a mercury vapor suppressant. Ventilation should not be conducted during source identification or during the confirmation clearance sampling process. Frequent monitoring throughout a response will verify if engineering controls are working properly.

5.5 Clearance Screening/Sampling

Once a thorough cleanup is conducted and a slow methodical MVA screening of the spill area is completed showing that readings are at or consistently below agreed upon action levels, final clearance screening/sampling can be conducted.

Integrated air sampling can be conducted in accordance with NIOSH Method 6009 (refer to Appendix B) or a modified NIOSH method 6009 (refer to Appendix B). There may be occasions when local health officials will refuse to release the site unless laboratory confirmation analysis is provided.

If clearance screening will be conducted with an MVA or multiple MVAs, follow the methods as outlined in Appendix B. These methods generally involve sealing off the area from outside influence and setting up the MVA at the appropriate height, and with the appropriate temperature for the appropritate duration of time to allow for laboratory equivalent results. Some MVA instruments have built in software that will allow for time weighted average (TWA) to be shown at the end of the sampling period while others have the data stored on the instrument, which requires downloading and entering the data into a spreadsheet so that the final TWA can be calculated. Generally, the longer the

period of sample collection, the greater the air sample volume, which results in lower detection limits. When multiple rooms are affected and there are a limited number of MVAs available, instruments should be set up in the rooms with the highest previous readings, where the spill originated, in the room of greatest concern (e.g., child's bedroom), or in room(s) in the home where maximum exposure to mercury vapor contamination would occur (such as bedrooms or the living room) after consultation with the local, county or state health official, ATSDR, or an EPA toxicologist.

6 Additional Media Screening, Sampling and Analytical Methods

During most mercury spill cleanups, air monitoring is conducted using a handheld MVA (see Chapter 5), but other equipment and sampling techniques may also be beneficial or required. This chapter describes additional screening methods and discusses collection and analyses of solid, liquid, and air samples, and investigation-derived wastes (IDW). Generally, data from these analyses are used for proper hazard classification, cleanup confirmation, and waste disposal purposes. Complete and proper documentation of relevant sampling-related information (e.g., locations, depths, field screening results, sample preservation) and appropriate chain-of-custody procedures for samples should be made in accordance with all applicable Standard Operating Procedures (SOP).

6.1 General Discussion

Analytical methods described in this chapter pertain only to determination of total mercury; however, mercury speciation analysis of environmental media may also occur to identify the distribution of organic and inorganic species of mercury. These data may be useful to determine the source(s) of a mercury release if unknown, and predict mobility and toxicity of mercury within the food chain of an ecosystem.

To ensure protection of workers, adherence to a site-specific Health and Safety Plan (HASP) is necessary for activities involving sampling and field screening techniques discussed in this chapter. In addition, proper handling of samples and sampling equipment, including proper decontamination of reusable sampling supplies, is critical to limit cross-contamination and to help ensure overall accuracy of analytical data.

6.2 Solids

Analyzing solid environmental media (e.g., soil, sediment, sludge, residue) for mercury may be necessary at the location(s) of a suspected release. These data would be used to identify a significant risk to human health or the environment that warrants cleanup. If visible mercury beads are observed in the media, cleanup will be necessary and should occur before follow-up screening/sampling to determine whether additional cleanup is needed.

6.2.1 Bulk Solids (soil, sediment, sludge, etc.)

Different methods of field screening and laboratory analysis may be appropriate for samples of bulk solids; however, choice of technique will depend on the level of accuracy required of the data. The following methods are listed in order of increasing data accuracy and include techniques involving equipment likely available for use at EPA sites. Other field screening equipment and methods may also be useful for certain applications, although supplies for those methods may not be readily available (or cost efficient) during emergency response activities.

6.2.1.1 Field Screening with MVA

Two methods of preliminary field screening of solid environmental media (e.g., soil, sediment) using an MVA are described as follows. The preferred method may depend on available resources and type of media being investigated (e.g., the procedure described below in Section 6.2.1.1.1 may not be appropriate for evaluation of submerged sediment).

6.2.1.1.1 In Situ Screening

If a release to soil or other solid environmental media is suspected, in situ screening using a handheld MVA may be appropriate initially to detect any mercury vapor levels above background. To determine the areal extent of contamination across an area of concern, a grid system may be established by placing a black, plastic bus tub upside down on the ground surface at each grid node (see Photograph 9-14 in Chapter 9). After placement of the tubs at the grid nodes, the investigator should allow at least 1 hour for any mercury vapors to collect within the tubs. Then the MVA can be used to screen the air beneath each tub by inserting the MVA probe into a small hole drilled in the tub (see Photograph 9-15 in Chapter 9). If bus tubs are not available, the area(s) of concern may be covered with plastic sheeting (with edges of the sheeting secured to the ground surface) to trap any mercury vapors beneath the sheeting. Allow at least 1 hour for any mercury vapors to collect beneath the sheeting before using the MVA (insert the MVA probe beneath the edge of the sheeting or through a small slit cut into the sheeting). If readings above background are observed at any location by either of these screening methods, conduct soil sampling for more definitive determination of mercury concentrations to determine whether cleanup of the medium is warranted. Note that weather conditions (extreme cold and lack of daylight) may affect the viability of this technique and the sampling process described in the next section may be more appropriate in these circumstances.

6.2.1.1.2 Sampling and Field Screening

Soil sampling (grab or composite) within the area of concern may be conducted to identify the extent of contamination. These samples may be collected using disposable stainless steel spoons, trowels, slide hammers, or other appropriate means. Approximately equal quantities of these samples may be placed in containers (re-sealable plastic (e.g., Ziploc®) bags, glass jars, etc.). After headspace vapors have been allowed to equilibrate for at least 1 hour, the investigator should screen the headspace of

each container using an MVA. Because of variations in matrices, moisture content, temperature, etc., accurate determinations of mercury concentrations within solid media cannot be achieved by this method, even if the samples are individually weighed in the field. This method is useful only to identify the extent of the contaminated area.

6.2.1.2 Sampling and Field Screening with Lumex RP-19C Attachment

A Lumex RP-91C attachment may be used in conjunction with a Lumex MVA to determine mercury concentrations within solid environmental media (e.g., soil, sediment, sludge) in the field. This instrument operates by heating a small aliquot of sample (about 50 milligrams [mg]) to approximately 800 degrees Celsius (˚C) to atomize any mercury in the sample before analysis with the Lumex MVA. Because this method includes instrumental calibration using a certified liquid or solid standard, accurate determinations of mercury concentrations in environmental media samples are achievable. The detection limit for this method is approximately 0.5 micrograms per kilogram (µg/kg) for total mercury. Prior familiarization with, and training on, use of the RP-91C is important to ensure (1) field users have adequate knowledge of all required equipment (e.g., RP-19C components, electronic balance, laptop with proper software, pipettes) and supplies (e.g., pipette tips, standards); and that (2) accurate results are obtained in the field. Use of the RP-91C attachment is detailed in an Equipment Operating Guide (EOG) that can be found at: http://www.epaosc.org/site/site_profile.aspx?site_id=0001.

6.2.1.3 Sampling and Laboratory Analysis

Collection of solid environmental media samples for laboratory analysis may be required to accurately determine the extent of contamination above an action level. This sampling may be warranted to determine whether cleanup is necessary, or to assess whether cleanup goals have been achieved following response activities. Sampling should proceed in accordance with established EPA SOPs (refer to Appendix B). During subsurface sampling within areas where elemental mercury may be present, care should be taken to avoid migration of spilled mercury to greater depths. Samples should be homogenized and placed into 4- or 8-ounce, wide-mouth, glass, or polyethylene containers. A summary of EPA-approved analytical methods for mercury in soils/bulk solids is included in Figure 6-1.

Figure 6-1: Analytical Methods for Bulk Solids

Method	Method Description	Method Detection Limit	Preservation	Holding Time
SW-846 7471B	CVAA	0.1 mg/kg	Store at < 4 ˚C	28 days
SW-846 7472	ASV	0.0004 mg/kg	Store at < 4 ˚C	28 days
SW-846 7473	TDAAA	0.0004 mg/kg	Store at < 4 ˚C	28 days
EPA 245.5	CVAA	0.1 mg/kg	None specified	28 days

Notes:

ASV	Anodic stripping voltammetry
CVAA	Cold-vapor atomic absorption
EPA	U.S. Environmental Protection Agency
mg/kg	Milligrams per kilogram
TDAAA	Thermal decomposition, amalgamation, & atomic absorption
˚C	Degrees Celsius

Although not all of the preceding analytical methods were developed specifically for EPA's Superfund Program, all of the listed methods have been approved for use on EPA-funded projects. Choice of the appropriate analytical method may depend on available sampling equipment, laboratory instrumentation, and the required detection limit. The analytical method may also be dictated if use of a Contract Laboratory Program (CLP) laboratory is necessary. Field duplicates, equipment rinsate blanks, field blanks, and background samples should be collected, if necessary, to meet site-specific goals, and as required by sampling-related Quality Assurance Project Plans (QAPP), Field Sampling Plans (FSPs) and SOPs, as well as by the selected analytical method.

6.2.2 Residue (surface dust/film)

In limited circumstances, collection of wipe samples may be warranted to evaluate the threat to human health presented by thin layers of mercury-containing dust, cosmetics, etc. Sterile gauze pads moistened with distilled/deionized water may be used for collection of the wipe samples. The area(s) wiped should be documented to enable determination of the mass of mercury per unit area (refer to the ERT SOPs in Appendix B). After sampling, each gauze pad should be placed into a clean, labeled container (e.g., 8-ounce glass jar), which should be stored in a cooler maintained at or below 4˚C until submitted to a laboratory for analysis. At least three media blanks of the wipe material (gauze pads) and one field blank (gauze pad dampened with distilled/deionized water) should be included with each sample set. Field duplicates may also be collected, as specified by sampling-related QAPPs, FSPs and SOPs. Wipe samples are typically analyzed by cold-vapor atomic absorption (CVAA) (e.g., EPA Method 7471B). The reporting limit for this method is 0.02 micrograms per wipe (refer to Appendix B for a list of EPA SOPs).

6.3 Liquids (groundwater, surface water, etc.)

If a mercury spill is suspected to impact liquid environmental media (e.g., groundwater, surface water), sampling for field screening or laboratory analysis may be warranted. Because of mercury's high toxicity and persistence, very small concentrations of it may pose a threat to drinking water wells, surface water intakes, and aquatic life. Sampling could involve collection from:

- Water hydrants, taps, or spigots into sample containers
- Streams, ponds, pools, sumps, etc., by dipping sample containers into those waters
- Greater depths of surface water bodies by use of discrete-depth water samplers
- Groundwater in temporary wells (installed by use of direct-push technology [DPT] equipment) through polyethylene tubing by use of a peristaltic pump, bladder pump, or foot valve
- Waste water from treatment facilities or impoundments

The following methods are listed in order of increasing data accuracy, and include techniques involving equipment likely available for use at EPA sites. Other field screening equipment/methods may also be used for certain applications, although supplies for those methods may not be readily available (or cost efficient) during emergency response activities.

6.3.1 Sampling and Field Screening with MVA

An MVA may be used to screen the headspaces of containers (jars or bottles) with liquid samples, after allowing at least 1 hour for mercury vapors to equilibrate within the containers. This technique will indicate only whether the liquid medium contains mercury (i.e., mercury that has volatilized into the container's headspace); it will not yield a concentration of mercury within the liquid medium. This procedure may be useful to determine whether sampling of liquids for more accurate field screening (see Section 6.3.2) or for laboratory analysis (see Section 6.3.3) is warranted.

6.3.2 Sampling and Field Screening with Lumex RP-91 Attachment

A Lumex RP-91 attachment may be used in conjunction with a Lumex RA-915+ or Lumex 915M MVA to determine mercury concentrations in liquid environmental media (groundwater, drinking water, surface water, etc.) in the field. This instrument operates by transferring an aliquot (1-2 milliliters [mL]) of sample to an impinger that contains a reducing agent which converts all forms of mercury in the sample to its elemental state; air is bubbled through the impinger and carried to the RA-915+ MVA for analysis. Because this method involves instrumental calibration using a certified liquid standard, accurate determination of mercury concentrations in liquid environmental media samples can be achieved. The detection limit for this method is approximately 0.5 nanograms per liter (ng/L) for total mercury. Note that prior familiarization and training on use of the RP-91 is important to ensure (1)

field users have adequate knowledge of all required equipment (all RP-19 components, laptop with proper software, pipettes, etc.), and supplies (pipette tips, standards, etc.); and (2) accurate results are obtained in the field. Use of the RP-91 attachment is detailed in an EOG included on the ERTG website (see Appendix D).

6.3.3 Sampling and Laboratory Analysis

Sampling of environmental liquids for laboratory analysis may be required to accurately determine concentrations of mercury for comparison to health-based standards or other action levels. Sampling should proceed in accordance with established EPA SOPs (refer to Appendix B). Samples should be collected in 1-liter, high-density polyethylene or glass bottles (except for analysis via EPA Method 1631E, for which samples must be collected in glass bottles or fluoropolymer bottles with fluoropolymer or fluoropolymer-lined caps). A summary of EPA-approved analytical methods for mercury in water/liquids is included in Figure 6-2.

Figure 6-2: Analytical Methods for Liquids

Method	Method Description	Method Detection Limit	Preservation*	Holding Time
SW-846 7470A	CVAA	0.2 µg/L	pH <2 with HNO_3	28 days
SW-846 7472	ASV	0.1 µg/L	pH <2 with HNO_3	28 days
SW-846 7473	TDAAA	0.1 µg/L	pH <2 with HNO_3	28 days
EPA 200.7	ICP-MS	0.2 µg/L	pH <2 with HNO_3	28 days
EPA 245.1/245.2	CVAA	0.2 µg/L	pH <2 with HNO_3	28 days
EPA 245.7	CVAF	0.005 µg/L	5 mL 12N HCl	28 days
EPA 1631E	CVAF (w/ pre-concentration)	0.0005 µg/L	5 mL 12N HCl or 5 mL BrCl solution	90 days
Standard Methods 3500-Hg B	CVAA	1.0 µg/L	pH <2 with HNO_3	28 days

Notes:

* Some laboratories may also require samples to be cooled to a specific temperature (e.g., < 4 ˚C).

ASV	Anodic stripping voltammetry
BrCl	Bromine monochloride
CVAA	Cold-vapor atomic absorption
CVAF	Cold-vapor atomic fluorescence
EPA	U.S. Environmental Protection Agency
HCl	Hydrochloric acid
HNO_3	Nitric acid
ICP-MS	Inductively coupled plasma-mass spectrometry
mL	Milliliters
N	Normal
TDAAA	Thermal decomposition, amalgamation, & atomic absorption
˚C	Degrees Celsius
µg/L	Micrograms per liter

Although not all of the preceding analytical methods were developed specifically for EPA's Superfund Program, all of the listed methods have been approved for use on EPA-funded projects. Choice of the appropriate analytical method may depend on available sampling equipment, laboratory instrumentation, and the required detection limit. The analytical method may also be dictated if use of a CLP laboratory is necessary. Collection of samples for analyses for both dissolved and total mercury may be warranted, especially for turbid liquids. Field duplicates, equipment rinsate blanks, field blanks, and background samples should be collected if necessary to meet site-specific goals, and as required by sampling-related QAPPs, FSPs and SOPs, as well as by the selected analytical method.

6.4 Investigation-Derived Waste

IDW from mercury spills may include recovered liquid mercury, used mercury vacuum filters, used cleaning/decontamination solutions, used personal protective equipment (PPE), and other discarded items that may be contaminated with mercury (e.g., clothes, bedding, paperwork, furniture, carpet). Disposal of recovered liquid mercury is addressed in Chapter 10. Sampling of other IDW for laboratory analysis may be required to coordinate proper disposal. Considerations for sampling and analysis of those materials are discussed in the following sections.

6.4.1 Solid Wastes

Typically, composite samples of solid IDW are collected for analysis for metals (including mercury) via the TCLP to determine leachability of metals from the materials when exposed to a mildly acidic extraction liquid typical of a landfill environment. Techniques for sampling this type of IDW must be adequate to enable collection of representative samples. Use of hand tools (e.g., scissors, saw, tin snips, utility knife) may be required to collect aliquots of the various materials comprising the IDW.

Field QC samples (e.g., field duplicates, equipment rinsate blanks) are not required by the TCLP method; however, these may be specified in site-specific QAPPs, FSPs or agency-specific SOPs. Proper disposal is described in Chapter 10.

6.4.2 Liquid Wastes

EPA SW-846 Method (1311) for the TCLP extraction specifies that if a sample is less than 0.5 percent solids, the filtrate may be analyzed as the sample extract. Therefore, liquid IDW samples meeting that criterion likely will not have to undergo the 18-hour extraction procedure. Because liquids are banned from land disposal anyway, TCLP analysis may not be the most appropriate analytical method for these types of media. Instead, analysis for total RCRA metals (including mercury) may provide the most useful data to coordinate proper disposal of the IDW. These results will help determine whether the liquid IDW can be disposed of at a publically owned treatment works (POTW) facility or by other appropriate means. Addition of a gelling agent to transform the IDW into a semi-solid material with no free liquids may also warrant consideration to facilitate disposal of the material at a landfill (after the solidified material has been sampled for paint filter analysis and for TCLP analysis as previously described).

Techniques for sampling this type of IDW must be adequate to enable collection of representative samples. Thieving rods or Coliwasas may be used to collect samples from drums or other containers, or sample jars may be dipped directly into the liquid if deemed appropriate to provide a representative sample of the liquid for disposal purposes. Field QC samples (e.g., field duplicates, field blanks, equipment rinsate blanks) should be collected as specified in site-specific QAPPs, FSPs or agency-specific SOPs.

Figure 6-3 lists analytical methods and associated sampling-related information regarding solid and liquid IDW.

Figure 6-3: Analytical Methods for Investigation-Derived Waste

Matrix	Description of Method	Analytical Method (SW-846)	Container	Preservation[a]	Holding Time
Solid Waste	TCLP	6010/6020, 7470A[b]	16-ounce jar (or larger)[c]	None	See below[d]
Liquid Waste (>0.5% solids)	TCLP	6010/6020, 7470A[b]	4-liter glass or plastic container	None	See below[d]
Liquid Waste (<0.5% solids)	Total RCRA Metals	6010/6020, 7470A[b]	2 1-liter glass or plastic containers	pH <2 with HNO_3	Mercury: 28 days Other Metals: 180 days

Notes:

[a] Some laboratories may also require samples to be cooled to a specific temperature (e.g., < 4 ˚C).

[b] Other acceptable analytical methods for mercury are listed in Section 6.3.3.

[c] If sample material is very lightweight (e.g., used Tyvek® coveralls, etc.) or cannot be packed tightly into a jar (e.g., elongated wood or metal fragments, etc.), additional sample volume should be collected (up to two 32-ounce jars per sample).

[d] Mercury: 28 days to extraction, 28 days after extraction to analysis

Other RCRA metals: 180 days to extraction, 180 days after extraction to analysis

HNO_3	Nitric acid
RCRA	Resource Conservation and Recovery Act
TCLP	Toxicity Characteristic Leaching Procedure
°C	Degrees Celsius
%	Percent

7 Exposure Limits

Several government agencies have established limits for various types of mercury exposure. Many of these limits deal with the chronic exposure of workers in industries that use mercury or mercury-containing devices. Other limits deal with the effects of acute exposure, such as those that might result from a mercury spill. Numeric values for cleanup and disposal purposes (e.g., soil) can be found in Chapters 9 and 10. A summary of environmental and occupational health standards is presented in Figure 7-1.

Figure 7-1: Environmental and Occupational Health Standards and Guidelines for Inhalation Exposure to Mercury Vapor

Agency	Mercury Concentration (µg/m^3) [1]
NIOSH IDLH	10,000
OSHA Ceiling Limit [2]	100
NIOSH REL [3]	50
ACGIH TLV [4]	25**
ATSDR suggested relocation Action Level	10
ATSDR suggested residential occupancy level*	1
ATSDR MRL [5]	0.2
EPA RfC [6]	0.3

** See* Final ATSDR Health Consultation *(March 22, 2012) for details regarding action levels (Appendix A)*

***EPA's health and safety practice is to upgrade to Level C PPE at or above 25 µg/m^3*

Notes:

[1] micrograms per cubic meter (µg/m^3)

[2] Ceiling Limit = exposure to the concentration of mercury vapor cannot exceed this limit at any time

[3] REL = Recommended Exposure Limit, a time-weighted average for an 8-hour day

[4] TLV = Threshold Limit Value, a time-weighted average for an 8-hour day

[5] MRL = Minimal Risk Level

[6] RfC = Reference Concentration

7.1 Mercury Inhalation Exposure and Vapor Limits

7.1.1 NIOSH

NIOSH has established 10,000 µg/m^3 as the concentration that is "immediately dangerous to life or health" (IDLH). The NIOSH Recommended Exposure Limit (REL) for mercury vapor is set at 50 µg/m^3 as an 8-hour time-weighted average (TWA), with a skin designation (indicating that skin exposure should be prevented).

7.1.2 OSHA

OSHA's legally enforceable ceiling limit for workplace exposure is set at 100 micrograms per cubic meter (µg/m^3). At no time in a workplace should the mercury concentration exceed this level.

7.1.3 ACGIH

The American Conference of Governmental Industrial Hygienists (ACGIH) set their Threshold Limit Value (TLV) at 25 µg/m^3 of mercury vapor (as averaged during an 8-hour workday).

7.1.4 ATSDR

ATSDR derived a chronic exposure (more than 365 days) Minimal Risk Level (MRL) of 0.2 µg/m^3 with a recommended action level of 1.0 µg/m^3 that should prompt environmental or health officials to implement a response action to reduce exposure. ATSDR suggested a residential occupancy level of 1.0 µg/m^3 that is considered "safe and acceptable" for occupancy by the most sensitive residents of any structure after a spill, provided no visible mercury is present. ATSDR also recommended an indoor sustained action level of greater than 10 µg/m^3; the level at which measures should be taken to relocate all occupants from potential mercury exposure. Indications are that this action level may be the concentration at which urinary levels of mercury begin to increase. Other studies indicate this concentration may be the lowest toxic concentration for humans. Continued exposure may be harmful. Please refer to the health consultation in Appendix A for more information.

7.1.5 EPA

EPA established a reference concentration (RfC) of 0.3 µg/m^3 for inhalation exposure, which represents "…an estimate (with uncertainty spanning perhaps an order of magnitude) of a daily inhalation exposure of a human population (including sensitive subgroups) that is likely to be without an appreciable risk of deleterious effects during a lifetime." EPA also established that a mercury concentration of 25 µg/m^3 is the level for upgrading to Level C PPE. Please refer to the health consultation in Appendix A for more information.

7.2 Ingestion Exposure

The EPA and Food and Drug Administration (FDA) limit for mercury in drinking water is 2 parts per billion (ppb). Additional information on mercury in drinking water can be found at: http://water.epa.gov/drink/contaminants/basicinformation/mercury.cfm. This limit and the material in the referenced web link are based on mercury compounds instead of elemental mercury, which is the focus of this guidebook.

7.3 Dermal Exposure

There is a significant potential contribution to overall exposure from contact with the skin, eyes, and mucous membranes. Dermal exposure can result in over-exposure even though air levels are less than the specified limits.

8 Relocation of Residents

In cases where mercury contamination exceeds the levels for safe occupancy, relocation of residents may be required. The OSC will consult with public health personnel to determine whether relocation of residents is necessary, based on environmental screening/sampling results and the health status of individuals who may be exposed. When available, local health departments play an important role in notifying residents of the need to relocate. A letter may be issued to notify the residents of sampling results and the relocation and cleanup process.

8.1 Relocation Options

Residents often prefer to stay with friends or relatives during mercury cleanups. When they are unable to do so, various service providers are available to help. Local health departments may also assist displaced residents in securing local accommodations. Resources of local health departments vary greatly, which may limit their ability to participate in mercury responses. The American Red Cross is often available to assist in relocation efforts and is sometimes able to fund temporary relocations; it may receive reimbursement from EPA when the removal is complete. For smaller-scale relocations, EPA may task Emergency and Rapid Response Services (ERRS) to provide this service. On larger mercury responses where multiple relocations may be required, the U.S. Army Corps of Engineers (USACE) can provide assistance. EPA's Regions have inter-agency agreements with USACE. OSCs should coordinate with their regional support coordinators to engage USACE assistance. If the occupants refuse to voluntarily relocate from the residence, most local jurisdictions have the authority to order a forced occupant removal or post a home unfit for human habitation.

NOTE: *The OSC does not have the authority, even after explaining to the residents the consequences of mercury contamination, to force relocation of residents or dispose of their mercury-contaminated items, without their consent.*

For additional information on this topic see *Superfund Response Actions: Temporary Relocations Implementation Guidance*, EPA, OSWER Directive 9230.0-97, April 2002.

EXAMPLE: *At a mercury spill site in Region 9, the residents of the mercury contaminated house were relocated to a motel when other accommodations were unavailable. The local chapter of the Red Cross initially funded the lodging for the family. EPA was able to provide added funding because the decontamination continued for an extended amount of time.*

8.2 EPA Relocation Program

In large multi-residential mercury responses, state and local relocation services may not be available. In these cases, EPA can coordinate and manage relocation of residents. The Uniform Relocation Assistance and Real Property Acquisition Policies Act (URA), 42 U.S.C. Section 4601, was enacted in 1971 to ensure uniform and equitable treatment of persons who may be displaced from their homes

and businesses during Federal programs, such as disaster relief or national emergencies, or as a result of projects involving acquisition of a private property. URA provides for the issuance of relocation benefits to persons displaced in such actions. EPA is authorized under Executive Order 12580, Superfund Implementation, to temporarily relocate the threatened individuals as part of the removal action. According to the URA, the EPA OSC determines the need for relocations that are carried out in conjunction with Superfund removal actions. See Superfund Response Actions: Temporary Relocations Implementation Guidance, EPA, OSWER Directive 9230.0-97, April 2002 or the Superfund Permanent Relocation Statement of Work Template and Users' Guide, OSWER 9230.0-108, August 2004 for additional guidance.

Under URA, persons who are temporarily relocated as part of a CERCLA removal action are eligible to receive reimbursement for all reasonable out-of-pocket expenses incurred in connection with the temporary relocation. Always ask residents if they have family or friends in the area to stay with before offering relocation. Each family is eligible to receive a housing allowance, which normally consists of paid lodging at a hotel. In addition, each family member is eligible to receive daily per diem (or food vouchers) plus incidental benefits for miscellaneous expenses. Per diem rates will vary according to the location of the incident. The Red Cross can assist by contracting with local hotels to provide temporary relocation to evacuated residents or by issuing vouchers to families to assist in the cost of food. Residents who relocate to the homes of friends and family members are eligible to receive relocation incidental benefits per family member. When items cannot be decontaminated and must be disposed of, residents may qualify for reimbursement. Replacement of disposed items is also an option and is discussed in Section 11.2. In past mercury responses, the Red Cross has provided benefits in the form of a check to the head of the household; EPA then reimburses the Red Cross after the project is completed.

CIC assistance should be requested if needed. The CIC is an EPA employee who works with the OSC to inform the public about response actions in accordance with the interactive community involvement requirements set forth in the NCP.

8.3 Release of Residential Clothing and Household Items

All personal items should be screened for mercury vapors before removal from the site/residence in order to prevent additional locations from becoming mercury contaminated. The relocation of residential families is a traumatic situation that will take time and patience. Generally, residents will want to take essential personal effects (e.g., toiletries, medications, work-related items) and clothing when being asked to relocate. All items must be screened following procedures described in Section 9.4.1 (Screening Residential Clothing and Household Items) before they are released to the resident. Because some items are essential, such as children's shoes, the Red Cross or other charities may issue a cash voucher for immediate replacement of essential items. Any released or disposed items should be documented and photographed or videoed. Residents should be instructed to select all items they plan to take out of their home while they are temporarily relocated. No more than four to six items

should be placed in a plastic bag (depending on size), and the bags should sit for a short period of time prior to screening. Items should not be moved to a new location without proper screening. The headspace of the bagged items should be screened using an MVA (see Photograph 8-1). A consistent reading greater than 3-6 µg/m^3 indicates that the items should not be removed from the site and returned to residents until vapor readings are lowered. These items should be documented in writing and with photographs or video.

Photograph 8-1
View of START using an MVA to analyze the headspace of bags containing potentially mercury-contaminated clothes

8.4 Site Security

EPA may request local police support or contract with local police departments to provide extra security while residences are vacant due to relocation. In addition, or alternatively, EPA may contract with private security companies to help prevent vandalism and burglary of vacant residential homes.

9 Cleanup Process

Prior to initiating the cleanup process, the OSC should ensure that all preliminary steps, as detailed in the previous chapters, have been taken before intrusive activity begins. A Mercury Decontamination Plan checklist of tasks is provided in Appendix C. Every response is unique. Some situations will require that all steps outlined in this document be taken. Other situations may be less complex and require only a few of these tasks. In either case, reviewing the checklist on any mercury response will reduce the likelihood of missing an important step in the process.

Mercury spills in residences can be challenging because mercury tends to accumulate in low spots and cracks. In addition, spilled mercury can easily spread because micro-beads of liquid are so small, they are difficult to see with an untrained eye. Liquid elemental mercury is like wet spilled paint. It adheres to everything that it comes into contact with and it is tracked into other areas. Unlike paint, mercury never dries and it is difficult to remove from porous material/objects. It may not be possible to decontaminate porous items that have absorbed mercury, such as carpet, drapes, furniture, and bedding. It is generally more cost-effective to properly dispose of contaminated porous items instead of attempting to decontaminate them.

NOTE: *A Decontamination Plan Checklist is provided in Appendix C. The checklist should be updated regularly to verify that work has been completed. The completed checklist should be returned to the site files. Any deviation from the plan should be noted in writing on the checklist. EPA will obtain a key for each structure to be decontaminated. All keys must be tracked and returned to the command post on a daily basis.*

9.1 Pre-Decontamination Procedures

Due to the extremely intrusive nature of mercury cleanups, EPA and the homeowners should thoroughly discuss the actions that are planned to be taken in their home. EPA should also describe how these actions will be documented. This is beneficial to the Agency as well as the homeowners.

9.1.1 Pre-Decontamination Documentation

Prior to decontamination, thorough video, photo, and written documentation of the contents and condition of the interior and exterior of the residence must be completed. Close coordination with the property owner and residents is critical during this step. Note date and time on video and photos. The video should be panned slowly and thoroughly and with narration to explain details (see Photograph 9-1). The video will be used during the restoration, reimbursement, and replacement processes. Any items that are removed from the home should also be documented via video, photo, and/or written logs.

Photograph 9-1
View of EPA personnel conducting pre-decontamination video documentation of the interior of a home

9.1.2 House Tracking Database

All information from removal activities should be tracked and organized (e.g., in a database or spreadsheet). Information to be tracked should include access agreements, temporary relocation dates, pre-decontamination documentation dates, air sampling data and results, post-decontamination documentation dates, reimbursement data, and de-list letter dates to the local health department. This is especially important when there are multiple response locations.

9.2 Establishing Work Zones and Containment Operations

Hazardous materials operations must be conducted in a controlled and methodical manner to ensure contamination is not tracked to other locations and to ensure the safety of responders. Mercury responses require that all contaminated items be decontaminated or removed in order to achieve the desired cleanup action levels. Items that cannot be removed should be decontaminated in place. All contaminated items requiring disposal should be documented in writing and/or with video or photographs, as described above. In addition, the Site Safety Plan must account for all potential hazards that may be encountered during cleanup operations.

9.2.1 Establish Control Zones and Ingress / Egress Routes

When addressing a mercury cleanup at a residential or commercial property, it is important to ensure that no contamination is present on or around entry points and walkways (e.g., sidewalks, driveways).

If access ways are contaminated, initial operations must be conducted to contain, remove, or treat contaminated surfaces. Specific cleanup processes are described in the sub-sections below. Once the extent of contamination is known, ingress/egress procedures should be developed in accordance with appropriate hazardous materials operations practices.

9.2.2 Establish Ventilation / Air Management

Establishing ventilation of a contaminated structure serves several purposes throughout the cleanup process, including:

- Decreasing ambient levels of mercury vapors within the structure to allow for identification of "hot spots"
- Reducing the potential for porous surfaces to adsorb mercury vapors
- Decreasing ambient levels of mercury vapors to allow for decreased level of personal protection
- Removing residual vapors after cleanup has been completed (see Section 9.5)

To establish ventilation, windows should be opened and fans placed strategically to drive the mercury vapors outdoors (and cycle fresh air in). As the ambient mercury concentrations fall, it will then be easier to determine where the source contamination is located. As cleanup operations progress, ambient mercury vapor levels should be re-checked.

There may be extreme cases where mercury vapor concentrations are too high to release untreated to the outside air; or there may be situations where ventilation is not logistically possible. Air handling units with mercury absorbing filters may be utilized to reduce the levels of mercury vapors being released during the removal action. Activated charcoal adsorbs mercury vapors from air, but it is not particularly efficient. Charcoal treated with sulfur compounds is more efficient, but this adsorbent cannot be regenerated once it is saturated, and it must be disposed of properly. Systems have been designed using gold or silver to remove mercury from air streams. Mercury forms amalgams with these metals, and it can be recovered by heating the adsorption unit. The regenerated unit may be reused. Copper and zinc are also used for mercury adsorption units.

9.2.3 Isolate Impacted Areas

Often mercury spills occur in specific areas of a structure and can be isolated by closing off the obviously affected room(s). In some cases, the heavily contaminated areas may not be as obvious. In these situations, after full structure ventilation is established and vapor levels begin to diminish, the contaminated areas and cross contaminated areas can be determined by using an MVA. If the heavily contaminated areas are distinctly room- or area-specific, responders should take measures to isolate these areas. Ventilation fans may need to be re-adjusted to ensure isolated areas do not release vapors to the rest of the structure. Isolation can be as simple as closing doors and exhausting air from

the area to the outside. If necessary, plastic sheeting can be used to close off open areas (e.g., hallways) from the rest of the building. Cross-contaminated areas can then be addressed using the approaches described in this chapter.

9.2.4 Establish a Waste Water Management Plan

Waste water is not typically generated during residential mercury responses. In cases where waste water is generated during a response, it is generally most cost-effective to dispose of the water appropriately instead of trying to treat it on site due to the low TCLP cleanup level of 0.2 mg/L.

In situations where a large volume of waste water is generated, a cost-analysis can be conducted to determine if on-site treatment is feasible and cost-effective. Some treatment techniques are described below:

Several techniques are available for cleaning contaminated water. In the Bristol-Myers Squibb (BMS) process; chlorine is added to wastewater, followed by BMS adsorbent (activated carbon/sulfur). Clarification and sedimentation have been proven effective in removing mercury from water. Water with a pH of 4.9 can be treated with sulfide to form a precipitate, which can then be removed by sedimentation or filtration. DuoliteTM GT-73 ion-exchange resin can routinely reduce the mercury content of wastewater from 0.2 to 70 parts per million (ppm) to between 1 and 5 ppb. In the Trace Mercury Removal - Immobilized Metal Affinity Chromatography (TMR IMACTM) process, chlorine is used to oxidize the mercury, and the solution is passed through TMR IMAC ion-exchange resin. Peat absorbs mercury from wastewater with pH from 5 to 5.5 and an approximate efficiency of 70%. Peanut hull charcoal can be used as a sorbent material. Bioremediation using Pseudomonas putida FB1 has achieved 99% mercury removal efficiency in laboratory studies, but has not yet been proven or accepted as a field remediation method.

Mercury-containing brine produced by electrolytic processes in the chlor-alkali manufacturing industry can be decontaminated using a bed of activated carbon impregnated with silver. This brine may also be passed through a strong anion-exchange resin. Mercury salts can be precipitated from alkaline solutions using soluble alkali sulfides. Flocculating agents such as ferric salts, starch, or gum arabic facilitate the removal of the mercury precipitates from the aqueous medium.

9.3 Specialized Products and Cleanup Tools

9.3.1 Mercury Response Products

There are numerous commercially available products available for use at mercury responses. However, it is important to understand the products' intended use. There are different products for different functions, including mercury indication, mercury vapor suppression, mercury amalgamation, and mercury recovery. This section is not an all-inclusive look at available products but includes some of the most commonly used products, which may be listed by their trade names. Including descriptions of these products in this

guidebook is not an endorsement by EPA, but is instead intended to make responders aware of some of the product options available. All manufacturers' instructions should be read and followed as some require special application procedures (e.g., water activated). The use of these products may or may not be necessary depending on the complexity of the spill.

9.3.1.1 Mercury Indicator Powder

Mercury indicator powder is generally used by response personnel that do not have direct access to an MVA. The indicator powder is sprinkled over the area suspected of having elemental mercury contamination and allowed to set for up to 3 days. If elemental mercury is present, the sulfur based powder will have a color change (generally from yellow to brown) indicating the presence of mercury contamination remaining.

9.3.1.2 Mercury Vapor Absorbent

Mercury vapor absorbent is a granular material generally utilized to bring overall concentrations of mercury in air down enough to negate the need for upgraded respiratory protection. This activated carbon-based material will absorb mercury vapors from areas of a mercury response that are hard to access (i.e., cracks and crevices). When the material is collected it should be managed with the appropriate waste stream for disposal.

9.3.1.3 Merconvap™

Merconvap™ is a chloride and sulfur based black liquid that is sprayed directly onto visible beads of mercury to suppress mercury vapors. This product can be used in areas where proper ventilation cannot be established prior to initiating physical collection of mercury. It has been well-documented that the physical collection of elemental mercury will increase the mercury in air concentrations due to agitation of the mercury during the process. This product will help reduce the amount of increased mercury vapors during the physical recovery.

9.3.1.4 Merconwipes™

Merconwipes™ are moistened cloths containing chloride and sulfur that are generally used as a polishing technique after a mercury cleanup is completed to make sure residual mercury is not left behind. Wipes are commonly found in commercially available mercury spill kits.

9.3.1.5 Hg Absorb™

Hg Absorb™ looks like silver metal shavings that are sprinkled over a mercury spill area. The granular zinc based compound will chemically react and amalgamate with the mercury allowing for easier physical collection of the mercury. This product must be activated with water for the amalgamation to take place.

Some spill kits contain sponges encrusted with this product which can be used as a final polishing technique at the end of a mercury cleanup. The sponge should be moistened prior to use.

9.3.1.6 HgX®

HgX® is a white powder that is mixed with water (generally 1.5 pounds HgX® to 5 gallons water) and is used as a final polishing technique. The solution is sprayed over the item or area and allowed to stand (sometimes overnight); plain water is used to clean it up. This process may need to be repeated more than once if concentrations remain elevated after plain water is used.

9.3.1.7 DeconGel™

DeconGel™ is a blue viscous gel material that can be brushed or sprayed onto various surfaces – allowed to dry – and then peeled off manually. Mercury beads and residue will be encapsulated into the bottom side of the polymer substance and removed from the contaminated surface area when peeled back. Since the mercury will be bound into the polymer, there is no separating the elemental mercury from the polymer in the field and it will all require appropriate disposal. The application and removal process can be repeated if elevated air concentrations persists.

9.3.1.8 Mercury Magnate™ Amalgamation Spill Powder

Mercury Magnate™ powder reacts with liquid mercury to form a solidified amalgam that not only brings the mercury vapor pressure below harmful levels, but also allows for easy pickup using a common magnet.

9.3.1.9 Powdered Sulfur

Powdered sulfur is the active ingredient in many commercially available products. Powdered sulfur can be purchased at farm and garden supply stores and can be considerably less expensive than name brand products. Powdered sulfur does two things: (1) it can make the mercury easier to see since there may be a color change of the powdered sulfur from yellow to brown and (2) it binds the mercury so that it can be easily removed and suppresses the vapor of any missing mercury.

It should be noted that powdered sulfur can be moderately toxic if inhaled so breathing the powder should be avoided. Powdered sulfur can also stain certain fabrics so it should be tested on a small inconspicuous area before using over an entire item.

9.3.1.10 Shampoos

During the initial stages of a response, it may be necessary to conduct decontamination of people and or pets. Although EPA does not endorse any one product over another, sulfur based Selsun Blue®, Exsel®, and Head and Shoulders Intensive Treatment Dandruff Shampoo® have been used successfully on people and

pets and were recommended for use on pets by the American Society for the Prevention of Cruelty of Animals (ASPCA).

9.3.1.11 Products to Avoid

Many EPA responders have noted numerous ineffective products that people have attempted to use to clean up mercury spills. False information is often disseminated verbally or through Internet searches. These products do not have any chemical purpose for spreading out over a mercury spill area. Examples of products that should never be used for mercury cleanup include: table salt, saw dust, sand, flour, and kitty litter. Although not considered a product, household vacuum cleaners should always be avoided in attempting to clean up mercury spills.

9.3.2 Mercury Cleanup Tools

9.3.2.1 Mercury Spill Kits

Several manufacturers provide commercially available spill kits. These kits are generally stocked with supplies sufficient to conduct a small mercury cleanup. Common supplies include rubber gloves, eye protection, pipettes, chemical powders, mercury collection sponges, disposable plastic dust pans, and mercury-specific hand pumps.

9.3.2.2 Mercury Vacuums

There are several companies that manufacture several models of mercury vacuums (see mercury vacuum comparison table in Appendix C). High-efficiency particulate air (HEPA) vacuum can not be used on a mercury spill because they lack mercury-specific features, including a liquid mercury drop out collection jar on the hose side of the vacuum for collection of visible liquid mercury as well as a series of internal filters (up to seven) that keep mercury vapors from being exhausted back into the atmosphere. Periodic screening of the vacuum's exhaust is necessary to assure that breakthrough has not occurred. Filters should be pro-actively changed to keep breakthrough from occurring. Significant care must be taken at the end of all responses to assure proper decontamination of the vacuum so that cross contamination into the response vehicle/equipment warehouse does not occur. Proper decontamination can take up to 3 hours per vacuum. Screening the vacuum with an MVA will assure that proper decontamination has been accomplished. It may be advantageous to have several vacuum hoses on hand as they have proven to be quite difficult to decontaminate and it may be more cost-effective to dispose of the hose after use on a large mercury spill response.

9.3.2.3 Mercury Hand Pumps

On small mercury releases, a vacuum hand pump (aspirator) can be used to collect visible mercury beads up to BB size. This is generally a slow, but effective process and has proven to work on stubborn beads located in shallow cracks. Many commercially available spill kits come with vacuum hand pumps.

9.3.2.4 Small Spill Cleanup Tools

Several common items found around the house have proven effective in collecting visible mercury beads on flat surfaces. Plastic covered playing cards, duct tape, disposable pipettes, eyedroppers, syringes, and shaving cream have all been used successfully by responders. When using these physical recovery techniques, slow and methodical movement is required to avoid spreading the mercury.

9.4 Removal Procedures

Most indoor responses can be quickly managed by completing the following tasks: (1) establish ventilation in the structure to bring down ambient vapor levels, (2) remove and evaluate/ decontaminate potentially contaminated loose items, (3) remove visible mercury, (4) treat or remove contaminated structures, and (5) conduct heat/ventilation cycles. More complex situations may require other techniques to successfully complete the cleanup. This section details the basic techniques and processes that should be employed on all significant interior spills. It also describes methods for less common situations that may be encountered. Note that smaller spills that are relatively contained (not tracked from the spill area and on non-porous surfaces) may require fewer steps to complete the cleanup.

9.4.1 Screening Residential Clothing and Household Items

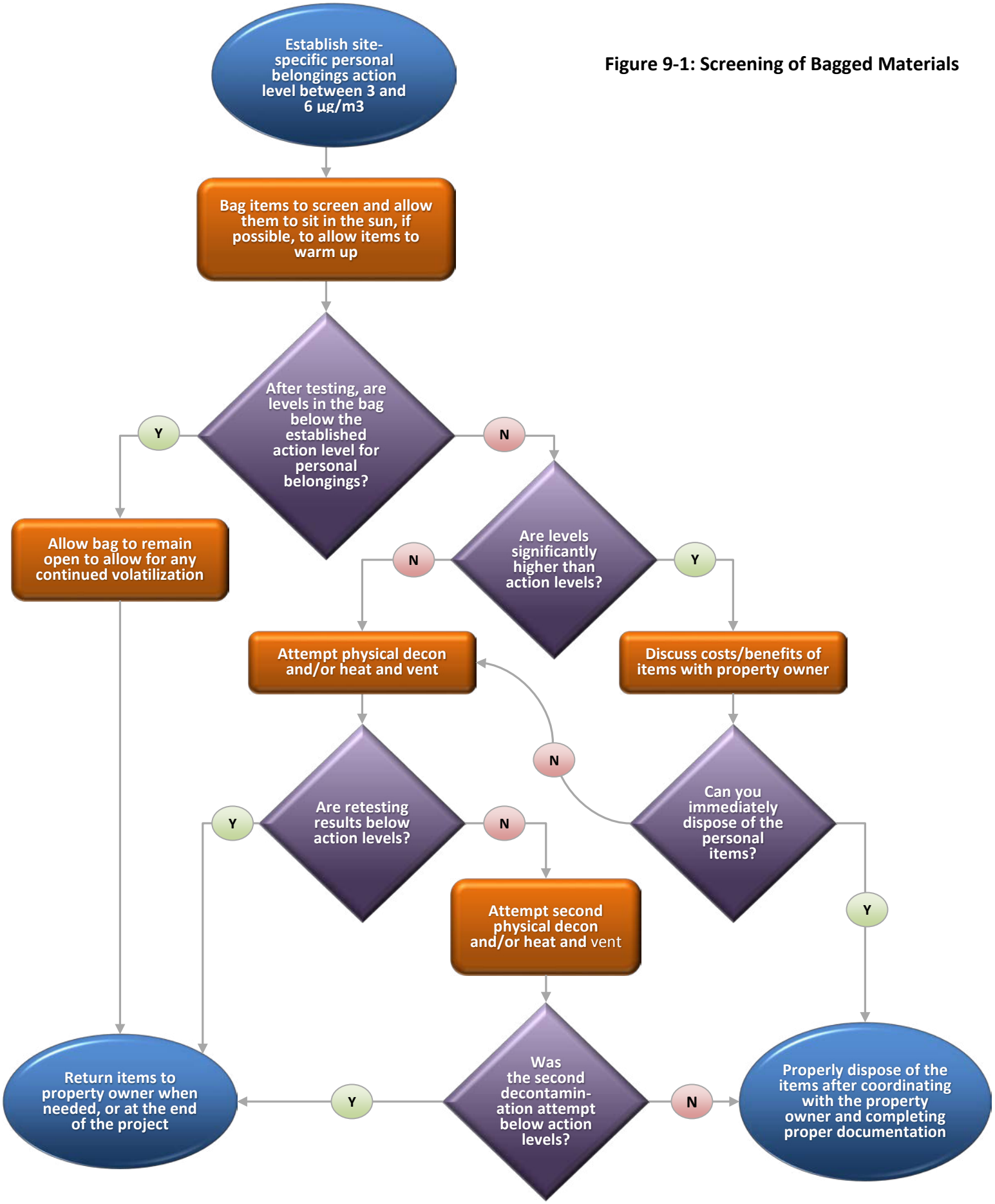
An MVA should be used to screen clothing and other porous items (e.g., linens, bedding, curtains) from contaminated areas of homes. All items should be bagged, sealed, and moved outside or to an uncontaminated staging area. Items that are too large to fit into trash bags are generally wrapped in plastic sheeting and allowed to sit in the sun until warm enough to screen using the same technique. With larger items, more than one location should be screened for headspace readings (e.g., headspace readings should be taken from at least three equidistant locations on a couch that has been covered in plastic). When using this technique, verify that the bags being used are not causing elevated readings themselves by randomly testing a warm empty bag. Newly purchased trash bags have given elevated readings on past projects. The bags should remain sealed and allowed to reach between 80° and 90° F to allow the contents of the bag to reach equilibrium with the air volume before the bag is sampled. This process allows any mercury vapors to accumulate in the head space of the bag. The head space in the bag should then be tested by poking a small hole in the bag and inserting the wand or extension tubing of the MVA (see Photograph 9-2) to take a head-space reading.

> ***NOTE:*** *Do not overfill the plastic bags because sufficient headspace is needed to obtain accurate mercury vapor readings. The number of items placed in the bag should be limited to fill approximately one third to one-half of the plastic bag. All types of plastic bags can be used, but they should be pre-screened before use to ensure they are not giving off detectable levels of mercury. It has been determined that some opaque (dark) plastic bags can give off detectible levels of mercury.*

Photograph 9-2
View of START personnel screening bags of clothes using an MVA

If readings are consistently above 3-6 µg/m^3, the items in the bags are considered to contain mercury vapors at a concentration where they should not be taken back into the homes. Concentrations above this level typically indicate that the items have been in physical contact with, or still contain elemental mercury. If mercury vapor levels are elevated, responders may attempt to allow the items to ventilate over a period of time before rescreening, preferably in a warm location or in direct sunlight. Once the bags screen below the 3-6 µg/m^3 action level, the bags should remain open and in an uncontaminated area to allow them to continue to "off-gas" over time. Bags that screen well above the action level should be disposed of or otherwise treated to reduce concentrations. Any items that require disposal should be documented in a database/spreadsheet and photo-documented prior to disposal. Final rescreen of the bagged materials should be performed post-decontamination, prior to items being returned to the house. Table 9-1 describes the process of screening bagged materials. More detailed methods for decontaminating personal items and furnishings are discussed in Section 9.4.5 below.

Figure 9-1: Screening of Bagged Materials



9.4.2 Removal of Mercury from Hard Surfaces

9.4.2.1 Physical Removal

This procedure is for hard surfaces such as concrete, tile, porcelain, metal, plastic, and newer hardwood floors. Physically remove all visible mercury using physical collection techniques (e.g., plastic-coated playing cards, duct tape, shaving cream, disposable pipettes, hand pumps) and/or an approved mercury-specific vacuum (see Photograph 9-3). Larger spills will always require the use of a mercury-specific vacuum. Exercise care while vacuuming to ensure all areas are vacuumed, paying particular attention to joints, cracks, and crevices in the flooring material. A crevice tool can be attached to the mercury vacuum to assist with these hard-to-reach areas. A best practice technique involves using a grid system - mark each vacuumed square with a piece of duct tape or masking tape to indicate that vacuuming has been completed (see Photograph 9-4).

Photograph 9-3
Removal of mercury beads with a mercury vacuum

Photograph 9-4
View of grid system marked on asphalt where mercury vacuuming has been completed

9.4.2.2 Residual Treatment and Wash

Before treating the floors and walls, scan the area for hidden mercury drops and hot spots using an MVA. Wash the affected area with a mercury treatment solution to bind and remove the mercury residue from the surface (see Photograph 9-5). When mercury treatment solutions are used, they can reduce low levels of elemental mercury contamination into a nonhazardous inorganic salt. Follow the manufacturer's recommendations and then wash the area with clean water.

Photograph 9-5
Mopping floors with mercury treatment solution

9.4.2.3 Heat/Ventilation Cycles

As ambient mercury levels come down close to 1 µg/m^3 and point sources are removed from the interior space, heating/ventilation cycles will help drive off residual mercury vapors. **In residential homes, this process should not be initiated until all visible mercury has been removed.** With the area secured (windows closed and air conditioning turned off) heat the area from 80°-90°F for 4 hours (the time and temperature will vary depending on site-specific circumstances) in order to volatilize any residual mercury. The temperature in the room can be regulated by the thermostat or with portable turbo heaters. For areas that are difficult to heat, turbo heaters (see Photographs 9-6 through 9-8) have been successful in raising the temperature to increase the volatilization of mercury. If using alternative heating sources, be sure to monitor for carbon monoxide and oxygen to ensure worker safety. In addition, when heating a residence above normal temperatures, be aware of potential heat-related damage. The most common problems involve plastics, candles, and adhesives (e.g., tile, linoleum, wall paper).

> ***NOTE:*** *In some cases where it was saturated in the structure, mercury may re-condense on surfaces after heating and ventilation cycles.*

Photograph 9-6
View of turbo heater applying heat to decontaminate a basement

Photograph 9-7
View of ventilation with an industrial fan

Photograph 9-8
View of ventilation with a blower unit

9.4.2.4 Screen Interior Air Space

After heating the area for 4 hours, reduce thermostat to normal room temperatures, open doors and windows, and ventilate for at least 1 hour (the times for heating and venting cycles will vary depending on site-specific circumstances). Use blowers and ventilation fans to facilitate air movement and to completely evacuate the air column from inside to outside by replacing the indoor air with fresh outdoor air.

With the windows closed, conduct ambient air monitoring for mercury vapor concentrations using an MVA or air sample pumps. Let air stabilize for up to 24 hours after venting before taking MVA readings (it may be as little as 1 – 2 hours for small, contained spills). Mercury vapor concentrations should be less than the desired action level (usually 1.0 $\mu g/m^3$ for residential). If ambient mercury vapor concentrations are not less than the desired action level, repeat steps beginning with residual treatment and wash. If mercury vapor levels are substantially high, elemental mercury or a saturated source likely remain in the structure.

9.4.2.5 Optional Steps

These optional steps should be taken only if mercury vapor concentrations coming off of surfaces or within cracks are below 3-6 µg/m^3 after multiple attempts following the steps above.

Seal Impacted Surfaces: Large cracks should be filled in with an epoxy joint or crack filler prior to sealing. Apply two coats of fast drying epoxy to affected surfaces (NOTE: DuraSeal® is the only finish product that has been tested and approved for use as a vapor barrier). Apply additional coats to cracks in the floor if necessary. After the epoxy has been applied and has cured, verify that ambient mercury vapor concentrations are less than the desired action level.

Physical Removal of Structural Materials: There are many situations where structural material such as walls, floors, and ceilings may require removal if they are overly saturated with elemental mercury. Best practices suggest that it is likely more cost-effective to remove and replace these items rather than spending excessive amounts of time trying to treat them. In addition to the other removal techniques described later in this chapter, physical removal may be necessary if vapor levels are not adequately reduced.

Floor tiles may require removal to remediate mercury contamination. Prior to removal, samples of resilient flooring (tiles) should be analyzed for asbestos content. If the resilient flooring contains asbestos, properly trained workers should follow procedures in the Occupational Safety and Health Administration's (OSHA) Occupational Exposure to Asbestos Standard 29 CFR 1926.1101.

EXAMPLE: *At an EPA mercury cleanup site, Lumex MVAs were used in an attempt to locate any mercury hot spots in the residence; the tile mastic was identified. ERRS crews removed the tile mastic from the kitchen and dining areas. A follow-up Lumex survey indicated mercury vapor concentrations as high as 4 µg/m3. Based on these levels, the ERRS crews applied two coats of concrete primer/sealer. A subsequent Lumex mercury vapor survey indicated mercury vapor concentrations below 1 µg/m^3. A final round of air confirmation samples were collected and analyzed; results were below 0.22 µg/m^3.*

Photograph 9-9
View of floor cracks sealed with caulking material

9.4.3 Removal of Mercury from Carpeted Surfaces

If mercury is spilled directly on carpeting, the carpeting usually cannot be decontaminated and should be removed and properly disposed. If the carpet was impacted by cross-contamination (i.e., mercury was tracked away from the initial mercury spill to the carpet), the carpeting may not have to be removed.

For removal of grossly contaminated carpet:

1. Physically remove all visible mercury using previously described physical techniques and/or an approved mercury-specific vacuum. Exercise care while vacuuming to ensure that all areas are vacuumed, paying particular attention to joints between carpeting and molding. Mark each vacuumed square with a piece of duct tape or masking tape to indicate that vacuuming has been completed. Be sure to vacuum both with and against the carpeting nap to ensure tiny mercury beads are removed from the carpeting. Due to the fibrous nature of carpeting, vacuuming the beads will temporarily increase the ambient concentration of mercury vapor contamination. When removing, roll carpeting (and, if necessary, padding) inward to prevent mercury beads from releasing (see Photograph 9-10).
2. Monitor the remaining floor with an MVA.

3. If elevated levels of mercury vapor are emitting from the surface of the floor, wash the affected area with a mercury treatment solution.
4. Once surface vapors are minimized, conduct heating/ventilation cycles as described in Section 9.4.2.3 above.
5. Screen/monitor the remediated space as described in Section 9.4.2.4 above.

If the carpeting was cross-contaminated, responders may attempt to treat the carpet in lieu of removal. Using a mercury vapor suppressant wash and/or initiating heat/vent cycles may be considered in these situations. If a carpet wash is used, the carpeting should be cleaned again after the remediation work is completed to remove treatment residues from the carpet. After treatment, if ambient mercury vapor concentrations still exceed 1.0 $\mu g/m^3$ after 1 hour of ventilating, the carpeting should be removed, along with any padding beneath the carpeting. After the affected flooring has been removed, follow the procedures for removing mercury from hard surfaces.

Photograph 9-10
View of carpet removal

9.4.4 Removal of Mercury from Wooden Floors

Some wooden or laminate flooring can be cleaned using the procedures described in Section 9.4.2 (Removal of Mercury from Hard Surfaces). If the flooring has substantial cracks or grooves and behaves more like a porous material, the flooring may have to be removed. In these cases, conduct the removal of flooring in a methodical method, similar to methods used to remove carpeting, above. The

difference is that wood/laminate flooring will be taken apart (not rolled up, like carpet) as seen in Photograph 9-11 below. During demolition of the floor, have a mercury vacuum with crevice tools ready to remove any visible mercury that may be present between boards or under the flooring

Photograph 9-11
View of removal of mercury from wood flooring

9.4.5 Removal of Mercury from Personal Items

Non- and semi-porous personal items can almost always be decontaminated using mercury treatment solutions. Depending on the level of contamination, porous personal belongings may be decontaminated using heat. Items may be put into plastic bags, labeled to identify the owners, and collected in a central area. Initial mercury levels inside the bag headspace should be measured and recorded, as described in Section 9.4.1 above. The bag contents may be heated from approximately 80°-90°F for 24 hours, and then vented (time and temperature will vary from spill to spill and the types of material being treated). Mercury vapor levels should then be measured, and if necessary, the process repeated until the mercury levels drop below the action level. The basic procedure for removing mercury contamination from furnishings and clothing is described below, followed by two alternate methods.

1. Set up a disposable structure (tent) to hold the mercury-contaminated personal belongings and furnishings downwind from the work area. Designate a “warm zone” where personnel should not enter due to mercury vapor exhaust.

2. Place several industrial or shop grade electric, gas, or kerosene powered heaters inside the tent and place blowers at exhaust points inside the tent (verify the MVA being utilized does not have any interference issues with the fuel source of the heaters).
3. Post at least one 10-pound fire extinguisher outside of the structure and a smoke detector inside the structure.
4. Maintain the temperature inside the structure between 80° and 90°F.
5. Remove items from bags and place items inside the structure on plastic sheeting or hang from makeshift clothes lines, segregated by source or level of contamination.
6. Heat contaminated items in the structure to force the volatilization and removal of mercury vapors. Longer heating times may be required for heavily contaminated furnishings and clothing.
7. No person should enter this "decontamination structure" unless trained and protected with a minimum of Level C personal protection with mercury specific cartridges.
8. Following the heating period, the structure should be ventilated.
9. All clothing and furnishings should then be placed into plastic sheeting or trash bags and screened using an MVA to verify that mercury concentrations are less than the desired action level for personal effects.
10. If mercury vapor concentrations continue to exceed the established action level for personal effects, repeat step 6 or properly document and dispose of the items.
11. Appropriate decontamination and disposal of all materials and supplies, including the actual decontamination of the structure, should occur prior to dismantling the structure.

Personnel engaged in the mercury cleanup operation should make sure that their personal items, such as clothing and shoes, are not contaminated before leaving the site. These items must be scanned for mercury vapors using real-time instrumentation before leaving the site.

9.4.5.1 Alternative Decontamination Methods for Porous Items

For EPA-funded mercury cleanups, it is more cost-effective in most cases to dispose of mercury-contaminated items. However, under unique circumstances, the following two alternative methods can be attempted to decontaminate mercury-contaminated items.

<u>Method 1</u>

1. Clothing and furnishings may be placed on plastic sheeting in the sun and heated to volatilize the mercury vapors (see Photograph 9-12). Place in the sun for at least 4 hours (time will vary due to numerous variables). Longer heating times may be required for heavily contaminated furnishings and clothing.
2. All clothing and furnishings should then be placed into plastic sheeting or trash bags and screened using an MVA to verify that mercury concentrations are less than 3-6 $\mu g/m^3$.
3. If mercury vapor concentrations continue to exceed the action level, the items should be properly documented and disposed of.

4. Typically, this alternative method is only effective in warm- to hot-weather conditions.

Photograph 9-12
View of mercury contaminated clothing/furnishings volatilizing in the sun

Method 2:

1. Clothing and furnishings such as draperies may be heated and ventilated using an ordinary clothes dryer set to the highest heat setting. Cycle items at least twice before screening, and cycle the dryer empty and on the highest heat setting between loads of contaminated clothing and furnishings.
2. All clothing and furnishings should then be placed into plastic sheeting or trash bags and screened using an MVA to verify that mercury concentrations are less than the desired action level for personal effects.
3. If mercury vapor concentrations continue to exceed the action level for personal effects, the items should be properly documented and disposed of.
4. Once completed, screen the commercial or household dryer with an MVA for residual contamination. This practice may contaminate the household dryer. If the mercury vapor concentration is greater than the action level for personal effects, then the dryer should be considered contaminated and properly disposed.

9.4.6 Removal of Mercury from Washers and Dryers

In residential situations where mercury has been spilled long before any response action took place, contaminated clothing may have been laundered. The washing and drying machines may have become contaminated. In most cases, running empty cycles can clear out the residual mercury that is present in these machines. However, if screening with an MVA indicated that free liquid mercury is likely present, more intrusive work may need to be performed, including removing the washing or drying drum and recovering any free mercury that may be present in the machine, evaluating or replacing hoses, and cleaning machine components with mercury decontamination products. In situations where the machines require additional effort to clean, it may be more cost-effective to simply dispose of the machines and replace them. If the machines are to be dismantled for cleaning, they should either be moved outdoors or placed on a containment pad to capture any liquid mercury that may be present and released.

Photograph 9-13
View of START screening a household washing machine with a Lumex MVA

9.4.7 Removal of Mercury from Vehicles

For vehicles, ATSDR recommends a mercury action level in the range of 3-6 µg/m^3. Some vehicles are especially difficult to clean due to the fabric materials used in flooring and seats.

The steps for cleaning vehicles include:

1. Remove all visible mercury using physical techniques and/or a mercury vacuum.
2. Once all visible mercury has been removed and the known affected area has been thoroughly cleaned, keep the windows and doors open for several hours to allow for venting of volatilized mercury.
3. Once vented, close windows and doors and allow vehicle to heat up inside to normal operating temperatures.
4. Slowly open a door and thoroughly screen the vehicles interior with an MVA.
5. If readings exceed the desired vehicle action level, repeat steps 1-4.
6. If readings continue to exceed the action level, carpeting and porous seating my require removal and disposal.

9.4.8 Removal of Mercury in Plumbing

Mercury in plumbing is usually contained in the traps adjacent to the plumbing fixture, such as sinks, drains, and toilets. Dismantling is the preferred method of recovering elemental mercury from plumbing in this setting. After the mercury is recovered from the drains, the mercury vapor concentration should be measured using an MVA.

If dismantling of the plumbing is not possible or practical (e.g., cement floor drains), a magnetic amalgam powder may be used. The magnetic amalgam powder can be gently poured into the plumbing fixture containing the mercury and gently forced into the trap by use of a drain plunger. This technique should be employed with extreme caution to avoid forcing the mercury farther into the plumbing system. Wait several minutes to allow the magnetic amalgam powder to react with the mercury, and then introduce a plastic-covered magnet into the plumbing system. The mercury is removed as the plastic-covered magnet is slowly withdrawn.

In some cases, plumbing will not respond to the cleanup techniques described above. It may be necessary to either remove or abandon (i.e., seal) floor drains to achieve appropriate ambient air mercury vapor levels. Close coordination with the property owner is essential in these situations.

9.4.9 Removal of Dermal Mercury Contamination from Humans and Animals

To assess and remove residue from humans and animals that come into direct contact with elemental mercury or with mercury contaminated items, follow the procedures described below.

<u>Humans:</u>

1. Determine if a person is contaminated with mercury residue by screening them with the MVA. Start by running the MVA inlet within approximately a half inch of the person's palm-side-up hands. Then move to their shoe bottoms. Then ask if you may screen the extremities of their clothing. Generally, if mercury residue is present, it will be on the person's hands, shoes, or

clothing. To get a more confident shoe reading, have the person remove their shoes and screen them in a plastic bag following the steps outlined in Section 9.4.1.

2. If detectable mercury residue is present, issue a trash bag or drum liner to each impacted individual.
3. In the event that exposure occurred away from the individual's home, first take measures to prevent cross contamination. The person should be issued alternative clothing or a Tyvek® suit and bags should be placed over their shoes. When they are home, instruct the individual to change into non-contaminated clothing and place his or her potentially contaminated shoes and clothes into a trash bag or drum liner. Written instructions should be issued on how to proceed. Alternatively, shower facilities could be arranged for at the site.
4. As described in Section 9.4.1, screen the exposed individual's clothing and shoes with an MVA.
5. It is recommended that the exposed individual shower with warm water and wash his or her hair with sulfur-based shampoo as described in Section 9.3.1.10. A commercial product such as HgX® Hand Cream and Cleaner may also be used. Only use products that are intended for direct human use.

Animals:

1. First determine if the animal is contaminated with mercury residue by screening them with the MVA. Start by running the MVA inlet within approximately a half inch of their fur or skin. A funnel may also be attached to the MVA inlet in order to assess a larger area and to prevent inlet contamination. Then move to their feet bottoms.
2. Remove collar or other items from the animal and place into a plastic bag.
3. As described in Section 9.4.1, screen the items in the bag with an MVA.
4. If the animal is contaminated the OSC must determine if the animal should be washed and treated onsite, at a veterinarian's office, or at home by the pet owner.
5. It is recommended that the exposed animal be bathed in warm water with sulfur-based shampoo as described in Section 9.3.1.10. A veterinarian should be consulted for any other actions.
6. The animal should be re-screened as described above.

9.4.10 Removal of Mercury from Soils and Other Outdoor Surfaces

In most cases, mercury contamination is close to the ground surface. An investigation should be conducted to determine the horizontal extent of contamination. Using a sample grid system is useful at managing sample collection in determining the area of contamination. In warm and/or sunny conditions, upside down black bus tubs with a small hole drilled in the top work well for grid assessments over outdoor surfaces. As shown in Photographs 9-14 and 9-15, the headspace air inside the tub is an indicator that contamination is present and must be managed. If there is visible free mercury outside the structure (e.g., yard, sidewalk, street) a mercury vacuum should be used to recover the mercury. On uneven surfaces, the bus tub should be modified with a plastic shroud to add surface area and seal the head space, as shown in Photograph 9-16. In soils, excavation may be

required if the area is too large and vacuuming is not feasible. On hard surfaces (e.g., streets, parking lots), where mercury is spread over an expansive area, alternative containment and removal options may be considered; however, visible mercury must be removed.

Where applicable, consult the state environmental agency for the appropriate or relevant cleanup action levels for total mercury. Frequently, separate action levels are established for residential, commercial, and industrial land uses. For example, the following total mercury action levels were applied at a residential cleanup site in Ohio:

- Residential land use - 16.00 milligrams per kilogram (mg/kg)
- Commercial land use - 250 mg/kg
- Industrial land use - 230 mg/kg

Consult your state EPA representative for consultation on Applicable or Relevant and Appropriate Requirements (ARARs). The OSC may want a letter from the State documenting the appropriate action levels for total mercury in soil.

Disposal of contaminated materials is discussed in Chapter 10.

Photograph 9-14
View of a sample grid system

Photograph 9-15
View of a sample grid system

Photograph 9-16
View of a bus tub with shroud

Photograph 9-17
View of EPA ERRS contractor excavating mercury-contaminated soil

Photograph 9-18
View of mercury-contaminated soil being staged into a plastic-lined rolloff box

9.4.11 Removal of Mercury Containers

If a container of mercury is found in a home or other location, the container should be immediately sealed (airtight) or placed inside another container that can be sealed tightly. Wear protective gloves when handling the container to guard against contact with any mercury that may be on the outside of the container. The container should then be secured to prevent theft or damage. Plastic bags should not be used to contain free liquid mercury as vapor breakthrough will occur within several days. Disposal of elemental mercury is discussed in Chapter 10.

9.4.12 Removal of Contaminated Soils and Sediments on Industrial Sites

Although this guidebook addresses elemental mercury spills in and around structures, the following is a brief description of EPA's approach to classic and large-scale cleanup sites involving mercury contamination.

Large-scale cleanup efforts may be necessary when industrial or mining operations have spilled significant amounts of mercury in surface and subsurface soils, or when several years' worth of accumulation endangers surrounding land areas and waterways. The assessment of these sites should be conducted to determine the sources of the mercury contamination and delineate the pathways by which the mercury is dispersed to the surrounding environment. Dispersal pathways may include erosion and weathering of mine tailing piles, windblown soil and debris, leaching and runoff from affected areas, and mercury volatilization.

Remediation efforts can include source-control measures such as slope reduction and re-vegetation of mine tailing piles and management of water flow to and from the affected site. Pollution abatement measures include dredging or excavation, capping or covering the affected site, immobilization of contaminated media, extraction and concentration of elemental mercury, and off-site disposal. As with all large-scale remediation efforts, the cleanup process itself should not increase the hazard to public health and the environment.

9.5 Post-Cleanup Procedures

At the conclusion of the decontamination process the following basic steps should be taken:

1. Warm the impacted structure to 80°-85°F for a minimum of 8 hours.
2. Vent the structure for a minimum of 2 hours with open doors and windows and circulate air with fans.
3. Set the thermostat for normal living conditions and close doors and windows for a minimum of 4 hours to allow for ambient equilibrium of indoor air.

Section 5.5 and Appendix B detail specific procedures for conducting post-cleanup sampling and monitoring. In addition to the basic process described above, each individual site may require additional iterations of the steps.

9.5.1 Air Sampling and Confirmation of Cleanup

Air sampling should be conducted to confirm that residential cleanup activities are complete. Perform air sampling for mercury vapor using an accepted MVA procedure or by collecting air samples by the NIOSH 6009 method. See Chapter 5 for a description of applicable procedures. Sites requiring minimal cleanup may not require confirmation air sampling.

When the results of the air screening or sampling confirm that the mercury vapor concentration is below the established action level, the OSC should inform the local public health agency who will likely indicate that the facility is ready for reoccupation and the cleanup has been completed.

9.5.2 Confirmation of Cleanup in Soils

Where applicable, consult the state environmental agency for the appropriate or relevant cleanup action levels for total mercury. Frequently, separate action levels are established for residential, commercial, and industrial land uses.

Consult your state EPA representative for consultation on ARARs. The OSC may request a letter from the State documenting the appropriate action levels for total mercury in soil.

9.6 Best Practices and Recommendations

The following recommendations are based on EPA OSC experiences, but do not address the full range of circumstances that may be encountered:

- Monitor aggressively—in an undisturbed environment with normal air flow, ambient air measurements tell little about the state of surfaces. Monitor as close to the surface of interest as possible without cross-contaminating the MVA. In some cases, the surface being monitored could be agitated to promote mercury volatilization.
- Do not overestimate the ability to decontaminate with heating/venting cycles—if near-surface readings are over 10 µg/m^3, using heat and ventilation to decontaminate to a residential standard of 1 µg/m^3 is not practical and is a poor use of time and money.
- If aggressive monitoring shows mercury vapor contamination levels near the re-occupancy threshold under elevated temperature, decontamination via heating and ventilation may be successful.

- When in doubt, flooring should be removed. Although disruptive, this usually allows a room or structure to be returned to use sooner and substantially reduces labor time on the project, thereby reducing overall project costs.
- Mercury vapor may be masked in drains due to fresh water covering the liquid mercury. Within 2 – 3 days of stagnant water in a drain trap, there may be mercury vapor breakthrough. If drain traps are not physically removed for inspection, responders should regularly reassess drain openings with an MVA.
- Mercury vapor concentration is temperature-dependent. When temperatures are low mercury vapor concentration may not be easily detectable.

9.7 Avoiding Common Mistakes

The following recommendations are intended to assist OSCs in avoiding common mistakes during residential mercury responses:

- Do not enter a residence alone or without a signed access agreement from the property owner.
- An OSC should immediately contact the local health department during a residential mercury response and form a team.
- Document everything. *An OSC will probably only need 5% of the documented items but you just do not know what 5% that will be! Document it all!*
- As described in Section 9.6, if an elevated MVA reading is present, the best practice is to remove the item or material ("when in doubt, rip it out").
- Call an experienced OSC. Too often, a responder does not reach back for support and guidance. The best way to avoid common mistakes is to consult with the operational experts.

9.8 Regional Mercury Contacts

A list of individuals that assisted in developing this guidebook and can provide technical assistance for mercury spill situations is available at: www.epaosc.org/nationalmercuryworkgroup. If EPA emergency support is needed, the table below provides regional response numbers.

Figure 9-2: Regional Response Phone Numbers

Region	***Regional Response Number***
1	617-723-8928
2	None (Nat'l: 800-424-8802)
3	215-814-9016
4	404-562-8700
5	312-353-2318
6	866-372-7745
7	913-281-0991
8	303-293-1788
9	800-300-2193
10	206-553-1263
ERT	732-321-6660 702-290-7083

10 Disposal

As a general rule, EPA makes a hazardous waste determination for all mercury waste in accordance with 40 CFR 262.11, either through testing or applying generator knowledge. This chapter describes the disposal process from determining the appropriate designation of waste through transportation and final disposition of mercury containing materials.

10.1 Hazardous Waste versus Non-Hazardous Waste

10.1.1 Characteristically Hazardous Wastes

Wastes which exhibit, or are expected to exhibit, the characteristic for toxicity of mercury based on a TCLP concentration of mercury greater than or equal to 0.20 mg/L are considered D009 characteristically hazardous waste. To determine if mercury containing waste is a D009 characteristically hazardous waste, responders may either conduct testing according to the TCLP analytical method set forth in 40 CFR 261.24 or apply knowledge of the hazardous characteristic(s) of the waste ("generator knowledge").

LDR treatment standards found in 40 CFR 268.40 for U151 listed hazardous waste and for D009 characteristically toxic hazardous waste are essentially identical. See Section 10.2 (RCRA Requirements) for further discussion of mercury waste treatment and disposal standards.

10.1.2 Household Hazardous Waste

If a mercury spill occurs in a home, wastes generated during the cleanup would likely be considered a household hazardous waste provided the mercury waste is generated by the residents on their premises and the mercury spill came from wastes generated by consumers in their home. Household hazardous waste is not regulated under RCRA as a hazardous waste (40 CFR 261 .4(b)(l)) when the waste is safely managed by the homeowner.

The household hazardous waste exemption was enacted to provide for the legitimate purchase and use of chemical products that are intended for household use without triggering the cradle-to-grave requirements under RCRA Subtitle C. If a responder determines that the original source of the mercury spilled in the residence, or other circumstances regarding the spill incident, do not comport with the regulatory intent of the household hazardous waste exemption, it would be a Regional decision in consideration of state ARARs as to whether or not the household hazardous waste exemption applies.

10.1.3 Universal Waste

Intact (unbroken) mercury-containing equipment that is classified as hazardous waste can be collected and managed under the streamlined collection standards for universal waste set forth in 40 CFR 273. Some states also define broken mercury-containing equipment as universal waste, provided the broken equipment and the spilled mercury are transferred to a container that meets the requirements of 40 CFR 262.34. However, this interpretation is not consistently applied in all states.

10.1.4 Non-Hazardous Waste

If waste mercury is spilled from a source which is not a listed hazardous waste (U151), any spill residues and contaminated debris determined not to be characteristically hazardous waste (D009) either through TCLP testing or applying generator knowledge would not be classified as a hazardous waste and would not be subject to the LDRs or treatment standards prior to land disposal. Non-hazardous wastes are often referred to as “special wastes” for purposes of identifying and tracking low-level mercury contamination through the disposal process.

10.1.5 Listed Hazardous Wastes

Mercury containing articles are not among the process- and industry-specific wastes found in the F and K lists in 40 CFR 261.31 and 261.32. Discarded mercury containing articles do not meet the P or U listing criteria either, because they are in a used form and do not meet the definition of a commercial

chemical product as interpreted or intended by EPA. Although mercury is identified in 40 CFR 261.33 under the listing U151, the materials listed in 40 CFR 261.33 include only those commercial chemical products known by the generic name of the chemicals listed (45 FR 78451, November 25, 1980). Since manufactured articles which simply contain these listed chemicals are rarely, if ever, known by the generic name of the chemical they contain (e.g., thermometer, manometer, sphygmomanometer, lamps, batteries, switches), such manufactured articles are not covered by the U151 listing. EPA considers the P and U list definition of commercial chemical product to exclude manufactured articles such as meters, switches, and lamps. (45 FR 78541; November 25, 1980).

These mercury containing articles, the elemental mercury spilled from those articles, and any related spill residues and contaminated debris, would only be subject to regulation as a hazardous waste if they exhibited a characteristic of a hazardous waste found in 40 CFR Part 261, Subpart C, or if they are a listed hazardous waste for reasons other than the mercury content. Similarly, mercury containing commercial chemical products with a different generic trade name (e.g., Thimerosal, Mercurochrome, Merthiolate) are not U151 listed waste when spilled or discarded although these formulations may be characteristically hazardous for toxicity, with the EPA hazardous waste code D009.

However, if commercial chemical product mercury is spilled (i.e., a spill directly from a container of elemental mercury which was purchased by a laboratory, manufacturer, or other entity as a commercial chemical product and is clearly labeled with the generic trade name "mercury"), the spilled mercury and any spill residues and debris which come into direct contact with the mercury from the spill could be classified as U151 listed hazardous waste. In which case, the land disposal restriction (LDR) and treatment standards promulgated in 40 CFR 268.40 for U151 listed hazardous waste would apply. However, after commercial chemical product mercury is placed into a manufactured article or device (e.g., elemental mercury placed in a Honeywell mercury instrument, elemental mercury placed into a manometer), any mercury spilled from the article or device is excluded from the U151 definition for the reasons discussed above. As such, there are a very limited set of circumstances that would result in a spill of U151 listed mercury waste, which are rarely encountered when handling mercury cleanup waste in typical responses and removal actions. The vast majority of responses and removal actions will involve D009 characteristically hazardous mercury waste.

When making a determination as to whether the U151 listing applies to a mercury spill, consider the following excerpt from the October 1998 guidance document, "Management of Remediation Waste Under RCRA," EPA530-F-98-026.

"Where a facility owner/operator makes a good faith effort to determine if a material is a listed hazardous waste but cannot make such a determination because documentation regarding a source of contamination, contaminant, or waste is unavailable or inconclusive, EPA has stated that one may assume the source, contaminant or waste is not listed hazardous waste and, therefore, provided the material in question does not exhibit a characteristic of hazardous waste, RCRA requirements do not apply. This approach was first articulated in the Proposed NCP preamble which notes that it is often

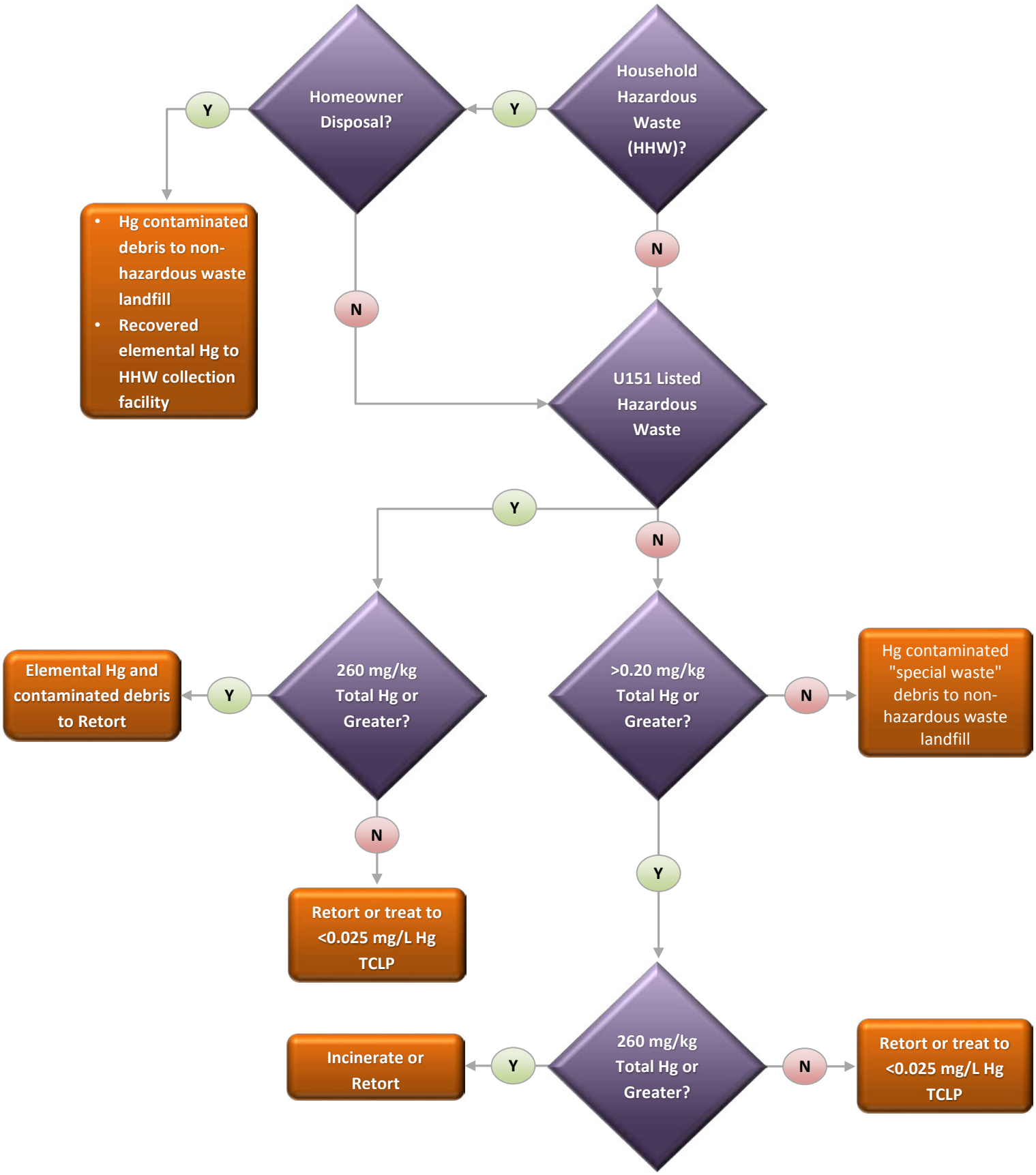
necessary to know the source of a waste (or contaminant) to determine whether a waste is a listed hazardous waste under RCRA and also notes that, "at many CERCLA sites no information exists on the source of the wastes." The proposed NCP preamble goes on to recommend that the lead agency use available site information such as manifests, storage records and vouchers in an effort to ascertain the sources of wastes or contaminants, but that when this documentation is not available or inconclusive the lead agency may assume that the wastes (or contaminants) are not listed RCRA hazardous wastes. This approach was confirmed in the final NCP preamble. See, 53 FR 51444, December 21, 1988 for proposed NCP preamble discussion; 55 FR 8758, March 13, 1990 for final NCP preamble discussion."

10.2 RCRA Requirements

Wastes which are known to be contaminated with mercury at levels equal to or exceeding RCRA TCLP hazardous waste determining limit of 0.2 mg/l and the land ban level of 260 mg/kg must go to a RCRA facility for retort or other form of treatment prior to being disposed of at a hazardous waste landfill. Retorting is an EPA-approved treatment process during which mercury is reclaimed through heating and distillation of mercury contaminated wastes. Wastes which are known to be contaminated with mercury at levels less than RCRA TCLP hazardous waste determining limit of 0.2 mg/l and land ban level of 260 mg/kg are considered non-hazardous special waste.

The flow chart below summarizes the RCRA treatment and disposal standards applicable to mercury containing waste.

Figure 10-1: RCRA Treatment and Disposal Decision Tree



10.3 Transportation/Shipping

A waste profile and a manifest should be used for all mercury-contaminated household items and soil that are transported for off-site disposal. Typical basic shipping descriptions are as follows:

Contaminated debris or soil with mercury concentrations equal to or exceeding RCRA TCLP hazardous waste determining limit of 0.2 mg/l and land ban level of 260 mg/kg would be shipped as:

RQ, Waste Toxic solid, inorganic, n.o.s., 6.1, UN3288, PG III (mercury contained in soil)

Or:

R.Q., Hazardous Waste solid, nos., (D009), 9, NA3077, PGIII

Call the RCRA Hotline at (800) 424-9346 to determine proper shipping names.

In some cases, even though analytical results indicate that waste can be classified as non-hazardous, the OSC, as the generator, may have concerns about the representativeness of the sampling. As a matter of due diligence, the OSC may choose to ship the material to a hazardous waste landfill, even though the waste was classified as non-hazardous.

10.4 Disposal

Household waste/personal items should be segregated by waste streams. There are wastes that have come into direct contact with liquid mercury and waste items that have only come into contact with vapors. For disposal sampling, composite samples are collected and analyzed for Total Mercury and TCLP. The waste manifest for mercury residues may be complicated due to elemental mercury possibly being a listed waste (U151) or characteristic waste (D009). If the waste is not a characteristic or listed waste, a Subtitle D landfill may accept it as non-hazardous special waste.

All contaminated items should be placed into roll-off boxes or drums. Site security should be procured to guard the roll-off boxes and drums until disposal arrangements are made. The following disposal options may be considered:

- Liquid mercury can be managed as follows (see Photograph 10-1):
    - For small residential spills (thermometers and thermostats), recovered mercury can be placed and sealed in a plastic or glass container for delivery to a household hazardous waste (HHW) facility (preferred) or the resident can dispose of it as a

NOTE: *Often OSCs receive questions regarding proper disposal of CFLs. Advise callers that if the CFLs have not broken, commercial hardware or home improvement stores often accept these items for free disposal. For more information on CFLs, consult EPA's Mercury website: www.epa.gov/cfl*

household solid waste (not preferred, but legal). Most household hazardous waste facilities with small quantity generator (SQG) permits can accept very small quantities from residents or responders.

  - For non-residential sites (i.e., schools, hospitals, businesses), encourage the responsible party to conduct the cleanup or hire a contractor. There is no exemption for businesses to dispose of mercury as a solid waste (as there is for households). If an HHW facility is a SQG, responsible parties can also deliver small quantities of liquid mercury at a minimal cost.
  - When EPA is the generator of the material, wastes must only be sent to CERCLA-approved facilities. Mercury retort facilities generally charge by transportation, rather than quantity. As a result, it costs the same to manage 1 pound of mercury as it does 50 pounds.

- Low-level mercury-contaminated household debris can be transported as non-hazardous waste to a hazardous or "special waste" landfill.
  - Items containing less than 0.2 milligrams per liter (mg/l) TCLP mercury are considered nonhazardous special waste.

- Mercury containing wastes greater than 0.2 milligrams per liter (mg/l) TCLP mercury are considered hazardous.
  - As described above, items containing greater than 260 mg/kg of total mercury must go to a RCRA hazardous waste treatment and disposal facility.

- Disposal costs vary depending on how the waste is classified. Non-hazardous solid waste may cost up to $40/ton for transportation and disposal. Special waste and hazardous waste may cost between $60 and $100 per ton for transportation and disposal (depending on the site and disposal facility location).

- Based on the generator's knowledge, the OSC may sign profiles that household debris is characterized as non-hazardous.

- ERRS Contract disposal coordinators and Regional off-site rule coordinators can assist in identifying appropriate landfill or retort facilities to accept mercury wastes.

NOTE: *There are other resources available for information on how to manage specific mercury containing situations. The Thermostat Recycling Corporation (TRC) can accept mercury containing thermostats. Also, the National Vehicle Mercury Switch Recovery Program (NVMSRP) provides information on the management and disposal of mercury switches from vehicles. For more information, refer to www.epa.gov/mercury/business.*

- Universal waste is considered a RCRA hazardous waste with unique management requirements. There are companies that specialize in the management of universal wastes through the disposal process.

Photograph 10-1
View of containers used to ship liquid mercury for recycling (retorting)

10.5 Compliance with the Mercury Export Ban Act (MEBA)

Land Disposal Restrictions in the United States prohibit high-level mercury wastes from being land disposed (landfilled). Instead, high-level wastes are mostly retorted, which involves heating the wastes and recovering the elemental mercury. Recovered mercury is reused in industrial and consumer applications. The U.S. began restricting the use of mercury in products like batteries (Battery Act, 1996), and states have further restricted mercury from schools and hospitals. With fewer domestic uses for mercury, the U.S. has been exporting mercury. However, mercury emissions travel the globe and the U.S. and other nations are taking steps to remove elemental mercury from general circulation. In 2008, the U.S. enacted the Mercury Export Ban Act (MEBA) to limit the ongoing circulation of U.S. sources of mercury. The act has three main provisions that were to take effect in 2013, including:

- Federal agencies are prohibited from conveying, selling, or distributing elemental mercury that is under their control or jurisdiction, other than to the U.S. Department of Energy (DOE);
- All export of elemental mercury is prohibited; and

- DOE shall permanently manage and store elemental mercury generated in the U.S. DOE will accept all Federal and any other voluntary transfer of elemental mercury.

*As of October 2014 DOE has not constructed a storage facility and therefore has not been accepting elemental mercury for storage.

MEBA may have disposal implications on CERCLA response actions. Among these issues are limitations of EPA to transfer elemental mercury to any party except DOE. However, mercury containing waste is not subject to MEBA. Currently, mercury waste may be disposed of as described earlier in this chapter. If waste is retorted, the recovered elemental mercury is then put back into commerce in the U.S. by the treatment company. If the retort facility does not have a market for the recovered mercury, there could be an expectation for the generators of the waste to pay for short or long term storage. EPA does not pay for this type of service as it would be considered post removal site control, which is restricted by the National Contingency Plan for removal actions, and it would lead to the removal action lasting more than 12 months, which is not allowed unless additional findings can be made that it is an emergency or will be consistent with the remedial action to be taken.

Waste export is also not uncommon, and the export prohibition of MEBA may or may not affect export depending on whether the material is excluded and whether elemental mercury may be recovered from the material. The solutions to these issues are not straight forward. Individual situations should be discussed with EPA HQ on a case-by-case basis.

For more information on MEBA, visit http://www.epa.gov/hg/exportban-ques.htm.

Photograph 10-2
View of EPA ERRS contractor loading mercury-contaminated clothing and household items (non-hazardous "special waste") into roll-off boxes for disposal

11 Restoration, Replacement and Reimbursement

In residential situations, EPA generally has the responsibility of ensuring that properties are restored and/or occupants are adequately compensated for losses. However, with residential mercury responses, often the contamination is a direct result of an occupant's actions. When the occupant releases elemental mercury, by rule, they are considered a responsible party. Under CERCLA authority, EPA has an obligation to either ensure that the responsible party takes responsibility for the cleanup or pursue cost recovery after a government-funded action has been completed. In many residential cases, the occupants demonstrate they are not viable, meaning they do not have adequate resources to pay for a cleanup. If the occupant is the responsible party but is found to be not viable, EPA may limit the amount of replacement or reimbursement that it does. At a minimum, EPA should ensure that enough restoration is achieved to make the dwelling livable (i.e., no holes in floors or walls). As a matter of policy, EPA does not upgrade properties when conducting removal actions. Replacement of personal items should be evaluated on a case-by-case basis as part of Regional enforcement policies and guidelines. Refer to EPA's *Guidance on Compensation for Property Loss in Removal Actions (September 1995)* for additional information.

11.1 Restoration

If EPA agrees to restore a residence following a removal, the restoration phase begins when (1) the residential home has been properly decontaminated, (2) post-decontamination air sampling is completed, and (3) a public health agency has determined that air levels are appropriate for residents to reoccupy the home.

The OSC should begin the restoration phase by reviewing pre-decontamination materials (e.g. video, photos, logs). Note any special considerations identified during the decontamination process. List all items to be restored in each residence. A restoration subcontractor should conduct a pre-restoration inspection of each residential yard or home to assess the condition of the structure and utilities and to prepare an estimate of the total cost to restore the impacted items (e.g., yard, carpet, linoleum, walls, floor tile) to their pre-contamination condition. The OSC reviews, modifies if necessary, and approves the estimate prior to initiating any restoration work. Residential restoration should return each house to its condition prior to decontamination and should repair any damage caused by the decontamination process. Some local governments may have resources available to assist with this process. Refer to the Post-Decontamination Checklist found in Appendix C to ensure all potential operations are addressed.

11.1.1 Post Restoration Documentation

Using the same videotape that was recorded to document the pre-decontamination condition of the residence, document the condition of the residence after the EPA contractor has completed removal, decontamination, and restoration activities. Details such as windows, light fixtures, and even the condition of plaster and drywall panels should be documented. A detailed video will help avoid potential disputes about the condition of the residence following decontamination.

11.2 Replacement

If EPA agrees to replace contaminated household items, a third party appraiser should be hired to determine their value. Appraisers charge either flat fees or hourly rates. Following appraisal, EPA's contractor can be used to procure household items for comparable replacement value. At past sites, local government and/or the American Red Cross has agreed to replace "essential items," such as washing machines, mattresses, and clothes.

11.3 Reimbursement

If EPA agrees to reimburse residents for lost household items, a third party appraiser should be hired to determine their value. Following appraisal, EPA can utilize the USACE to provide reimbursement services. For more information on reimbursement compensation, refer to EPA's Guidance on Compensation for Property Loss in Removal Actions (September, 1995). Local government and the American Red Cross may also have the ability to reimburse residents for lost household items.

11.4 Demolition

There are rare cases where structures are so heavily contaminated that they cannot be decontaminated. In some cases the entire house is saturated with elemental mercury. In other situations, the cleanup cannot be achieved without doing major structural damage to the home. If the OSC determines that the only course of action is abandonment or demolition, the decision should be made in consultation with the local municipality responsible for the property. In addition, EPA should not unilaterally take demolition action. The OSC should consult with Regional and Headquarters management as well as Regional Council if they are contemplating these actions.

In some cases, the municipality and/or the homeowner may agree that abandonment is appropriate. After EPA ensures that mercury is no longer an imminent and substantial risk to the environment, the municipality then takes responsibility for posting the structure as uninhabitable and may make longer term plans for demolition (without EPA's future involvement).

Each individual situation will determine what actions are needed to assist the occupants in finding alternate housing. EPA should coordinate with the municipality to evaluate the situation and determine what level of support can be provided to the displaced occupants. Refer to Chapter 8 for more information on temporary and permanent relocations.

12 Reoccupation

Once the results of the air sampling study confirm that the mercury vapor concentration is below the action level set by local health officials/EPA/ATSDR and post cleanup procedures have been completed, the OSC or the local public health agency will indicate that the facility is ready for reoccupation.

12.1 Obtaining Health Concurrence

In almost all instances, the local public health official will determine if a building is safe for human occupancy. At the conclusion of the cleanup, the OSC provides the health department with all relevant reports and data demonstrating that the cleanup was achieved by meeting agreed upon goals. The health official will often provide a written letter (or form) to demonstrate that they concur with the outcome of the cleanup. The letter will document that the structure is safe for human occupancy. In situations where local health officials do not have the expertise to advise on mercury contamination, they may defer to State or Federal public health officials for concurrence with EPA. In rare situations where EPA and local or state health officials disagree on cleanup levels, EPA will consult with ATSDR to evaluate the site specific case.

12.2 De-List Letter from U.S. EPA

When ATSDR or a public health agency indicates that a residence is ready for reoccupation, and restoration activities have been completed, the OSC submits a letter to the local health department

stating that cleanup has been completed and clean-up levels for mercury have been achieved. A copy of the air sampling analytical results should be attached to the letter. Based on this letter, EPA will de-list the site from the master database. Examples of letters regarding (1) a residence that was sampled but did not require decontamination and (2) a residence that required decontamination are provided in Appendix C.

With smaller spills, single residence situations, and/or at the agreement of the involved agencies, a "de-list" letter may not be necessary and all final agreements and documentation can be accomplished via the final Pollution Report (POLREP).

12.3 De-List Letter from Local Health Department

After an OSC submits a letter reporting analytical results and de-lists a residence from the master database, the local health department or other recipient agency should submit a letter to EPA acknowledging that the residence is being removed from the master database. An example de-list letter is provided in Appendix C.

With smaller spills, single residence situations, and/or at the agreement of the involved agencies, a "de-list" letter may not be necessary and all final agreements and documentation can be accomplished viaPOLREP.

12.4 Assisting Residents in Reoccupying Homes

EPA, local health departments, and the American Red Cross typically assist residents in returning to their homes. These agencies are usually available to answer questions about reoccupation. Verbal or written guidance should be given to the occupants for any or all of the following:

- Unpacking bagged items that were not contaminated
- Cleaning of materials that may have been decontaminated using vapor suppressant compounds
- Any structural changes to the building
- Review of what materials were disposed, adjusted and/or replaced
- Actions that the occupants can take to ensure residual vapors continue to dissipate
- Who to contact for future concerns about the action taken.

13 Responder Health and Safety

As described in Chapter 7, screening levels may indicate that respiratory protection is required. Most residential responses can be conducted in Level D PPE. When respiratory protection *is* required, Section 13.1 describes the equipment options available to responders. All EPA response activities are conducted in accordance with EPA's *Emergency Responder Health and Safety Manual*.

13.1 Personal Protective Equipment

Responders may come into contact with mercury via the air or by direct contact, for example, when removing and decontaminating items such as clothes, flooring, furniture, or personal items. PPE, appropriate hygiene, and operational safety all help reduce the exposure risk.

13.1.1 Respirators

Options for respiratory protection at mercury-contaminated sites (from least to most protective) include:

- Level D – No respirator
- Level C – Full-face air-purifying respirators (APRs) with mercury vapor cartridges (Scott AV-2000* with mercury vapor/P100 742 series cartridges)
- Modified Level C – Powered air-purifying respirator (PAPR)*
- Level B – Self-contained breathing apparatus (SCBA) systems (Scott Air-Pak®)*

**Scott AV-2000 APRs require the quarter turn adapter to attach the 742 Series cartridges. This adapter is removed when attaching the SCBA regulator or for use with the 4- mm adapter for the PAPR*

EPA's health and safety policy establishes 25 ug/m^3 as the threshold to upgrade to Level C PPE. NIOSH allows mercury vapor cartridges to be used when air concentrations are less than 50 ug/m^3. Concentrations exceeding this should alert the responders to upgrade respirators to SCBA; however, such high levels are unusual during cleanup actions due to engineered ventilation of indoor spaces.

Photograph 13-1
Scott AV-2000 APR

Photograph 13-2

Scott APR mercury vapor cartridge with P100 and ESLI

Since mercury vapor has no warning properties (i.e., no smell, taste, irritation), end-of-service-life indicators (ESLIs) on the visual edges of the cartridges warn when it is time to change the cartridge. The ESLI is a paper strip that reacts with mercury, changing from orange to dark brown. Once the reaction has taken place, responders should leave the site and the cartridge should be changed. Even if the ESLI on the cartridges are not reacted by the end of the day (after an 8-to-12-hour shift), common practice is to change the cartridges the next morning due to possible absorption of mercury in the charcoal filter media overnight.

Figure 13-1: Recommended Respiratory Protection Based on Mercury Vapor Concentrations

Level of Protection	Action Level
Level D	< 25 ug/m^3
Level C with mercury vapor cartridges	<50 ug/m^3
Level B	> 50 ug/m^3

If the ambient concentration of mercury vapor exceeds the exposure limits, PPE should be upgraded accordingly. NIOSH-approved mercury specific cartridges must be used with the respirators. The MSA Mersorb® - P100 Indicator Type Combination Cartridges should be used with the MSA respirators and the Mercury Vapor/Chlorine with P100 should be used with the Scott respirators.

13.1.2 Gloves, Booties and Suits

Protecting feet and hands with appropriate gloves and booties is critical, as these are the areas of the body most likely to come in direct contact with elemental mercury.

PPE clothing for chemical protection must meet the permeation testing requirements of ASTM Method F 739. In this standard, a test cell is divided with a swatch of fabric. The liquid chemical is introduced on one side and monitored for permeation and breakthrough on the other. These tests have shown that nitrile, neoprene, butyl rubber, and even natural rubber protect against liquid elemental mercury. Activities that will rip these materials or force liquid mercury into the material may require additional protection in the way of outer leather gloves, thicker synthetic gloves, or additional layers of neoprene that are easily removed and replaced while sampling.

Material needed to protect the body is determined by the activity of the wearer. If the person is conducting simple sampling, monitoring, or other low-impact tasks, a Tyvek® suit may be appropriate. However, if the task requires possible contact with mercury such as removal of contaminated furniture or demolition of flooring, a polymer-coated fabric such as a Saranex® or Tychem®-style suit may be needed. All materials listed in the Quick Selection Guide to Chemical Protective Clothing passed permeability tests for mercury, showing protection greater than 8 hours.

13.2 Controlling Ingestion

Ingestion of mercury on contaminated sites typically happens by inadequate decontamination of hands followed by eating, smoking, applying cosmetics, chewing gum, or chewing tobacco in the exclusion zone. Therefore, ingestion is easily controlled by prohibiting such activities on-site or requiring hand cleaning upon every exit from the inclusion zone.

13.3 Worker Exposure Levels

Figure 13-2 contains the current regulated and recommended mercury vapor exposure limits for workers. Personnel working on-site should consider the exposure limits listed in Figure 13-2 when selecting PPE.

Figure 13-2: Worker Exposure Published Action Levels

Agency	Action Level
Occupational Safety and Health Administration (OSHA) This number represents a Ceiling not a time weighted average	100 ug/m^3
American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Value (TLV) - Time weighted Average	25 ug/m^3
NIOSH Immediately Dangerous to Life and Health (IDLH)	10,000 ug/m^3
National Institute for Occupational Safety and Health (NIOSH) Recommended Exposure Limit (REL) - Dermal	50 ug/m^3

13.4 Health and Safety Plan

A Health and Safety Plan (HASP) must be prepared for each response. Components of a HASP include:

- Site Safety Plan
- Action Levels for Evacuation of Work Zone Pending Reassessment of Conditions
- Decontamination Procedures/Solutions
- Equipment/Supplies Checklist
- Emergency Contact Information
- Site-Specific Health and Safety Plan Acceptance
- Existing Site Safety Plan Addendum Form
- Daily Safety Meeting Record
- Hazard Evaluation Sheets for Major Known Contaminants – NIOSH Information

13.5 Responder Decontamination

A responder who has been working with elemental mercury will probably have small droplets adhering to gloves, boot covers, and over garments. Removing these items at the decontamination line, testing them, and disposing of them as mercury-contaminated waste off-site, if necessary, is the best way to ensure that contamination is not spread. Personnel decontamination at a mercury site is straightforward. A responder is assumed to be contaminated on all surfaces except the mask. Decontamination consists of removing gloves, booties, and overgarments without contaminating skin or street clothes. One proven process is described below:

- A decontamination line is established consisting of an approximately 2-meter x 2-meter area covered in plastic sheeting, with table, stool, and plastic trash bag;
- Radios, instruments, GPSs, and other equipment items are placed on the table and readied for the next entry. Chargers may be used during decontamination. Equipment that has come into contact with mercury-contaminated surfaces is assumed to be contaminated until its status is verified by monitoring;
- Responders leaving the exclusion zone sit on the stool, remove PPE, and place it in the contaminated trash container; the order of removal is (1) boot covers, (2) overgarments, and (3) gloves; and
- Responders take off their masks as they leave the exclusion area. Masks are assumed to be uncontaminated unless the responder has touched the mask with outer gloves.

Decontamination is most likely to fail due to lack of discipline; that is, responders failing to pass through decontamination while retrieving forgotten equipment, taking rest breaks, and so forth. Decontamination discipline should be maintained by:

- Reminding responders how easily contamination is spread;
- Providing additional required equipment at the edge of the decontamination zone; and
- Ensuring that PPE is completely removed for bathroom breaks.

In hot environments and during prolonged operations, drinks may be staged at the edge of the decontamination zone. If safety and operations concur, responders may come to the exclusion zone boundary, pull back overgarment hood, remove gloves, remove mask, drink, remask, reglove, and return hood over mask.

Responder decontamination does not necessarily involve monitoring for residual contamination using a monitoring instrument. Time and effort is usually better invested in ensuring that decontamination practices are adhered to rigorously. In special circumstances, such as personnel leaving the exclusion zone without PPE, monitoring may be necessary. Sometimes it is prudent to screen hands and feet. Equipment and instruments can be scanned with the Lumex.

Appendix A: ATSDR Chemical Specific Health Consultation and Suggested Action Levels

Executive Summary

In 2000, the Agency for Toxic Substances and Disease Registry (ATSDR) provided tables of action level guidelines for indoor air concentrations of elemental or metallic mercury in response to a request from both the U.S. Environmental Protection Agency (EPA) and the state of Michigan. The action levels had been previously developed for individual sites and situations, but the tables summarized these guidelines in a succinct package for use by field personnel. The request was prompted by several small spills in homes caused by replacing or relocating natural gas regulators containing mercury. The homes affected included those serviced by utility companies in both Chicago and Detroit. The guidelines were designed to help risk managers at spill scenes in homes or other locations make decisions regarding cleanup, relocation, etc. Throughout the years, these action level guidelines have been widely disseminated by users. A workgroup has been formed jointly by EPA and ATSDR to develop consistent cleanup guidance for mercury spills, including not only public health actions but also cleanup and sampling methods. As part of that joint effort, EPA has requested that ATSDR update the 2000 guidelines to be included in a more comprehensive guidance. This health consultation is intended to provide that update.

The health consultation provides detailed justifications for action levels based on the ATSDR Chronic Minimal Risk Level and EPA Reference Concentration. The recommended action levels for mercury in residential settings remain 1 $\mu g/m^3$ for normal occupancy and 10 $\mu g/m^3$ for isolation (e.g., evacuation, limited access) of the residents from exposure to the mercury. Action levels for settings other than residential are based on residential levels and adjusted for the condition based on the presumed exposure. Sections that describe when action levels should be adjusted to meet site specific conditions are included. The most useful features of the 2000 tables have been retained; new sections have been added that address issues related to the tables that have recurred during the past 11 years. Additional information to help on-scene risk managers communicate risk is provided. Technological advances in detecting environmental mercury are also considered.

1.0 Introduction

1.1 Background

Elemental, also called metallic, mercury is common in our environment due in part to its unique properties and multiple uses in our daily lives [Baughman 2006; Gochfeld 2003; Risher 2007; Song 2009]. Mercury in its elemental state can pose a hazard to humans. The hazard for any person is based on how sensitive that person is to the effects of mercury, how long that person is exposed to mercury, and how much mercury is present, among other factors. These factors as they pertain to mercury spills are discussed below. Mercury is persistent in the environment, and is considered a hazard primarily under chronic exposure scenarios under most conditions. Mercury cleanups are difficult and pose substantial challenges [MacLehose 2001] to risk managers, such as the U.S. Environmental Protection Agency's (EPA) On-scene Coordinators (OSC). Throughout the years, various EPA Regions have established guidance for conducting these cleanups. EPA's

Office of Emergency Management convened a National Workgroup to harmonize this guidance and invited the Agency for Toxic Substances and Disease Registry (ATSDR) to join the Workgroup [EPA 2011]. Many of the guidance documents developed by the various regional offices included "Suggested Action Levels for Indoor Mercury Vapors in Homes or Businesses with Indoor Gas Regulators". This guidance was developed by ATSDR for public health and environmental professionals in 2000 [ATSDR 2000]. The National Workgroup requested that ATSDR revise these action levels to reflect advances in technology and knowledge gained through experiences since ATSDR provided them. EPA and ATSDR staff formed a Subgroup of the National Workgroup. The Subgroup determined that an ATSDR chemical-specific health consultation would be the most effective way to accomplish this task. The health consultation will be included in the National Policy upon finalization of that policy. The Subgroup requested that the list of action levels be expanded to include other exposure settings such as schools and vehicles such as school buses.

Mercury is a conductive metal and a liquid at room temperature, physical properties that make the substance a unique asset in many industrial and consumer applications [HSDB 2005]. Mercury is also used in some of the rituals and practices of certain religious sects [Alison Newby 2006; Garetano 2006, 2008; Rogers 2007, 2008]. When spilled, mercury's viscosity is similar to that of water—it flows and collects in the same way and locations that water would if spilled. However, mercury is unusually dense compared with water; a milliliter (mL)of mercury weighs more than 13 grams (g) while a milliliter of water weighs only 1 gram. Mercury has a low vapor pressure at standard temperature and pressure, so the liquid vaporizes slowly at room temperatures [HSDB 2005; NIOSH 2007]. Elemental mercury may combine with oxygen to form a mercuric oxide skin on its outer surface. Mercuric oxide does not vaporize, but the shell formed in this manner is fragile. The slightest movement can break this oxide shell and free the elemental mercury contained inside [EPA 2005]. Mercury amalgamates with other metals and is attracted to sulfur-based compounds [Yamamoto 2007]. Mercury is unusual in the number and properties of other compounds it forms. This health consultation evaluated metallic mercury (elemental mercury or quicksilver) only. Other forms of mercury have different properties and different hazards that are not addressed here except as they relate to metallic mercury. In American homes with no known mercury spill, concentrations in the 0.01–0.1 $\mu g/m^3$ range have been reported, with typical ambient (outside air) concentrations approximately a factor of 10 less than that [Carpi 2001; Garetano 2008; Johnson 2003].

1.2 Health Implications

The primary route of exposure to metallic mercury is inhalation of its colorless and odorless vapors [ATSDR 1999; Bose-O'Reilly 2008; Lee 2009]. Ingested elemental mercury can be absorbed poorly through the intestinal walls. Dermal exposure or absorption of metallic mercury through the skin is considered a minor exposure route [ATSDR 1999; Ellis 2009]. Some case studies report dermal irritation after prolonged contact with mercury [De Capitani 2009], however, this dermal irritation does not seem to cause greater absorption.

The organ or organ system in humans most sensitive to all forms of mercury changes somewhat over our life spans. For a developing fetus or young child, the most sensitive endpoint is considered to be the developing central nervous system (CNS) [Abbaslou 2006; Baughman 2006; Bensefa-Colas 2010; Bose-O'Reilly 2008, 2010; Grant 2010]. While data about humans are limited, several animal studies report CNS effects in offspring after maternal exposure to mercury (see Section 2.2.1.6 of the ATSDR Toxicological Profile) [ATSDR 1999; Morgan 2002]. As humans mature, our CNS system completes its development and we become less sensitive to the effects of mercury on our CNS. That is, a greater exposure (i.e., higher concentration, more frequent exposure events, or longer duration of exposure events) is required to produce effects on the CNS. For this reason, our most sensitive populations are young children and developing fetuses; women who are confirmed or suspected to be pregnant also require consideration as a sensitive population to protect the fetus. The age at which young children become less sensitive to the CNS effects of mercury is unclear but the concern is usually for pre-school children. Individuals that have matured beyond this window of greater vulnerability for the CNS may experience effects on the kidneys before the effects on the CNS become evident.

Consequently, the next human organ most sensitive to the effects of mercury tends to be the kidney; inorganic forms of mercury are excreted almost exclusively through the kidneys [Baughman 2006; Bensefa-Colas 2010; Franko 2005; Opitz 1996; Samir 2011]. Generally speaking, the concentration of mercury that may pose a CNS threat to the young is less than the concentration that could affect the kidneys in older children or adults under the same conditions of exposure. In animals, acute mercury exposures (as long as 14 days in duration) of approximately 0.05 mg/m^3 may cause significant CNS effects; exposures in the 0.5–0.86 mg/m^3 range more commonly cause significant CNS effects. Typically, acute exposures of ~3 mg/m^3 affect the kidneys (see Figure 1A) [ATSDR 1999]).

1.3 Guidance Values

Both ATSDR and EPA have developed health guidance values (HGVs) for inhaled mercury vapors, based on a 1983 study of workplace exposures [Fawer 1983]. The workers in the study were exposed in their workplace to mercury vapors. The workers in the Fawer cohort came from three different types of workplaces: fluorescent tube manufacture; chloralkali plants; and acetaldehyde production. The authors reported a Lowest Observed Adverse Effect Level (LOAEL) of 26 $\mu g/m^3$ of exposure averaged over a period of 15 years [Fawer 1983]. As discussed below, the effect noted in the study was a slight tremor in the hands. ATSDR has defined a Minimal Risk Level (MRL) for chronic exposures (more than 365 days) to mercury of 0.2 $\mu g/m^3$. In developing the MRL, the workplace average from Fawer was adjusted from a 40-hour to a 168-hour exposure per week (i.e., 24 hours/day, 7 days/week), and then divided by an uncertainty factor of 30 (3 for use of a minimal LOAEL and 10 for human variabliliy) to account for the LOAEL and individual sensitivities. {It should perhaps be noted that the concentration in the Fawer study as well as many other occupational studies was averaged over a typical workday and their results may not be completely representative of continuous or significantly longer durations of exposure such as may be found in a residential setting.} Thus, an MRL is an estimate of the level of daily exposure to a hazardous substance (in this case, metallic mercury), sustained through a specific route and duration of exposure, that is unlikely

to cause measurable risk for adverse, noncancerous health effects (metallic mercury is not considered carcinogenic [cancer causing]) [ATSDR 1999]. EPA used the same study as their primary reference to develop a Reference Concentration (RfC) of 0.3 µg/m^3 using slightly different assumptions and somewhat different justifications for the same uncertainty factors. EPA also cites other supporting studies in a weight of evidence approach [EPA 1995]. Please see the IRIS record available at www.epa.gov/iris for the details of their derivation. The RfC is an estimate (with uncertainty spanning perhaps an order of magnitude) of a daily inhaled exposure of the human population (including sensitive subgroups) that is unlikely to cause an appreciable risk of harmful effects during a lifetime. For further information, see Section 2.5, Chapter 7, and Appendix A of the ATSDR Toxicological Profile for Mercury and the EPA's Integrated Risk Information System (IRIS) on the Internet at www.epa.gov/iris/. ATSDR considers the RfC and the MRL for chronic exposures to be within the uncertainties of the derivations and the same value for all practical purposes.

Within the limits of this health consultation, an *action level* is an indoor air concentration of mercury vapor that should prompt public health and environmental officials to consider implementing response actions. The various suggested action levels provided in this document are intended as recommendations, not as regulatory values or cleanup values, although some of the recommended action levels may correspond to present or future values adopted by regulatory authorities. The following discussion is intended to confirm that these action levels should not be considered as "bright line" indicators of toxicity or predictors of adverse health effects. These action levels are provided primarily to prevent adverse health effects by identifying environmental concentration associated with any level of toxicity. The secondary purpose is to identify when precautions should be implemented to prevent adverse health effects and when such precautions may be stopped with a reasonable expectation of no adverse effects. Risk managers, such as EPA OSCs and their state and local counterparts, should determine whether a recommended response action is necessary based on the actual conditions and circumstances they encounter at the exposure site.

2.0 Discussion

In the course of this discussion, the reader may find it useful to refer to Tables 1 and 2 found towards the end of this consultation. In the tables, the sections of this consultation that bear on the development of the recommended action levels are provided in the right hand column. As the discussion progresses, there are 4 key elements in this approach to bear in mind; these elements are adjusted to the assumed conditions of exposure in each scenario. These elements are explained in the various sections and summarized here:

- Visible mercury cannot be left readily accessible after a clean up is complete (Section 2.1);
- Experience has shown concentrations of 6 µg/m^3 or above are usually associated with the presence of liquid mercury that may not have been discovered (Section 2.1);
- Urinary levels in some humans begin to increase at environmental concentrations as low as 10 µg/m^3; this consult treats exposure to that concentration, if not terminated, as a threshold that could cause effects in some people (Section 2.2.2) ;

- The benefits to human health of cleaning transient spills to a concentration below 1 μg/m^3 under most conditions typically do not outweigh the potential consequences to overall quality of life for individuals in that environment (Section 2.2.1).

2.1 "Visible" Mercury

Because of metallic mercury's unique properties and appearance, it has long attracted the attention of humans of all ages. Liquid mercury is shiny and flows easily over the hand. It flows together to make large beads and splits apart to make smaller beads—the beads can take any shape. It feels heavy to the touch, but splatters readily. For all these reasons, liquid mercury may be kept, shared, and distributed by non-professional persons who are not aware of the hazard. If visible mercury is not contained appropriately, it is a likely hazard because it may fall into the hands of our most sensitive population [Hudson 1987]. Visible mercury should therefore be considered an attractive nuisance [Azziz-Baumgartner 2007; Baughman 2006; CDC 2005; Johnson 2004; MacLehose 2001; Nickle 1999; Risher 2003].

ATSDR is often asked how much mercury is required for it to become visible to humans. While visual acuity (i.e., how well one sees objects) varies by individuals, it must be remembered that the air concentrations of mercury associated with the HGVs discussed in Section 1.3 are small and mercury is very dense. In a room that is 3 meters (roughly 10 feet) square with a 3 meter [m] ceiling, approximately 5 micrograms [μg] of vaporized mercury would elevate the air concentration of mercury in the room to the ATSDR MRL (3 m x 3 m x 3 m = 27 m^3 x 0.2 μg/m^3 = 5.4 ug). Five micrograms equates to less than a nanoliter of liquid mercury (5 x 10-6 g x 1 mL/13.5 g = 3.7 x 10-7 mL or ~0.4 nL). For comparison, the most popular brand of oral thermometer in the United States contains approximately 0.3 milliliters of mercury, or about 4 grams (4,000,000 micrograms) of liquid mercury. A nanoliter (nL) of liquid would be 6 orders of magnitude or 1 million times smaller than the volume in a thermometer and effectively invisible to most humans. Therefore, if an uncontained bead of mercury can be seen in most indoor spaces, it is possible that enough vapors are present in that space for the concentration to be greater than the HGV described previously. Multiple factors such as relative humidity, surface area of the liquid, barometric pressure, and temperature can influence vaporization of a liquid. Many of these factors can change over time and by location. During an indoor release, most of these factors would likely be fairly constant in a state that would promote vaporization. Because mercury is much denser than air, stable conditions are likely to stratify (layer) the mercury vapors in a confined space like the room described previously. In addition, different materials likely to be found in indoor environments may have different affinities for mercury vapors, which can also affect how much mercury is available in the indoor air. The actual concentration at any given point in a room at any given time would be expected to vary [Lui 2011; EPA 2005; Winter 2003]. Air-monitoring instruments are required to determine the existence of, and often to find the source of, mercury in a room [CDC 2005]. The experience of EPA staff has been that concentrations as low as 6 μg/m^3 typically indicate that liquid mercury is present in a room [Nickle 1999; Nold 2011].

Because mercury is an attractive nuisance fascinating to many people and even a microscopic amount of it can contaminate many individual spaces, the initial criteria for all mercury cleanup actions must be that no

visible mercury remains. This is indicated in both tables 1 and 2 in the 2 columns on the right. Removing the liquid mercury also reduces the source of the vapors in the space, meaning that any residual vapor concentrations in the area should decrease over time after the source is removed [Azziz-Baumgartner 2007; Baughman 2006; CDC 2005; Cizdziel 2011; Risher 2007; Tominack 2002]. All of the action levels [i.e., usually less than 1 or less than 3 μg/m^3 in Tables 1 and 2] recommended here that terminate cleanup actions as opposed to implementing protective measures assume that all visible mercury has been removed from the location of the spill. The importance of this key action in protecting public health cannot be overemphasized.

2.2 Residential Settings

2.2.1 Normal Occupancy: Because elemental mercury is primarily an inhalation hazard, any cleanup should be focused on minimizing this exposure pathway. Cleaning any area in a typical residential setting to make the indoor air concentration meet the MRL or RfC would require removing virtually every nanoliter of liquid mercury from that area. This exacting task could lead to difficult risk-management decisions, such as the considerable loss of personal property that is contaminated to the extent that cleanup is not feasible (e.g., the cleaning process would destroy the property or exceed the cost of replacing the article with similar articles). This loss of property could be severe enough to cause a substantial lifestyle change that could increase the potential for adverse health outcomes [Nickle 1999]. ATSDR prefers that no person be exposed to a concentration of a toxic substance greater than the recommended HGVs, such as the RfC or MRL. However, given the extraordinary measures required to remove enough liquid mercury to reach the HGV concentrations, the human health benefit of such a removal action may not always be warranted by the threat [ATSDR 2008; CDC 1995; Nickle 1999; Risher 2003].

The principal study (i.e, Fawer, 1983) upon which both of the HGVs for mercury discussed in Section 1.3 was based used a very sensitive method of measuring the adverse health effect in the workers. Tremor reported in the study could only be measured when a small weight was suspended from the study worker's hand. The tremor did not cause debilitating harm or contribute in any way to a lower quality of life for the workers. Because many of the participants worked in the facilities in the study before adequate protective emission controls were in place, the long-term workers likely may have been exposed to much higher levels of mercury than was reported in the study. However, the workers clearly had been exposed to sufficient mercury to cause a measurable tremor in their hands, which represents a systemic effect.

The lowest concentration of mercury reported in the scientific literature considered to be the most significant by ATSDR in the ATSDR Toxicological Profile (Table 1; ATSDR 1999) associated with adverse human health effects is 10 μg/m^3 [Ngim 1992]. This study was essentially a survey of symptoms among dentists, nurses, and aides who worked with dental amalgams that contained mercury for 8–10 hours per day during a 6-day work week. The authors of the study simulated preparing the amalgams, measured the concentration in the breathing zone, and reported the concentration from the simulation as the exposure of the survey participant. How accurately the simulation reflected both historical conditions and current practices is unknown. While both EPA and ATSDR chose to use other studies to develop their respective

HGVs, both agencies agree that Ngim [1992] is an essential supporting study [ATSDR 1999; EPA 1995; Ngim 1992].

Although ATSDR and EPA have established HGVs with no appreciable risk of human harm, a range of uncertainty exists regarding the concentration at which a person may actually experience health effects. The closer air levels are to the RfC or the MRL, the less likely any exposure is to cause adverse health effects. The closer air levels are to the lowest concentrations known to cause any level of harm to humans (the lowest toxic concentration level for humans [TCLo]), the more likely any exposure is to cause harm. In many cases, response action will be initiated quickly enough to recover the liquid mercury and stop exposures in short order. Applying HGVs, such as the RfC or MRL, that are intended for chronic exposures to situations involving shorter term exposures could be overly conservative in many cases. Historically, ATSDR has recommended 1 $\mu g/m^3$ as the residential level requiring cleanup. This concentration is a factor of 10 lower than the human TCLo [Ngim 1992], and a factor of 26 lower than the concentration which is the point of departure for the HGV of both ATSDR and EPA [Fawer 1983]. {It should be noted that the concentrations in these studies were averaged over a typical workday and their results may not be completely representative of continuous or significantly longer durations of exposure such as a residential setting.} This concentration is within a factor of 10 of the HGV concentrations described earlier. This concentration is also approximately 100 times that expected to be seen from the many other sources of mercury in our environment [ATSDR 1999; Cairns 2011; Carpi 2001; Cizdziel 2011; Garetano 2008; Johnson 2003; Lyman 2009; Song 2009]. Studies indicate that 1 $\mu g/m^3$ is approximately an order of magnitude lower than the concentration (i.e., 10 $\mu g/m^3$) where results of urinary levels of mercury appear to begin to increase in concentration.. [Hryhorczuk 2006; Tsuji 2003]. Experience in previous removal actions by EPA has shown an action level of 1 $\mu g/m^3$ generally causes significantly less disruption of lifestyles and fewer potential consequences for individuals or families involved in the spill event [Nickle 1999]. ATSDR's standard practice has been to recommend this value (1 $\mu g/m^3$) unless the exposed population is particularly susceptible to the effects of mercury (e.g., a mercury spill in a neonatal intensive care unit or a dialysis center).

2.2.2 Isolation/Relocation: ATSDR is often asked at what level of mercury in indoor air persons should be isolated from the exposure to mercury. Isolation in this sense may include, but not be limited to:

- reducing the time persons spend in a particular area;
- closing the ventilation system connections leading to and from a specific portion of a building;
- reducing the emission rate of vapors from the source; or,
- relocating some or all of the persons who normally occupy the building.

All of these isolation techniques have some negative implications, whether relatively minor, such as reducing the time spent in a given room, or potentially significant, such as persons leaving their home entirely. To complicate matters further, it is common for the persons involved to be uncertain as to when the release occurred. Before isolating an area and incurring those negative implications, ATSDR suggests that, in most cases, the threat to the persons involved should be certain. Due to uncertainty about the

duration of exposure before the spill was discovered, continued exposure to mercury levels that could be harmful should be minimized [Azziz-Baumgartner 2007]. Some studies have indicated that urinary levels of mercury in humans begin to increase at mercury concentration levels 10 μg/m^3 or higher. [Hryhorczuk 2006; Tsuji 2003]. Based on this and the Ngim study discussed above, ATSDR will consider the mercury concentration level of 10 μg/m^3 as the TCLo in humans for this health consultation. At the TCLo, adverse effects are possible for susceptible persons, depending on the duration of exposure [ATSDR 1999; Cherry 2002; Hryhorczuk 2006; Ngim 1992; Tsuji 2003]. Therefore, ATSDR usually recommends risk managers consider the need to isolate humans from the spill when a concentration level ≥10 μg/m^3 is determined.

As with the other action levels described in Tables 1 and 2, conditions at the scene may indicate that a higher, or rarely a lower, concentration than 10 μg/m^3 is acceptable before isolation measures are truly required. In addition, the risk manager at the scene (e.g., an EPA OSC) may have reasons to seek relocation of residents other than mercury contamination, such as physical hazards caused by removal techniques or necessary curing of sealants.

2.2.3 Personal Belongings: The hazardous state for this form of mercury is predominantly a vapor; therefore, it can be highly mobile in the indoor environment. Both the liquid and the vapor may collect in porous materials, such as fabric, rubber, and home furnishings. The mercury may invade cracks and crevasses of appliances, flooring, and electronics. In many settings, these belongings represent a substantial investment on the part of the owner who will have an understandable desire to salvage whatever is possible. The challenge of determining what can be saved and what must be disposed of lies in the uncertainties associated with the exposure. For instance, how much time does a child spend sleeping with a favorite stuffed animal and breathing whatever vapors their companion emits? How often does a refrigerator cycle on or off, and who is normally nearby and affected by that heating? How large is the room where the home computer is off-gassing mercury? We do not have the data to answer these kinds of questions and to address all of the possible permutations without analyzing specific conditions and personal habits at a site. This level of detailed analysis, which could change from person to person or structure to structure, is not feasible for a non-site–specific health consultation. We must either dispose of everything contaminated or evaluate the potential risk of the contamination.

The ultimate goal of evaluating a contaminated belonging would be to ensure that the mercury concentration in the breathing zone of the person using the contaminated items under normal use patterns will not exceed 1 μg/m^3 for a time sufficient to cause harm. The preferred method to assess the amount of contamination is to bag small-to-medium items, heat the bag to what might be reasonably anticipated to be maximum temperatures of normal use, and take headspace readings within the bag [Baughman 2006; Nickle 1999]. Large items, such as couches, recliners, and mattresses, with porous surfaces that come in contact with mercury can raise the vapor concentrations more than smaller items in the same room. For larger items, such as appliances and electronics, typically the vapors from the cooling vents have been measured for mercury concentrations. These concentrations would normally be much higher than the readings after the vapors have dispersed into the room. The higher readings would be observed because

the same number of molecules of vapor would be contained in a smaller space (e.g., at the point of emission at the vent or contained within a bag).

The suggested action levels developed in 2000 recommended that the elevated readings in the headspace or the point of emission should be less than 10 μg/m^3 [ATSDR 2000]. Because ATSDR wanted to ensure that the belongings had actually been contaminated before they were deemed a threat, that suggested level was based primarily on the human TCLo and the technical limitations of the survey instruments available at the time. Extensive field testing by EPA's Environmental Response Team has demonstrated that newer instruments are both more sensitive and less prone to yielding false positives due to interferences. Therefore, measurements can now detect lower concentrations with the same level of confidence as higher levels that were measured previously [EPA 2005].

Generally speaking, EPA's experience has shown that when liquid mercury comes in direct contact with porous objects or objects that generate heat under normal operation, those objects are not recoverable. ATSDR recommends that such objects be disposed of appropriately [Nickle 1999].

The recommended action level for the residential setting is ≤1 μg/m^3; the 10 μg/m^3 suggested in 2000 has generally worked well in reducing the vapors from belongings in a home (when belongings have been exposed only to mercury vapors) to support this action level [Nickle 1999]. When an unusually large object, such as a freezer, is used in a small room, such as a typical utility room, the contamination level in the room may exceed the 1 μg/m^3 limit even when the freezer does not exceed the 10 μg/m^3 limit for personal belongings. Likewise, when several items, such as clothing, that do not exceed the 10 μg/m^3 headspace limit are placed in a small room, such as a second bedroom in a mobile home, the home may exceed the 1 μg/m^3 limit. Obviously, appliances not in use when tested may exceed the action level during normal use.

The site risk manager's professional judgment determines when a lower action level is necessary. EPA's experience has shown that concentrations in the 1–3 μg/m^3-range in the headspace/vent emission usually will allow levels in even smaller rooms to remain at or below 1 μg/m^3. Experience has also shown that these action-level concentrations indicate that minimal or no contact between the contaminated item and liquid mercury has occurred. Finally, EPA's experience has also shown that concentrations >6 μg/m^3 in indoor air usually indicate the presence of liquid mercury that may not have been discovered [Nickle 1999; Nold 2011]. Therefore, ATSDR recommends headspace readings for belongings that may have been contaminated byvapors from a mercury spill that are in the range of 3-6 μg/m^3 be considered protective of human health

2.2.4 Conditions when other concentrations should apply: Under some conditions, ATSDR will consider concentrations in non-occupational settings above 1 μg/m^3 as safe for human health [ATSDR 2008]. Examples of these conditions are when other mechanisms can be put into place to reduce exposure durations for sensitive persons, or when a population is less sensitive (e.g., healthy adults). These conditions usually occur when the methods required to achieve lower concentrations may possibly cause more harm (e.g., increased property damage and potential harmful lifestyle changes as described earlier) than would the short duration of exposure to slightly higher mercury levels (when the source of the

mercury vapors has been controlled [e.g., removal of visible mercury]). Conditions vary from site to site, which may suggest the need for modification; however, ATSDR has never considered an exposure level in a residential setting at a concentration >10 μg/m^3 as acceptable for long-term use. Again, use of these higher levels normally implies that all visible mercury has been removed, indicating that all point sources are removed or isolated. Subsequently, with no mercury source to continue vaporizing levels are expected to decline with time.

Persons in whom the CNS is developing (e.g., fetuses, infants, and young children) are the population considered most sensitive to mercury exposure and, thus, require greater protection [Bensefa-Colas 2010; Bose-O'Reilly 2008; Opitz 1996]. No evidence indicates that persons with deteriorating nervous systems are more susceptible to the effects of mercury than healthier adults; however, a person's underlying conditions may mask the more subtle effects of mercury. Prolonged exposure to mercury also affects the kidneys [ATSDR 1999; Baughman 2006; Bensefa-Colas 2010; Franko 2005; Opitz 1996; Samir 2011]. Under almost all conditions, removing visible mercury from the indoor environment until a residual concentration of 1 μg/m^3 is reached would be protective of even the most sensitive population.

If a person has an underlying condition that makes them more susceptible to the effects of mercury than healthier persons, a concentration less than 1 μg/m^3 mercury in a residential setting may be considered necessary. An invalid with poorly functioning kidneys who normally lives in a space where mercury has been spilled is an example of this situation. An infant born prematurely who is struggling to complete its development may be more susceptible to mercury contamination than an infant born at full term. When OSCs are faced with similar unusual conditions, consulting with public health officials and the healthcare provider for the person is warranted.

Inhaling elemental mercury from a spill may contribute to the overall body burden of mercury. Persons with already high systemic levels of mercury may be more susceptible to adverse effects due to the contribution of the new exposure [Goldman 2001; CDC 2001]. Persons likely to have high systemic levels of mercury include those who work with mercury in occupational settings. Other persons likely in this category are those who routinely eat more than the recommended two meals of fish per week [EPA/FDA 2004]. These persons should be advised to consult their personal healthcare provider regarding the additional exposure to mercury due to the spill. Risk managers may need to consider isolating these persons at a lower concentration of mercury than suggested in Section 2.2.2 earlier. No adverse effect would be expected at the normal occupancy level suggested in Section 2.2.1.

2.3 Commercial and Occupational Settings

2.3.1 Workplaces covered by the Occupational Safety and Health Administration regulations in Subpart Z: Occupational settings where mercury exposure is anticipated are addressed by various occupational standards. The Occupational Safety and Health Administration (OSHA) does not have a specific standard for mercury in Title 29 of the Code of Federal Regulations (29 CFR). However, general requirements, such as the Hazard Communications Standard (29 CFR 1910.1200), Respiratory Protection Standards (29 CFR 1910.134), and a health and safety program for workers who might be exposed to a "Subpart Z" hazard (29

CFR 1910.1000, Table Z-2), do apply. See http://www.osha.gov/SLTC/mercury/index.html for a complete list of standards applicable to mercury exposure. Industrial hygiene recommendations and best practices by the American Conference of Governmental and Industrial Hygiene (ACGIH), the National Institute for Occupational Safety and Health (NIOSH), and OSHA include periodic monitoring of the workplace air, biological exposure indices to monitor worker's individual body burdens, periodic medical monitoring, and engineering controls to reduce mercury concentration at any given workstation [HSDB 2005]. See http://www.osha.gov/SLTC/healthguidelines/mercuryvapor/recognition.html for these guidelines. In addition, workers are presumed to be healthy adults with exposure durations of 40-hour workweeks for 40 years. Under these conditions, which obviously include responders and others workers subject to the requirements of OSHA's Hazardous Waste Site Operations and Emergency Response Standard [29 CFR 1910.120]), the occupational standards would be expected to protect human health. OSHA established the Permissible Exposure Limit (PEL), the only legally enforceable federal U.S. standard, as a ceiling (i.e., level not to be exceeded) value of 100 $\mu g/m^3$ (actual standard is 1 mg/10 m^3). NIOSH set a Recommended Exposure Limit (REL) of 50 $\mu g/m^3$ as a 10-hour, time-weighted average. The American Conference of Governmental and Industrial Hygienists (ACGIH) recommended the most recent occupational exposure standard as the Threshold Limit Value–Time Weighted Average (TLV-TWA) of 25 $\mu g/m^3$. ACGIH has also recommended biological exposure indices (BEI) in both urine and blood [ACGIH 2008; HSDB 2005].

2.3.2 Workplaces not covered by Subpart Z: In some occupational settings, such as many commercial retail settings, medical offices, and schools, exposure to mercury is not an expected hazard. Which settings are covered by the various requirements in Subpart Z vary from standard to standard. For example, to quote the hazard communications standard 29 CFR 1910.1200(b)(2)), the HazComm standard applies to "…any chemical which is known to be present in the workplace in such a manner that employees may be exposed under normal conditions of use or in a foreseeable emergency." A mercury spill in an occupational setting is not likely to be a normal condition and, if the mercury is not used in the normal work at the setting, it would be unlikely to be a foreseeable emergency. A more detailed list of exemptions in 29 CFR 1910.1200(b)(6)(ii) specifically excludes any setting "…when the hazardous substance is the focus of remedial or removal action being conducted under CERCLA in accordance with the Environmental Protection Agency regulations."

In these settings, the protections associated with the occupational standards and recommended guidelines described earlier (e.g., medical monitoring, engineering controls, hazard communications) are not typically available [Risher 2003]. Without these additional protective measures, applying the occupational standards to these situations is inappropriate. However, the exposure duration in most workplaces would be roughly the same. Therefore, the underlying assumption for residential exposures (exposure for 24 hours, 7 days a week, for non-employed persons living in the home or 16 hours, 7 days a week for persons employed outside the homes and school-aged children not being homeschooled) would not reasonably apply. Adjusting the 1 $\mu g/m^3$ residential action level discussed earlier from a 168-hour exposure (24/7) or a 112-hour exposure (16/7) to a 40-hour exposure, which is more typical in a commercial or public workplace, would yield an equivalent protection in the 3–4 $\mu g/m^3$-range (i.e., 168 hours is about 4 times longer than 40

hours and 112 is about 3 times longer). The exposure for non-employees, such as customers or clients in businesses or students in a school, would be even more transient. Although these non-employees could be more susceptible than presumably healthy adult workers, a concentration in this 3–4 µg/m^3-range should be safe for them as well [CDC 1995; Nickle 1999; Ratcliffe 1996].

2.3.3 Conditions when other concentration may apply: The interaction between mercury and the developing CNS is poorly understood. Therefore, mercury exposures should be minimized for workers in all settings who are confirmed or suspected to be pregnant, or may become pregnant. In commercial settings, such as maternity wards, dialysis clinics, pre-kindergarten daycare, and pediatric intensive care units, susceptible populations reasonably may be expected to spend prolonged periods of time. In those cases, minimizing mercury exposures or lowering the acceptable residual concentration should be considered.

When considering response operations during a mercury spill, balancing the risks associated with specific settings may be necessary. For instance, if a mercury spill occurs in a commercial setting that provides essential life-saving services to a community and is the sole source for those services, disrupting these services may cause greater harm than exposure to the mercury. Exposure to mercury at levels as high as occupational levels for only a few hours is not likely to cause serious harm to a person, whereas missing a scheduled dialysis treatment may cause significant harm. The risk manager at the scene should consult with public health authorities in the community if this kind of circumstance is suspected.

2.4 Schools and Educational Settings

Schools can pose a significant challenge during mercury cleanup. First, schools commonly provide a community setting in which many children could be exposed to a single source of liquid mercury discovered in or brought to the school. Second, the school environment can actually be a source of mercury—the fascinating chemical and physical properties of mercury can make it seem a useful teaching tool. Other potential exposure locations in a school include utility rooms and ventilation spaces where mercury may be used in temperature or pressure controls. Third, school areas, such as buses, gyms, cafeterias, and hallways, are commonly used by many people; they may walk through spilled mercury and spread contamination to other areas. Fourth, schools have multiple appliances (e.g., classroom computers and computer labs) that can produce heat. A classroom with 1–5 computers not in use may be safe; however, 5 computers turned on and producing their normal amount of heat in the air may generate enough mercury vapors in the room from a spill to pose a risk to staff and students [ATSDR 1997; CDC 1995, 2005; EPA 2010; Gordon 2004; Mercury in Schools 2004; Nickle 1999; Taueg 1992; Tominack 2002]. Additionally, the length of exposure duration may be too short to likely harm the seemingly most sensitive population (i.e., the students).

Many school systems have programs to remove hazards, including mercury, in their schools. However, students can bring mercury to the school and share it with their fellow students, a contingency that school officials must recognize and address.

The exposure scenario at most schools, even with after-school programs, is typically much closer to a workday type of exposure (i.e., 7–10 hours) than a residential setting; however, the longest time most students will spend in any given school building will be commonly 3–5 years. Some private schools may offer more extended instructional opportunities, both in the number of hours per day and in the number of years (i.e., number of grade levels taught). Staff at these schools may be in the same setting for a considerably longer time (e.g., a 40-year work lifetime; 10–12 hour days), depending on their personal habits and regional turnover rates. Students or staff could be pregnant. Risk managers should be aware of the potential for these unique circumstances within a school.

Consideration should be given to closing or isolating areas of schools with mercury concentrations of ≥10 $\mu g/m^3$, depending on the exposures, pending removal of the hazard. Given the variables associated with exposures in educational settings, ATSDR recommends a range ≤3 $\mu g/m^3$ before resuming normal operations of the school. This recommendation is based on the residential action levels discussed earlier and adjusted for a normal school day. Presuming all visible mercury in the setting has been removed, this action level is considered appropriate.

2.5 Vehicles

The scenario for persons exposed to mercury while in vehicles is challenging to estimate because it depends on many factors. The purpose of the vehicle (e.g., a school bus versus a family van), the habits of the individual users (e.g., how much time does Mom spend in the car in a hot parking lot waiting for the kids to get out of school?), the sensitivity of the individual passengers (e.g., is Mom in the previous example pregnant?), and the number of passengers routinely in the vehicle are probably the biggest considerations. However, the intended use in any given period may greatly influence the potential hazard posed by mercury in a vehicle. For instance, a spill in a family vehicle that is used soon after for a prolonged vacation may cause more intense exposure than otherwise might be expected. Given all the possible variables, the most sensitive anticipated use of a vehicle should determine the action level for that vehicle.

For family vehicles, the exact exposure scenario depends on the habits of the principle drivers, but some exposure to most of the family is possible at some point. The duration of exposure on any given day is likely to be only a small fraction of the 24-hour period, but this could be offset by much longer duration exposures for transient periods (e.g., the family vacation). Because most of the family could be exposed while in the vehicle, the entire spectrum of sensitivities must be considered. The vehicle itself will be a fairly confined space with variable air-change rates (e.g., use of the air conditioner compared to open windows). Other than the transient exposure scenario of the family vacation, the length and intensity of the exposure duration should allow a higher spectrum of action levels than has been discussed up to this point.

For work vehicles, the exposure scenario can be either a vehicle that is used primarily to commute to a work location with a duration equal to a fraction of a full day (e.g. similar to the family vehicle above), or a vehicle that, for all intents and purposes, is the work location with a duration closer to an normal workday (e.g., sales and service vehicles, some construction equipment). In this instance, the population being exposed can be assumed to be a healthy adult. The occupied working area of the vehicle would be similar

to a family vehicle or smaller and could be relatively open to the environment (e.g., an operator's seat on a piece of construction equipment), or closed similar to the family vehicle (e.g., the service van). For closed vehicles, concentrations higher than that of a family car would be acceptable generally. Without engineering controls and recommendations for settings protection when mercury is a known hazard, the acceptable concentration in these vehicles should not approach the occupational standards.

For multi-passenger vehicles, such as school buses or church vans, the exposure scenario would depend upon the underlying purpose of the vehicle. In other words, most passengers in a school bus would be students, and the characteristics of the population would be similar to that described earlier for the school being served. Population characteristics of the passengers in a city bus or a church van would be closer to that of the general population. For common carrier vehicles, such as airplanes or trains, the exposure duration would be relatively short for the passengers but closer to a workplace exposure for the crew. While space for individual persons may be limited, the interior of the multi-passenger vehicle over all would tend to be more spacious than other vehicle types. Air-change rates would vary significantly depending on the status and type of the vehicle. Given the high variability in the sensitivity of the population being transported, acceptable concentrations would be lower than most commercial or work vehicles. Exposure duration for most multi-passenger vehicle would be relatively short (e.g., measured in hours); however, exposure duration in a common carrier would vary over a fairly broad spectrum.

Visible mercury should not be present in any vehicle for all the reasons cited earlier in Section 2.1, but primarily because it could be tracked into other settings. The risk manager should be mindful that, even in a vehicle, higher concentrations mean a source of liquid mercury is likely present. If concentrations inside the vehicle do not decline significantly with cleaning and removing potential sources, a source of liquid mercury is especially likely. Concentrations >6 $\mu g/m^3$ should raise concerns about the presence of liquid mercury in the vehicle.

Given all of these variables and concerns, ATSDR recommends an action level in the range of 3–6 $\mu g/m^3$. This is based on concerns similar to the commercial setting (such as schools and retail establishments), adjusted for the shorter and transient exposure in the vehicles, and avoidance of tracking and the nuisance hazard of liquid mercury. Pregnant women and very young children should spend the minimum time possible in a vehicle contaminated with mercury. For a transient exposure of prolonged duration, alternative transportation should be considered for sensitive persons in the family.

3.0 Conclusions

For the given scenarios requested by the Action Level Subgroup, ATSDR considers the action levels in this health consultation and summarized in the following tables appropriate to protect public health. If the action levels are exceeded, the risk managers on scene should consider appropriate response actions to protect the health of persons most likely to be exposed or more sensitive to the effects of mercury.

Before selecting any specific action level or course of action, risk managers should consider the assumptions and limitations described in this health consultation as they apply to the situation

encountered when responding to a release. Risk managers should consider consulting with ATSDR staff or EPA risk assessors when unusual situations or unusually sensitive persons are involved.

In all cases where cleanup actions are terminated under these schemes, the action levels recommended are based on the assumption that all liquid mercury has been removed from the scene of the exposure.

4.0 Recommendations

In removal actions, ATSDR recommends that any liquid mercury at the scene be isolated and removed as expeditiously as possible to avoid tracking the mercury to other locations.

Each site may have site-specific concerns that should be considered before selecting an appropriate action level. Risk managers at the scene of a spill should consider consulting with regional risk assessors or public health officials at ATSDR, the State, or local authorities regarding unusual circumstances that they encounter.

ATSDR recommends the liberal use of field screening devices and methods to detect the presence of mercury in areas where a spill is suspected and to monitor the progress of cleanup. Environmental samples analyzed in a laboratory are generally unnecessary until all visible mercury is removed and confirmation is required that response activity is complete.

Samples to confirm final cleanup should be collected and analyzed in a manner equivalent to the modified NIOSH 6009 method. ATSDR considers readings from a properly calibrated Lumex Mercury Vapor Analyzer, that are representative of 8 hours of exposure at the point of sampling, as comparable to the NIOSH 6009 method in the range of 0.1-10 $\mu g/m^3$ [Singhvi, 2003] and will accept these in lieu of laboratory analysis.

Application of the action levels provided in this health consultation should be modified as necessary to reflect actual conditions at the site of a mercury release. At the request of the lead agency, ATSDR is available to review site-specific situations and assist in making any decision to modify the application at the site.

The conclusions and recommendations provided in this health consultation are based on the information available to ATSDR as of the date of the document. New or additional information may necessitate a modification of our conclusions and recommendations.

5.0 Appendices

Table 1: Suggested Action Levels for Residential Settings

Action Level (μg/m³)	Use of Action Level	Rationale for Action Level	Sampling Suggestions and other Considerations	Consult Section
Less than 1	Acceptable level for normal occupancy for most sensitive persons. No further response action needed	Experience has shown that response actions to reach levels lower than 1 μg/m³ can be disruptive enough to cause more harm than benefit. 1 μg/m³ is within an order of magnitude of health guidance values and indoor background levels. This concentration is 25 times lower than the concentrations referenced in the development of health guidance values.	No visible mercury; highest quality data.* Sampling in breathing zone of most sensitive person under normal conditions for use.	See Sections 2.1 and 2.2.1
3–6	Acceptable level for unrestricted use of family vehicles under most conditions.	Exposure duration in most vehicles is short compared with other settings, allowing a higher concentration as the "floor" of this range. Requirement for no visible mercury means the source of vapors has been removed and concentrations should continue to fall. The "ceiling" of the range is based on the presumption that liquid mercury may still be present but not yet discovered.	No visible mercury; highest quality data.* Sampling in the passenger compartment under normal use conditions. Unusual use of the vehicle in this case would be extended family vacations.	See Sections 2.1 and 2.5
3–6	Acceptable level to allow personal belongings to remain in owner's possession.	The sampling point suggested in the column to the right tends to concentrate the vapors higher than typical exposure conditions. Exposure frequency should be intermittent and	Survey instrument data generally acceptable.+ Readings should be at the vents of appliances or headspace of bags. Bags should be warmed passively to ambient conditions and	See Section 2.2.3

		the duration should be short. The 6 µg/m^3 is based on the possibility that liquid mercury i is present but may not have been discovered.	appliances/ electronics should be at operating temperatures.	
Greater than 10	Isolation of contamination from residents or evacuation of residents	Indications are that 10 µg/m^3 may be the concentration at which urinary levels of mercury begin to increase. Other studies indicate this concentration may be the lowest toxic concentration (TCLo) for humans. Continued exposure may be harmful.	Survey instrument data acceptable. [+] Exposure to contaminant should be minimized.	See Section 2.2.2

*Highest quality data is NIOSH 6009 analytic results or equivalent (e.g., Lumex reading averaged over 8 hours)

+Survey instrument data is considered any real-time monitoring equipment (e.g., Jerome, MVI, VM 300)

Table 2: Suggested Action Levels for Other Locations

Action Level (μg/m³)	Use of Action Level	Rationale for Action Level	Sampling Suggestions and other Considerations	Consult Section/Reference
Less than 3	Normal Occupancy for commercial settings where mercury exposure is not expected in normal course of work. (e.g., 29 CFR 1910 Subpart Z does not apply)	Concentration is based on residential action level of 1 μg/m³ adjusted for a work day (i.e., 24/7 exposure reduced to 8/5 or 40 hour workweek). Persons exposed in these settings would not expect the presence of mercury as part of their normal employment.	No visible mercury; highest quality data.* Taken in breathing zone of most sensitive person under normal conditions for use. Pregnant workers should be offered alternate worksite.	See Section 2.1 and 2.3.2
1–3	Acceptable level for schools to resume normal operations.	Concentration is based on residential action level of 1 μg/m³ adjusted for a typical school day.	No visible mercury; highest quality data.* Taken in breathing zone of most sensitive person under normal conditions for use. Pregnant workers and students should be offered temporary alternatives to working or attending the school.	See Section 2.1 and 2.4
3–6	Acceptable level for unrestricted use of vehicles under most conditions.	Exposure duration in most vehicles is short compared with other settings, allowing a higher concentration as the "floor" of this range. Requirement for no visible mercury means the source of vapors has been removed and concentrations should continue to fall. The "ceiling" of the range is based on the presumption that liquid mercury may still be present but not yet discovered.	No visible mercury; highest quality data.* Sampling in passenger compartment under normal use conditions. Unusual use of the vehicle in this case would be situations where the vehicle is the workplace.	See Sections 2.1 and 2.5
Greater than 10	Isolation of contamination or evacuation of workers	Indications are that 10 μg/m³ may be the concentration at which urinary levels of mercury begin to increase.	Survey instrument data acceptable.+ Exposure to contaminant should be minimized.	See Section 2.3.2

	not covered by a health and safety program addressing exposure to mercury.	Other studies indicate this concentration may be the lowest concentration toxic to humans.		
25	Normal Occupancy for industrial settings where mercury exposure is expected in normal course of work. (e.g., 29 CFR 1910 Subpart Z does apply).	Based on the 1996 ACGIH TLV. Assumes hazard communications programs as required by OSHA; engineering controls as recommended by NIOSH; and medical monitoring as recommended by NIOSH and ACGIH are in place.	Survey instrument data acceptable.[+] Workers in these settings should be subject to OSHA standards for mercury (e.g., medical records, Subpart Z, HCS, HAZWOPER).	See Section 2.3.1
25	Upgrade responder protective ensemble to Level C during uncontrolled releases of mercury	For response, workers subject to requirements of 29 CFR 1910.120, based on the ACGIH TLV, as recommended by the 1987 NIOSH/OSHA/USCG/EPA Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities (the" 4 agency guidance manual").	Survey instrument data acceptable.[+] Uncontrolled release refers to the absence of positive engineering controls on the material.	Occupational Safety and Health Guidance Manual for Hazardous Waste Site

* - Highest quality data would be NIOSH 6009 analytic results or equivalent (e.g., Lumex reading averaged over 8 hours)

+ - Survey instrument data would be considered any real time monitoring equipment (e.g., Jerome, MVI, VM 300, etc)

Figure 1A: ATSDR Toxicological Profile Figure 2-1 Acute Exposures (Annotated)

Developmental effects in animals

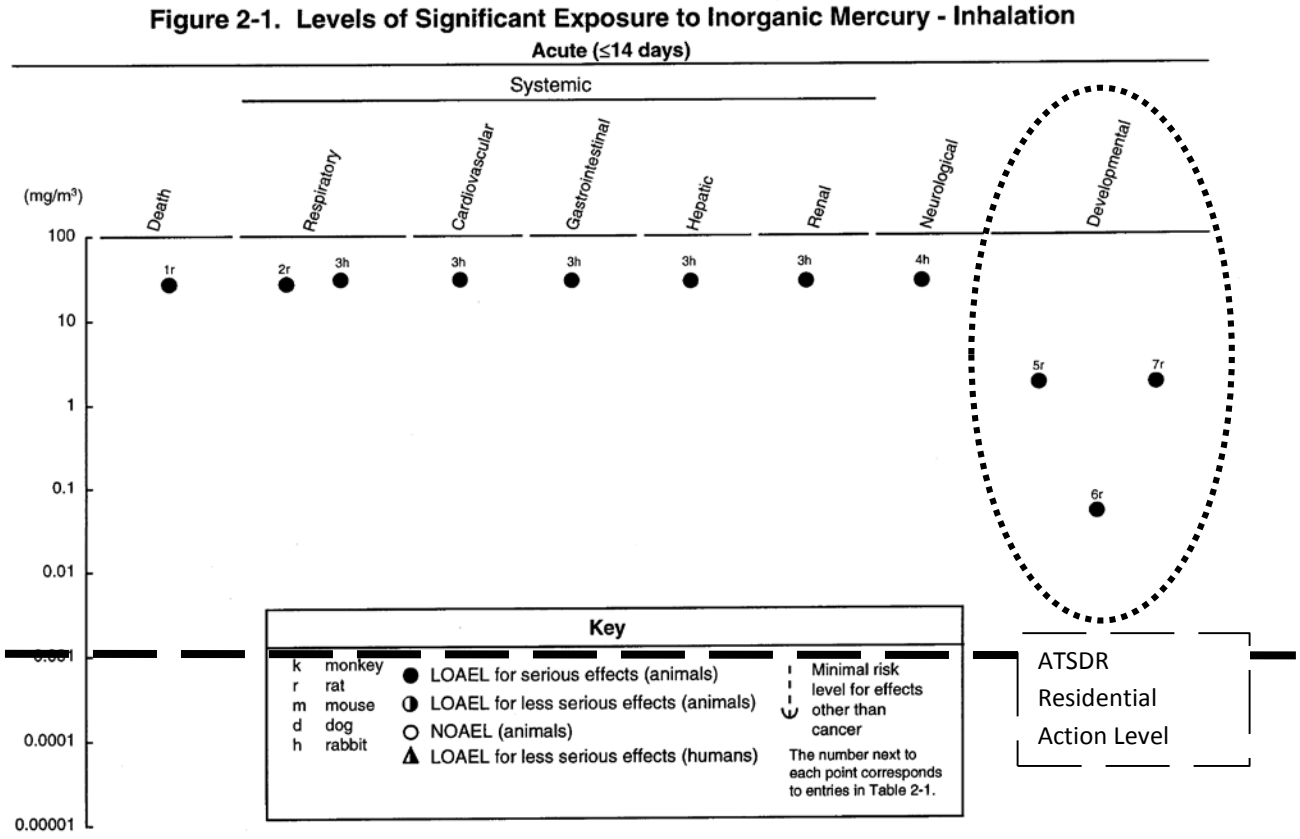


Figure 1A. Annotated insert of Figure 2-1 from the ATSDR Toxicological Profile graphing the significant inhalation studies of inorganic mercury by health effect and concentration for exposure durations of ≤14 days. Dashed line represents the ATSDR Residential Action Level recommended in this health consultation. This figure illustrates most clearly the reason for considering developmental effects as the most sensitive endpoint.

Figure 1B: ATSDR Toxicological Profile Figure 2-1 Intermediate Exposures (Annotated)

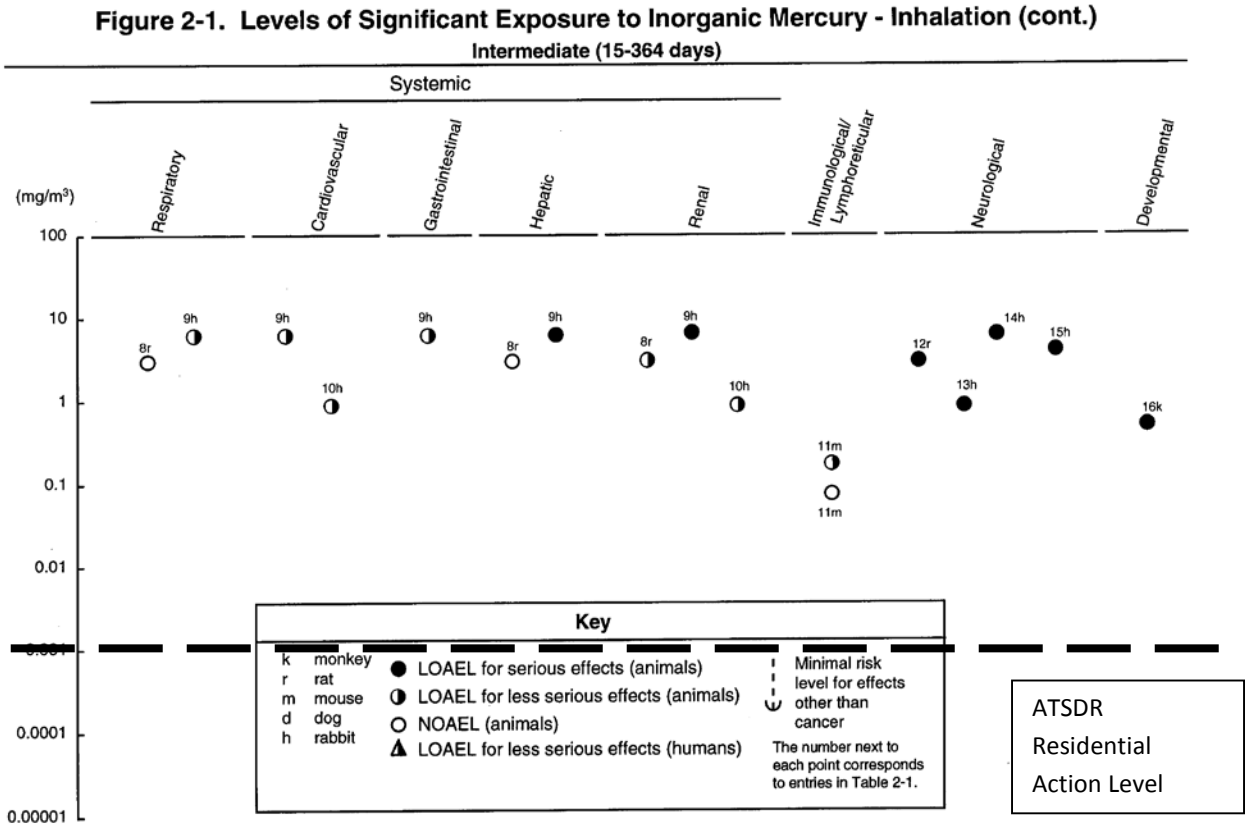


Figure 1B. Annotated insert of Figure 2-1 from the ATSDR Toxicological Profile graphing the significant inhalation studies of inorganic mercury by health effect and concentration for exposure durations of 15–364 days. Dashed line represents the ATSDR Residential Action Level recommended in this health consultation.

Figure 1C: ATSDR Toxicological Profile Figure 2-1 Chronic Exposures (Annotated)

Human Studies considered significant by ATSDR

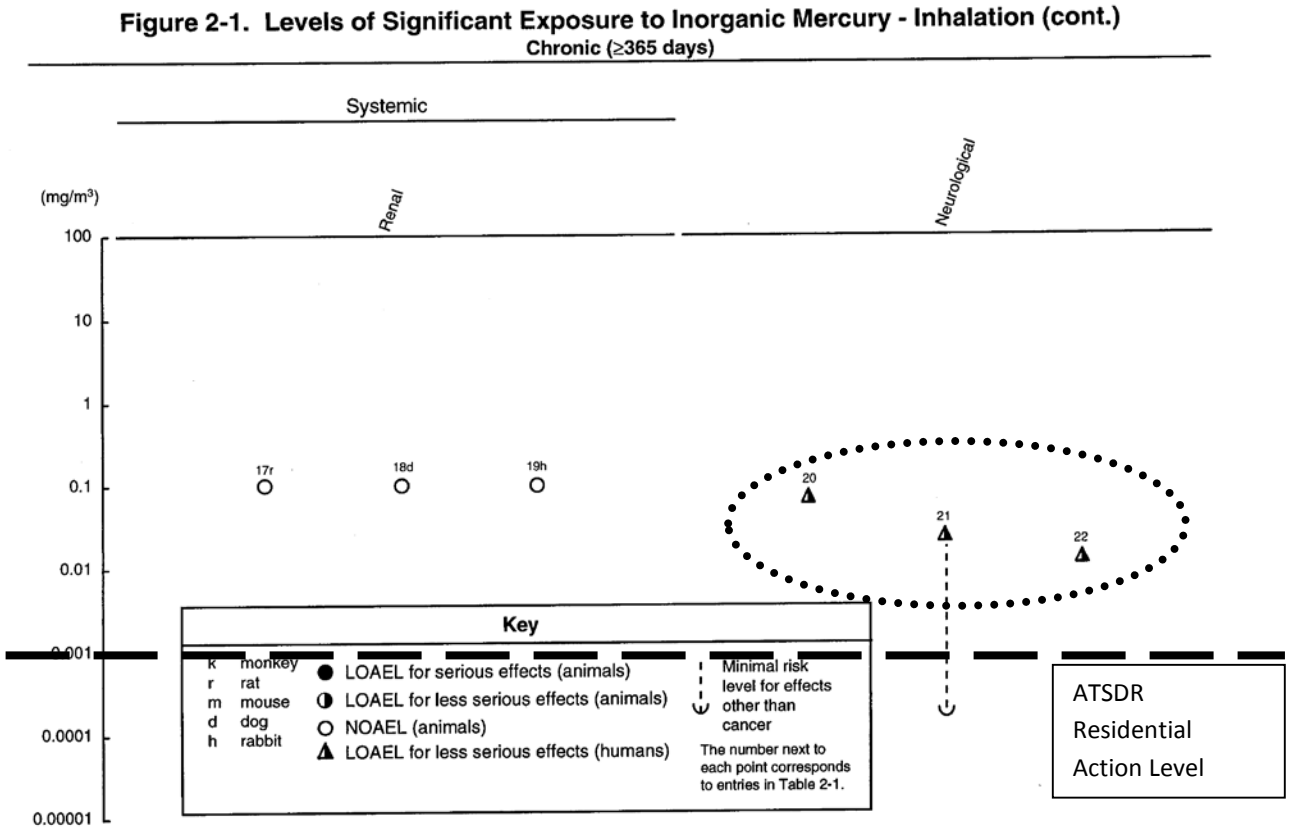


Figure 1C. Annotated insert of Figure 2-1 from the ATSDR Toxicological Profile graphing the significant inhalation studies of inorganic mercury by health effect and concentration for exposure durations of ≥365 days. Dashed line represents the ATSDR Residential Action Level recommended in this health consultation. This dotted circle indicates the three studies of humans in occupational settings that ATSDR considers most significant.

6.0 References

Abbaslou P, Zaman T. 2006. A Child with elemental mercury poisoning and unusual brain MRI findings. Clin Toxicol. 44; 1: 85-88

ACGIH 2008. TLVs and BEIs. Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices. American Conference of Governmental and Industrial Hygienists. Cincinnati, OH

Alison Newby C, Riley D, Leal-Almeraz T. 2006. Mercury use and exposure among Santeria practitioners; religious vs. folk practice in Northern New Jersey, USA. Ethn Health. Aug. 2006 11; 3: 287-306

ATSDR/EPA, 1997 National Alert for Mercury. Available at http://www.atsdr.cdc.gov.

ATSDR, 1999. Agency for Toxic Substances and Disease Registry. Toxicological Profile for Mercury. Atlanta: U.S. Department of Health and Human Services.

ATSDR, 2000. Suggested Action Levels for Indoor Mercury Vapors in Homes or Businesses with Indoor Gas Regulators. Letter consultation from ATSDR to Mr. Brendan Boyle, Michigan Health, and Mr. Ralph Dollhopf, EPA Region V. December 2000

ATSDR, 2008. Health Consultation for the McAlester Mercury Site. Letter to CDR Patrick Young. Jan. 2008

Azziz-Baumgartner E, Luber G, Schurz-Rogers H, Backer L, Belson M, Kieszak S, Caldwell K, Lee B, Jones R, Todd R, Rubin C. 2007. Exposure assessment of a mercury spill in a Nevada school -- 2004. *Clin Toxicol*. May 2007. 45; 4: 391-395.

Baughman TA. 2006. Elemental mercury spills. Environ Health Perspect. Feb 2006. 114; 2: 147-152.

Bensefa-Colas L, Andujar P, Descatha A. 2010. Mercury poisoning. Rev Med Interne. Jun 2010 [electronic publication before print].

Bose-O'Reilly S, Lettmeier B, Gothe RM, Beinhoff C, Siebert U, Drasch G. 2008. Mercury as a serious health hazard for children in gold mining areas. *Environ Res*. Mar 2008. 107; 1: 89-97

Bose-O'Reilly S, McCarty K, Steckling N, Lettmeier, B. 2010. Mercury exposure and children's health. Curr Probl Pediatr Adolesc Health Care. Sep 2010. 40; 8: 186-215

Cairns E, Tharumakulasingam K, Athar M, Yousaf M, Cheng I, Huang Y, Lu J, Yap D. 2011. Source,concentration, and distribution of elemental mercury in the atmosphere in Toronto, Canada. *Environ Pollut* Jan 2011 [electronic publication before print].

Carpi A, Chen Y. 2001. Gaseous elemental mercury as an indoor air pollutant. *Environ Sci Technol*. Nov 2001. 35; 21: 4170-4173.

CDC, 1995. Centers for Disease Control and Prevention. Mercury exposure in a residential community--Florida, 1994. Atlanta: U.S. Department of Health and Human Services. *MMWR.* Jun 1995. 44; 23: 436-437, 443.

CDC, 2001. Centers for Disease Control and Prevention. Blood and hair mercury levels in young children and women of childbearing age – US, 1999. Atlanta: U.S. Department of Health and Human Services *MMWR*. Mar 2001. 50; 8: 140-143.

CDC, 2005. Centers for Disease Control and Prevention. Measuring exposure to an elemental mercury spill--Dakota County, Minnesota, 2004. Atlanta: U.S. Department of Health and Human Services.

MMWR. Feb 2005. 54; 6: 146-149.

Cherry D, Lowry L, Velez L, Cotrell C, Keyes D. 2002. Elemental mercury poisoning in a family of seven. *Fam Community Health*. Jan 2002. 24; 4: 1-8

Cizdziel J and Jiang Y. 2011 Concentrations of gaseous elemental mercury in ambient air within an academic chemistry building. *Bull Environ Contam Toxicol*. Apr 2011. 86; 4: 419-422.

De Capitani EM, Souza EM, Vieira RJ, Madureira PR. 2009. Contact dermatitis to elemental mercury with distant lesion. *An Bras Dermatol*. Jan-Feb 2009. 84; 1: 75-77.

Ellis L, Mullins M, Galvin N, Scalzo A. 2009. Detection of elemental mercury in abdominal wall soft tissue. *J Med Toxicol*. Dec 2009. 5; 4: 205-208.

EPA. 1995. US Environmental Protection Agency. IRIS summary for elemental mercury. U.S. Environmental Protection Agency, Washington, DC. Available from: http://www.epa.gov/iris/. June 1995.

EPA. 2005. US Environmental Protection Agency. Ritualistic use of mercury simulation: a preliminary investigation of metallic mercury vapor fate and transport in a trailer. U.S. Environmental Protection Agency. Edison, NJ . January 2005. Available from http://www.epa.gov/.

EPA, 2010. US Environmental Protection Agency. Mercury in schools website. U.S. Environmental Protection Agency. Washington, DC. Available from: http://www.epa.gov.

EPA, 2011. US Environmental Protection Agency. National mercury cleanup policy workgroup charter. U.S. Environmental Protection Agency. Washington, DC [as transmitted via electronic mail (e-mail) by J. Kelly, EPA to R. Nickle, ATSDR on 03/04/2011 at 1:18 pm.]

EPA/FDA, 2004. US Environmental Protection Agency and the Food and Drug Administration. Advice for women who might become pregnant, women who are pregnant, nursing mothers, and young children. U.S. Environmental Protection Agency and U.S. Department of Health and Human Services, Washington, DC. EPA-823-R-04-00. Available from: http://www.fda.gov.

Fawer R, DeRibaupierre U, Guillemin M, Berode M, and Lobe, M. 1983. Measurement of hand tremor induced by industrial exposure to metallic mercury. *Br J Ind Med*. 40:204–208.

Franko A, Budihna MV, Dodic-Fikfak M 2005. Long-term effects of elemental mercury on renal function in miners of the Idrija Mercury Mine. *Ann Occup Hyg*. Aug 2005. 49; 6: 521-527.

Garetano G, Stern AH, Robson M, Gochfeld M. 2008 Mercury vapor in residential building common areas in communities where mercury is used for cultural purposes versus a reference community. *Sci Total Environ*. Jul 2008. 1; 397: 131-139.

Garetano G, Gochfeld M, Stern A. 2006 Comparison of indoor mercury vapor in common areas of residential buildings with outdoor levels in a community where mercury is used for cultural purposes. *Environ Health Perspect*. Jan 2006. 114; 1: 59-62.

Gochfeld M. 2003. Cases of mercury exposure, bioavailability, and absorption. *Ecotoxicol Environ Saf*. Sep 2003. 56; 1: 174-179.

Goldman L and Shannon M. 2001. Technical report: mercury in the environment: implications for pediatricians. *Pediatrics*. Jul 2001. 108; 1: 197-205.

Gordon A. 2004. Short-term elemental mercury exposures at 3 Arizona schools; public health lessons learned. *J T Clin Toxicol*. 42;2:179–187.

Grant C. Lalor G, Fletcher H, Potter T Vutchkov M, Reid M. 2010. Elements in human placentae in Jamaica. *West Indian Med J*. Oct 2010. 59; 5: 479-485.

Hudson P, Vogt R, Brondum J, Witherell L, Myers G, Paschal D. 1987. Elemental mercury exposure among children of thermometer plant workers. *Pediatrics*. Jun 1987. 79; 6: 935-938.

Hryhorczuk D, Persky V, Piorkowski J, Davis J, Moomey C, Krantz A, Runkle K, Saxer T, Baughman T, McCann K. 2006. Residential mercury spills from gas regulators. Environ Health Perspect. Jun 2006. 114; 6: 848-852.

HSDB, 2005. Mercury. Hazardous Substance Databank. Toxicology Data Network. National Library of Medicine. National Institutes of Health. Bethesda, MD 2005.

Johnson C. 2003. Letter Report to EPA Region II. Mercury vapor levels in dwellings in close proximity to the World Trade Center Site.

Johnson C. 2004 Mercury in the environment: sources, toxicity, and prevention of exposure. *Pediatr Ann*. Jul 2004. 33; 7: 437-442.

Lee R, Middleton D, Caldwell K, Dearwent S, Jones S, Lewis B, Monteilh C, Mortensen ME, Nickle R, Orloff K, Reger M, Risher J, Rogers HS, Watters M. 2009. A review of events that expose children to elemental mercury in the United States. *Environ Health Perspect*. Jun 2009. 117; 6: 871-878.

Liu J, Cheney M, Wu F, Li M. 2011. Effects of chemical functional groups on elemental mercury adsorption on carbonaceous surfaces. *J Hazard Mater.* Feb. 2011. 186; 1: 108-113.

Lyman S, Gustin M. 2009. Determinants of atmospheric mercury concentrations in Reno, Nevada, U.S.A. *Sci Total Environ*. December 2009. 408; 2: 431-438.

MacLehose R, Pitt G, Will S, Jones A, Duane L, Flaherty S, Hannant D, Stuttard B, Silverwood A, Snee K, Murray V, Syed Q, House I, Bellis MA. 2001 Mercury contamination incident. *J Public Health Med*. March 2001 23; 1: 18-22.

Mercury in Schools, 2004 Webpage; supported by the University of Wisconsin at http://www.mercuryinschools.uwex.edu/**.**

Morgan D, Chanda S, Price M, Fernando R, Liu J, Brambila E, O'Connor R, Beliles R, Barone S. 2002. Disposition of inhaled mercury vapor in pregnant rats: maternal toxicity and effects on developmental outcomes. *Toxicol Sci*. April 2002. 66; 2: 261-273.

Ngim CH, Foo SC, Boey KW, et al. 1992. Chronic neurobehavioural effects of elemental mercury in dentists. British Journal of Industrial Medicine. 49;11:782-790.

Nickle R. 1999 Mercury: Top of the hit parade for eight years. *Drug Chem Toxicol*. February 1999. 22; 1: 129-142.

NIOSH, 2007. NIOSH Guide to Chemical Hazards. US Department of Health and Human Services. Centers for Disease Control and Prevention. National Institute for Occupational Safety and Health. Cincinnati, OH Sept. 2007. DHHS (NIOSH) Publication Number 2005-149. Available at http://www.cdc.gov/niosh/npg/.

Nold E, Adams G, Nickle R. 2011. Email between the authors re: levels of mercury in air associated with the presence of liquid mercury. Electronic mail string dated 7/5/2011 at 1103 am.

Opitz H, Schweinsberg F, Grossmann T, Wendt-Gallitelli M, Meyermann R 1996. Demonstration of mercury in the human brain and other organs 17 years after metallic mercury exposure. *Clin Neuropath*. May-June 1996. 15; 3: 139-144.

Orloff K, Ulirsch G, Wilder L, Block A, Fagliano J, Pasqualo J 1997 Human exposure to elemental mercury in a contaminated residential building. *Arch Environ Health*. May-June 1997. 52; 3: 169-172.

Ratcliffe H, Swanson G, Fischer L 1996. Human exposure to mercury: a critical assessment of the evidence of adverse health effects. *J Toxicol Environ Health*. October 1996. 49; 3: 221-270.

Risher J, Nickle R, Amler S. 2003. Elemental mercury poisoning in occupational and residential settings. *Int J Hyg Environ Health*. August 2003. 206; 4-5: 371-379.

Risher J, De Rosa C. 2007. Inorganic: the other mercury. *J Environ Health*. Nov. 2007. 70; 4: 9-16.

Rogers HS, McCullough J, Kiesak S, Caldwell K, Jones RL, Rubin C. 2007 Exposure assessment of young children living in Chicago communities with historic reports of ritualistic use of mercury. *Clin Toxicol*. 45; 3: 240-247.

Rogers, HS, Jeffrey N, Kiesak S, Fritz P, Spliethoff H, Palmer C, Kass D, Caldwell K, Eadon G, Rubin C. 2008. Mercury exposure in young children living in New York City. Journal of Urban Health. Jan. 2008. 85;. 1: 39-51.

Samir A and Aref W. 2011. Impact of occupational exposure to elemental mercury on some antioxidative enzymes among dental staff. *Toxicol Ind Health*. March 2011. [Electronic Print ahead of Publication].

Singhvi R, Turpin R, Kalnicky D, and Patel J. 2001. Comparison of field and laboratory methods for monitoring metallic mercury vapor in indoor air. J Hazard Materials 83(1-2):1-10.

Singhvi R, Kalnicky D, Patel J, and Mehra Y. 2003. Comparison of Real-Time and Laboratory Analysis of Mercury Vapor in Indoor Air: Statistical Analysis Results. Proceedings of the Pittsburg Conference. 2003

Song X, Cheng I, Lu J. 2009. Annual atmospheric mercury species in downtown Toronto, Canada. *J Environ Monit*. March 2009. 11; 3: 660-669.

Taueg C, Sanfilippo D, Rowens B, Szejda J, Hesse JL: 1992. Acute and chronic poisoning from residential exposures to elemental mercury--Michigan, 1989-1990. J Toxicol Clin Toxicol. 1992 30; 1: 63-67.

Tominack R, Weber J, Blume C, Madhok M, Murphy T, Thompson M, Scalzo A. 2002. Elemental mercury as an attractive nuisance: multiple exposures from a pilfered school supply with severe consequences. *Pediatr Emerg Care*. April 2002. 18; 2: 97-100.

Tsuji J, Williams P, Edwards M, Allamneni K, Kelsh M, Paustenbach D, Sheehan P 2003. Evaluation of mercury in urine as an indicator of exposure to low levels of mercury vapor. *Environ Health Perspect*. April 2003. 111; 4: 623-630.

Winter T. 2003 The evaporation of a drop of mercury. American Journal of Physics. 71; 8: 783-786.

Yamamoto M, Charoenraks T, Pan-Hou H, Nakano A, Apilux A, Tabata M. 2007 Electrochemical behaviors of sulfhydryl compounds in the presence of elemental mercury. Chemosphere. Sep. 2007. 69; 4: 534-539.

Appendix B: ERT SOP for Clearance Sampling

DRAFT Indoor Mercury Spills – Area Clearance Procedure

11/13/2014

1. Scope and Application
2. Technical Approach
3. Responsibilities
4. Interferences
5. Equipment / Apparatus
6. Prerequisites: Pre-Operational Checks
7. Post-Remediation Procedure
8. Calculations
9. Quality Assurance / Quality Control (QA/QC)
10. Data Validation
11. Health and Safety
12. References
13. Appendices
    - A - Hand-Held Mercury Vapor Analyzer Comparison Table
    - B - Mercury Spill Survey Testing Record
    - C - Mercury Spill Clearance Testing Record for SKC Hydrar Tube
    - D - Mercury Spill Clearance Testing Record for Direct-Reading Mercury Analyzer

1.0 Scope and Application

This Standard Operating Procedure (SOP) outlines indoor air testing procedures to provide adequate data for evaluation by the appropriate Health Department to determine if a residential or commercial building meets public health guidelines for occupancy following the release or spillage of elemental mercury.

The testing procedures described here may also be useful for determining mercury vapor indoor air levels in an occupational setting where mercury is released although the occupational environment is not the focus of this document. Release of mercury in an occupational situation will often warrant coordination with the appropriate OSHA regional office or an OSHA designated state agency. (OSHA testing procedures for mercury vapor can be found at http://www.osha.gov/dts/sltc/methods/inorganic/id140/id140.html).

2.0 Technical Approach

Two approaches are generally acceptable to obtain adequate data to determine if a residential building can remain occupied or be re-occupied.

2.1 Sample Collection Approach. Indoor air samples are collected on solid sorbent material (e.g., Hopcalite or Hydrar) contained in glass collection tubes connected to personal sampling pumps (according to NIOSH 6009). Pump flow rates are set to collect 0.15 to 0.25 L/min of air over a defined time period (typically 8 hours with 200 L air sampled). The sorbent material from the collection tube (typically 200 mg in a single section) is digested in a mixture of concentrated nitric acid and concentrated hydrochloric acid. After preparation, the sample is analyzed by Cold Vapor Atomic Absorption (CVAA) techniques and results are reported in micrograms per cubic meter ($\mu g/m^3$).

2.2 Direct Reading Analyzer Approach. A direct-reading, portable mercury analyzer (with a detection limit of 0.2 $\mu g/m^3$ or lower) can be used to measure mercury vapor concentration in air. Results may be reported in units of nanograms of mercury per cubic meter of air (ng/m^3) or $\mu g/m^3$ (1000 ng/m^3 = 1 $\mu g/m^3$). The direct-reading mercury analyzer may be used to monitor mercury levels over a defined time period (typically 8 hours) to provide Time Weighted Average (TWA) values for use in determining if a building can be re-occupied by building occupants.

The following discussion outlines mercury vapor analyzers on the market. Note that the difference in detection limits among the instruments may impact their applicability for collecting the data needed for a re-occupancy determination.

2.2.1 Jerome 431, 431X, and J405: The Jerome 431, 431X, and J405 Hg vapor analyzers are based on gold film sensing technology. A thin gold film, in the presence of mercury vapor, undergoes an increase in electrical resistance proportional to the mass of mercury vapor in the sample. When the SAMPLE button is pressed, an internal pump draws ambient air through a scrubber filter and into the flow system. After 2 seconds, the sample solenoid bypass opens, closing off the scrubber filter from the flow system. The sample air passes through a gas filter that removes acidic gasses which interfere with the sensor's response to mercury. The sample air is drawn over the gold film sensor and the sensor adsorbs mercury vapor. Nine seconds after starting, the sample solenoid bypass closes, and the remainder of the sample is drawn through the scrubber filter and flow system. The instrument determines the amount of mercury adsorbed and displays the measured concentration on the digital meter. The digital meter is automatically re-zeroed at

the start of each sample cycle and the reading is frozen until the next sample cycle is activated, eliminating drift between samples.

The Jerome 431 and 431X units display results in milligrams per cubic meter (mg/m^3) and provide detection limits of approximately 1 $\mu g/m^3$ (0.001 mg/m^3) with useful range of 3 – 999 $\mu g/m^3$ (0.003 – 0.999 mg/m^3). The Jerome J405 displays results in $\mu g/m^3$ and provides a detection limit of 0.5 $\mu g/m^3$ with a useful range of 0.5 – 999 $\mu g/m^3$. These detection limits may not be adequate for making re-occupancy decisions.

2.2.2 Jerome J505: The J505 uses atomic fluorescence spectroscopy (AFS) for mercury analysis. A mercury light source emits at 254nm into a sample cell. Mercury atoms present in the sample cell absorb light at 254nm and, then re-emit light at the same wavelength. A photo multiplier tube (PMT) is used to measure the light emitted at 90° to the source, which correlates to mercury concentration. Ambient air is drawn through the intake port by the pump at a nominal flow rate of one liter/minute. The sample air flow is controlled by a valve, and flows either through a scrubber filter and then into the sample cell or directly into the sample cell where it is exposed to 254 nm light. Any mercury present absorbs and then re-emits the light; the re-emission is measured by the PMT. The PMT response during scrubbed flow is subtracted from the response during sample flow. The result correlates to mercury vapor concentration, which is calculated and displayed. After analysis, the sample air is routed through the exhaust scrubber to absorb any mercury before the sample stream is discharged. The J505 reports results in $\mu g/m^3$. The detection limit is 0.01 $\mu g/m^3$ with a useful range of 0.050 – 500 $\mu g/m^3$.

2.2.3 Nippon EMP-2: The NIC EMP-2 employs the ultraviolet (UV) Atomic Absorption Spectroscopy (AAS) method to determine mercury vapor concentration at a specific wavelength of 253.7 nm. Sample gas is drawn directly into the absorption cell and is exposed to radiation from the UV source. The decrease in signal at the detector is proportional to the amount of mercury vapor in the absorption cell, providing measurement of mercury concentration in real-time.

The NIC EMP-2 mercury survey meter reports results in $\mu g/m^3$. The detection limit is 0.1 $\mu g/m^3$ with a useful range of 0.1 – 1000 $\mu g/m^3$.

2.2.4 Mercury Instruments VM3000 and Tracker 3000IP: The VM3000 and Tracker 3000IP instruments utilize the Cold Vapor Atomic Absorption Spectroscopy (CVAAS) technique. The mercury concentration is measured in an optical cell made of fused silica. A maintenance-free membrane pump continuously feeds the sample gas to the optical cell where light absorption measurement takes place at a wavelength of 253.7 nm. Radiation from a mercury lamp passes through the cell and is measured by a solid state detector. The attenuation of the UV light reaching the detector depends on the number of mercury atoms in the optical cell. The internal computer performs real-time quantification of mercury concentration in the sample. The high-frequency driven electrodeless mercury discharge lamp (EDL) light source is controlled by a reference beam and reference detector device providing a stable baseline. Thermostatic control of the UV detector provides additional stability. To prevent temperature drift both the lamp unit and the detectors are temperature-stabilized. Because the optical cell is heated the unit is insensitive to water vapor.

The VM3000 and Tracker 3000IP units report results in $\mu g/m^3$ with detection limit of 0.1 $\mu g/m^3$ and useful range of 0.1 – 2000 $\mu g/m^3$.

2.2.5 Lumex RA 915 Light and RA-915$^+$: The operating principle for the RA 915 Light and RA-915+ is based on the effect of differential Zeeman Atomic Absorption Spectrometry (AAS) combined with high frequency modulation of polarized light. The UV emission source (mercury lamp) is positioned in a permanent magnetic field. The resonance mercury line at 254 nm is split into three polarized Zeeman components: π, σ^+, and σ^- respectively. When radiation is observed along the magnetic field lines, only the σ component radiation is registered. One σ component is within the mercury absorption line envelope and the other is outside it. In the absence of mercury vapor, the intensities of both σ components are equal. Mercury atoms cause a proportional, concentration-related difference in the intensity of the σ components. A polarization modulator is used to separate the σ components in time. Because the spectral shift of the σ components is significantly smaller than the width of molecular absorption bands and scattering spectra, the background absorption caused by interfering components generally does not affect the analyzer measurement. A multi-path cell with an effective length of 10 meters (m) is used for the RA-915+ (effective length of 3 meters for the RA 915 Light).

The Lumex RA-915+ reports results in ng/m^3. The detection limit for the Lumex RA-915+ is 0.002 $\mu g/m^3$ (2 ng/m^3) with a useful range of 0.020 – 100 $\mu g/m^3$ (20 – 100,000 ng/m^3). The Lumex RA 915 Light reports results in $\mu g/m^3$. The detection limit for the Lumex RA 915 Light is 0.1 $\mu g/m^3$ with a useful range of 0.1 – 100 $\mu g/m^3$.

Appendix A contains a comparison table for hand-held Mercury Vapor Analyzers.

Based on detection limits and useful range, the Lumex Ra915+, Lumex RA915 Light, Jerome J505, Nippon EMP-2, Mercury Instruments VM3000, and Tracker 3000IP may be acceptable for making re-occupancy determinations.

3.0 Responsibilities

Only trained, qualified persons who thoroughly understand these procedures should take measurements and process results.

Prior to selecting a direct-reading mercury analyzer, check with the manufacturer for the latest models and detection limits to ensure that the unit selected will be acceptable for re-occupancy derterminations.

4.0 Interferences

Direct Reading Instruments: Do not allow the direct-reading mercury analyzer to contact metallic mercury! Any direct contact of any part of the instrument with metallic mercury may result in high background noise for a prolonged period of time. Refer to the manufacturer's documentation for known interferences. There may be interferences from other contaminants not known to the manufacturer that might adversely affect mercury vapor measurement readings.

While taking measurements of mercury vapor concentrations in ambient air, observe basic safety regulations dealing with mercury and its compounds, mercury filled devices, and operating codes and safety regulations for electrical installations.

Sample Collection: Refer to NIOSH Method 6009 and SERAS SOP# 1827 for discussion of interferences in clearance sampling utilizing laboratory methods.

5.0 Equipment / Apparatus

5.1 Direct Reading Instrument

5.1.1 Ohio Lumex Model RA-915+ portable Mercury Vapor Analyzer or other equivalent direct-reading analyzer (must have a detection limit of 0.2 $\mu g/m^3$ or lower).

5.1.2 PC and Software for Lumex RA-915+ Control/Data Averaging or data logging capability with download of logged data for external data processing.

5.2 Sample Collection

5.2.1 Sampler: glass tube, 7 cm long, 6-mm OD, 4-mm ID, flame sealed ends with plastic caps, containing one section of 200 mg sorbent (typically, Hydrar) held in place by glass wool plugs (SKC, Inc., Cat. #226-17-1A, or equivalent).

5.2.2 Personal sampling pump, 0.15 to 0.25 L/min, with flexible connecting tubing.

5.3 Personal Protective Equipment (PPE)

Appropriate PPE should be used to protect the Lumex RA-915+ operator and personnel conducting sampling operations. Refer to the site-specific Health & Safety Plan for appropriate PPE.

6.0 Prerequisites: Pre-Operational Checks

The Lumex RA-915+ or other direct-reading mercury analyzer must have a current factory calibration with certificate or must be user calibrated according to the manufacturer's instructions. User calibrations must be documented.

Follow the operating procedures in SERAS SOP# 1729, *Operation of the Lumex RA-915+ Analyzer for Measuring Mercury Vapor Concentrations in Ambient Air*, when conducting pre-operational instrument checks and clearance testing for mercury vapor.

If using other direct-reading instruments, follow the manufacturer's instructions for pre-operational checks and instrument operation.

Follow guidelines in NIOSH 6009 and manufacturer's instructions for pre-operational checks, calibration, and operation of personal sampling pumps and for use of sampling tubes.

7.0 Post-Remediation Procedure

Mercury clearance testing may be started after appropriate cleanup (remediation) procedures have been performed by an authorized Contractor or Agency.

Measurements at the end of a clean-up day may indicate low to non-detectable air concentrations of mercury. However, despite the best clean-up efforts, elevated mercury vapor concentrations may be observed a day or two after remediation has been performed.

It is important to note that, during remediation sampling, all electronics should be in their normal operating mode (as when the room is occupied). For example, if there is a TV in a family room, the TV should be on during sampling.

Remediation activities are designed to remove most solid/liquid sources of metallic mercury. However, mercury vapor may become suspended in the air, especially if the room is warm. During the evening, the room typically cools, and mercury vapor may turn back into liquid and re-condense onto surfaces in different/additional locations. It then re-vaporizes when the air warms and is again detectable with air monitoring equipment. Also, if mercury beads are left behind in cracks/crevices, they may become covered with dust, which may suppress vapor formation. When the air and dust is disturbed during the next days' cleanup operations, the beads may give off vapor that is detectable with air monitoring equipment. Cleanup activities may need to be repeated. This rebound effect is normal and not an indication of an incomplete job the first time.

It is advisable to delay from several hours up to 1-2 days after the clean-up is complete before initiating clearance testing in order to verify the absence of a rebound effect. The exact time depends on site specific conditions such as the volume of mercury spilled and the size of the contaminated area. Professional judgment should be used.

The rebound effect vaporization/condensation cycle will continue as long as the vapor remains. As an alternative approach, a forced heating and venting process for 6-8 hours after liquid mercury is removed followed by approximately 8 hours of normal activity in the room, may be considered. For example, if the cleanup was finished at 3 PM, then forced heating/venting should occur until 9 - 11 PM and clearance sampling could begin around 8 AM the following day. This procedure will require less time in many circumstances and may be more effective in ensuring the room meets re-occupancy conditions.

Although not routinely performed, in some cases it may be warranted to consider a re-sampling event days to weeks after re-occupancy when the room(s) is not being used. There are obvious pros and cons to this approach but it may ensure that an effective cleanup was performed.

7.1 Visual Inspection and Mercury Source Location. Fill in the site and mercury vapor analyzer information on the Mercury Spill Survey Testing Record (MSSTR) form (Appendix B) prior to conducting the initial survey of the cleaned spill area. Inspect surfaces and crevices for visible droplets of mercury using a flashlight at a low angle to the surface (this procedure can also be used during the initial investigation of a reported small spill). If droplets are present, advise the site manager that cleanup procedures need to be repeated.

If visible mercury is not observed, conduct a survey with the Lumex RA-915+ or other real-time mercury vapor analyzer (section 2.3) at a sampling height of 1-2 inches (2.5 – 5 cm) above the entire surface of the spill area. It may be appropriate to use a less sensitive instrument such as the Jerome 431 for an initial screening. Record location/readings on

the MSSTR form. If mercury readings are consistently above 1 μg/m^3, advise the site manager that cleanup procedures may need to be repeated. After **all visible mercury has been removed** and real-time readings are consistently below 1 μg/m^3, initiate clearance sampling to measure very low levels of mercury.

7.2 Clearance Sampling Using Laboratory Methods. Clearance sampling is particularly important in the later stages of cleanup, where site responders are attempting to determine if building re-occupancy is appropriate based on public health guideline values for mercury vapor. Due to the time and resources required, it is best to conduct sampling when the responders are reasonably certain clearance values can be met. NIOSH Method 6009 can be used to measure mercury concentrations in air samples at levels down to 0.1 μg/m^3.

Fill in the site and air sampling information (action level for clearance, date, and sampling locations) on the Mercury Spill Clearance Testing Record for SKC Hydrar Tube (MSCTR-HT) form (Appendix C).

Collect air samples (according to NIOSH 6009, typically eight hours) from the centers of rooms that are occupied a significant number of hours per day and consider doing so where field instrument readings indicate potential problem areas. In homes, samples should be collected from living and sleeping areas, with particular attention paid to those rooms occupied by the youngest residents of the home. Ideally, the following conditions should exist in order to obtain results offering a reasonable level of certainty that returning building occupants will not be exposed to mercury vapor concentrations above health-based guidelines:

1. Placement and operation of fans in the sampled areas for air circulation in the room as close to normal operation as possible. NOTE: If a fan is not normally in operation, then having one in operation during sampling may not be representative of actual exposures.
2. Temperature between 75 °F and 85 °F. NOTE: Sampling should be done at the normal room temperature if that is above 85 °F.
3. Sampling height generally at 2.5 ft (or representative height for occupant's common activities, e.g. potentially lower for very young children).
4. Constant activity over the sampling period to disturb areas that once contained liquid mercury - using a mechanical device, for example, a robotic vacuum. This agitation is to prevent oxidation of the liquid mercury surfaces, which inhibits vaporization. NOTE: The device used to disturb the mercury should be decontaminated or discarded with contaminated material after clearance sampling is completed. NOTE: Constant activity may not be needed if fans are operated during the sampling period.
5. Typically, windows closed and air conditioner off as this approach likely represents the worst-case conditions for elevated mercury levels. If sampling occurs under other conditions, they should be noted on the clearance testing record form.

Ambient (background) air samples should be taken for comparative purposes. The ambient (background) samples are defined as areas of the home that are removed from circulating fans. It may also be advisable to take one or two outside samples depending on site conditions particularly if there is any potential for elevated exterior readings. Duplicate samples and blanks should be used to monitor the repeatability of the data and to check for sample contamination, respectively. Samples should be collected in common areas of multi-family dwellings (e.g., lobbies and common hallways).

Fill in the pump#, flow (L/min), time on, and time off for each sampling location on the MSCTR-HT form.

Submit samples to an accredited laboratory for mercury analysis according to NIOSH 6009. Record the mercury concentration ($\mu g/m^3$) for each sampling location on the MSCTR-HT form. Provide a copy of the form to the site manager for use in determining re-occupancy status.

7.3 Clearance Sampling Using Portable Mercury Analyzers (MVAs). An alternate approach to the use of NIOSH Method 6009 is to monitor mercury vapor concentrations with the Lumex RA-915+. Mercury vapor concentration is monitored for a defined time period (typically 8 hours) and the average value for the time period is reported. Monitoring should be conducted in the same locations and using the same conditions (1-5) as noted above for Clearance Sampling. The Lumex RA-915+ incorporates external PC control to perform time averaging of mercury vapor results. This may also be accomplished using other direct-reading instruments (with a detection limit of 0.2 $\mu g/m^3$ or lower) that incorporate internal data logging combined with external data processing.

OPTIONAL: If continuous monitoring over the 8 hour period is not feasible due to a limited number of MVAs and/or large number of sampling areas, averaging discrete readings over the 8 hour time period (e.g., 1 reading per hour) may be considered. With this approach, 2 or 3 MVAs may be used for clearance of 10-15 areas in an 8 hour period; the standard procedure (continuous 8 hour monitoring) would require 15-20 MVAs to accomplish the same task. This optional approach may not be appropriate if the mercury vapor concentration has large fluctuations or changes rapidly over the 8 hour time period.

OPTIONAL: A second Mercury Vapor Analyzer (MVA) may be added as a Quality Assurance (QA) check. The second MVA should be co-located with the first unit to provide duplicate results for the location, which can be used to confirm that the first unit is operating properly.

NOTE: Battery power may not be sufficient to operate the Mercury Vapor Analyzers for 8 hours. In that case, an external power source is required.

Fill in the site and air sampling information (action level for clearance, date, location, time on, time off, total hours, and average mercury concentration) for each sampling location on the Mercury Spill Clearance Testing Record for Direct-Reading Mercury Analyzer (MSCTR-DRMA) form (Appendix D). Provide a copy of the form to the site manager for use in determining re-occupancy status.

8.0 Calculations

Real-time, direct-reading instruments provide mercury vapor results in units of ng/m^3 or $\mu g/m^3$. The conversion factor is 1 $\mu g/m^3$ = 1000 ng/m^3. Additional calculations are not required. The Lumex RA-915+ (with PC control) calculates and reports the average value in ng/m^3 for the time period monitored and additional calculations are not required. NIOSH 6009 results are reported in $\mu g/m^3$ and additional calculations are not required.

For direct-reading instruments that provide data-logging (see Appendix A), the results are downloaded according to the manufacturer's instructions and then, imported into a spreadsheet where the time-averaged value is calculated.

OPTIONAL: A similar spreadsheet calculation may be used to determine the average value when multiple discrete readings from 1 or 2 MVAs have been taken over the 8 hour period.

9.0 Quality Assurance / Quality Control (QA/QC)

Direct Reading MVA Instruments:

The following general QA/QC procedures apply for operation of the Lumex RA-915+ mercury analyzer (or equivalent):

1. All data must be documented on field data sheets or in site logbooks.

2. The instrument must be operated according to SERAS SOP# 1729 and/or the operating instructions supplied by the manufacturer, unless otherwise specified in the work plan. Instrument checkout activities must occur prior to operation and they must be documented.

3. Procedures must be used to ensure the accuracy and precision of mercury measurements in ambient air as specified by the manufacturer and all verification procedures must be documented.

4. Optional: Second co-located MVA to provide duplicate results. All QA/QC procedures noted above (1-3) apply to this unit.

5. Optional: Concurrent collection of NIOSH Method 6009 samples and direct reading MVA measurements. The NIOSH samples should be collected at a minimum of 5 - 10 percent of the sampling locations. Consider placing the NIOSH sampling instruments in locations . where children spend considerable time and/or where initial readings were elevated.

Sample Collection:

The QA/QC procedures outlined in NIOSH Method 6009 must be followed for clearance sampling utilizing laboratory methods.

10.0 Data Validation

Direct Reading Instruments:

The analyst will ensure that the direct-reading MVA and clearance sampling equipment are operated in accordance with the manufacturer's instructions and/or the appropriate SOP, and that all operational checks have been completed and are within the specified criteria.

Sample Collection:

Refer to SERAS SOP #1017 for Data Validation procedures applicable to samples collected/analyzed according to NIOSH method 6009.

11.0 Health and Safety

When cleaning up and handling mercury, follow the site-specific Health & Safety Plan prepared for the general health and safety practices of your organization.

For sample collection and analysis, refer to SERAS SOP #3013, SERAS Laboratory Safety Program.

The analyst should consult all appropriate material safety data sheets (MSDS) prior to running an analysis for the first time. If a MSDS is unavailable from the manufacturer of the material, consult other sources such as EPA, OSHA, NIOSH, etc.

12.0 References

National Institute for Occupational Safety and Health. 1996. NIOSH Manual of Analytical Methods. Method 6009. 4th ed. Suppl. Available at: http://www.cdc.gov/niosh/docs/2003-154/

Ohio Lumex Co., Inc., 2001. Mercury Analyzer RA-915+ Users Manual.

Ohio Lumex Co., Inc., 2001. Analyzer RA-915+ User's Manual: Operation With a PC.

SERAS SOP# 1017, Data Validation Procedure for Routine Inorganic Analysis.

SERAS SOP# 1729, Operation of the Lumex RA-915+ Analyzer for Measuring Mercury Vapor Concentrations in Ambient Air.

SERAS SOP# 1827, Analysis of Mercury in Air Using Cold Vapor Atomic Absorption (CVAA) (Based on NIOSH Method 6009).

SERAS SOP #3013, SERAS Laboratory Safety Program.

13.0 Appendices

A. Hand-Held Mercury Vapor Analyzer Comparison Table
B. Mercury Spill Survey Testing Record
C. Mercury Spill Clearance Testing Record for SKC Hydrar Tube
D. Mercury Spill Clearance Testing Record for Direct-Reading Mercury Analyzer

APPENDIX A

Hand-Held Mercury Vapor Analyzer Comparison Table

Instrument	Jerome 431X	Jerome J405	Jerome J505	Jerome 431	Mercury / EMP-2	Mercury Vapor Monitor VM-3000	Mercury Tracker 3000 IP	Lumex RA 915 light	Lumex RA-915+
Manufacturer	Arizona Instrument LLC	Arizona Instrument LLC	Arizona Instrument LLC	Arizona Instrument LLC	Nippon Instruments Corporation, Japan	Mercury Instruments GmBH	Mercury Instruments GmBH	Lumex, Russia	Lumex, Russia
Distributor					Brandt Instruments, Inc., LA	ST2 Service Technologies, Inc., CO	ST2 Service Technologies, Inc., CO	Ohio Lumex Co., OH	Ohio Lumex Co., OH
Units	mg/m^3	$\mu g/m^3$	$\mu g/m^3$	mg/m^3	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	ng/m^3
Range	0.003 to 0.999	0.5-999 (displayed) 0.5 - 5000 (recorded)	0.05 - 500	0.003 to 0.999	0.1 - 1000	1 to 100 1 to 1000 1 to 2000	0.1 to 100 0.1 to 1000 0.1 to 2000	0.1 to 100	20 to 20000 (multi-path cell) 500 to 200000 (single-path cel)
Methodology	Change in resistance of gold after mercury absorption	Change in resistance of gold after mercury absorption	Atomic Fluorescence Spectroscopy (AFS)	Change in resistance of gold after mercury absorption	Cold Vapor Atomic Absorption Spectroscopy (CVAAS)	Cold Vapor Atomic Absorption Spectroscopy (CVAAS)	Cold Vapor Atomic Absorption Spectroscopy (CVAAS)	Zeeman Atomic Absorption Spectrometry, High Frequency Modulation of Light Polarization	Zeeman Atomic Absorption Spectrometry, High Frequency Modulation of Light Polarization
Accuracy (percent)	+/- 5% @ 0.1 mg/m^3	+/- 10% @ 1 $\mu g/m^3$	+/- 10% @ 1 $\mu g/m^3$	+/- 5% @ 0.1 mg/m^3	+/- 5% @ 100 $\mu g/m^3$	NA	NA	Info not available	+/-20%
Detection Limit	0.001	0.5	0.01	0.001	0.1	0.1	0.1	0.1	2
Response Time	12 sec (Sample Mode) 3 sec (Survey Mode)	7 sec (Sample Mode) 2 sec (Survey Mode)	28 sec (Standard Mode) 16 sec (Quick Mode) 1 sec (Search Mode)	12 sec (Sample Mode) 3 sec (Survey Mode)	1 sec manual: 5 min	1 second	1 - 16 sec (programmable)	10 - 255 sec (programmable)	1 - 255 sec (programmable)
Wavelength	Not applicable	Not applicable	254 nm	Not applicable	253.7 nm	253.7 nm	253.7 nm	254 nm	254 nm
UV source	Not applicable	Not applicable	Info not available	Not applicable	Low pressure Hg discharge lamp	Electrodeless Hg low pressure lamp	Electrodeless Hg low pressure lamp	Glow discharge mercury lamp	Glow discharge mercury lamp
Stabilization	Not applicable	Not applicable	Info not available	Not applicable	Reference beam	Reference beam & thermal	Reference beam & thermal		light polarization
Optical cell	Not applicable	Not applicable	Info not available	Not applicable	Info not available	Fused silica, 25 cm long	Fused silica, 25 cm long	Multi-path cell	Multi-path cell, 10 meter equivalent
Heating of cell	Not applicable	Not applicable	Info not available	Not applicable	Info not available	70°C	70°C	Info not available	Info not available
Pump	750 mL/min	750 mL/min	1 L/min	0.75 L/min	1.0 L/min	Membrane, 2 L/min	Membrane, 2 L/min	>15 L/min	>15 L/min
Filter	Yes	Yes	Info not available	Yes	Info not available	PTFE 1: 47-50 mm diameter	PTFE 1: 47-50 mm diameter	Yes	Yes
Calibration Method	Factory Calibrated.	Factory Calibrated.	Factory Calibrated.	Factory Calibrated.	Factory calibrated with standard gas, and this calibration value is stored in the microprocessor memory before shipping. Recalibrate at 6 month intervals.	Factory calibrated (using MC-3000 Mercury calibration). The operator can recall actual calibration factor and enter a new calibration	Factory calibrated (using MC-3000 Mercury calibration). The operator can recall actual calibration factor and enter a new calibration	Factory calibrated. Calibration parameters inaccessible to users.	Factory calibrated. Calibration parameters inaccessible to users.
Interferences and Correction	Chlorine, NO2, H2S, Mercaptans; interferences removed by internal filters.	Chlorine, NO2, H2S, most mercaptans; NOTE: the C/M filter removes these compounds. Special use filters available.	Chlorine, ammonia, humidity/ water vapor, gasoline	Chlorine, NO2, H2S, Mercaptans; interferences removed by internal filters.	Benzene, Acetone, Carbon Tetrachloride, SO2, NO, NO2, Aromatic Hydrocarbons, Water Vapor, Dust Automatic correction	Benzene, Acetone, Carbon Tetrachloride, SO2, NO, NO2, Aromatic Hydrocarbons, Dust	Benzene, Acetone, Carbon Tetrachloride, SO2, NO, NO2, Aromatic Hydrocarbons, Dust	Info not available	Info not available
Power	115 / 220 V	12V DC Power Adaptor	12V DC Power Adaptor	115 V or 230 V	100 / 240 V	110 / 240V	230 V/ 50/60 Hz or 110-120 V / 50/60 Hz optional	220 V, 50 Hz or 110V, 60 Hz, 20W	220 V, 50 Hz or 110V, 60 Hz, 20W
Battery	Internal Ni-Cd (6 hr capacity)	Internal Ni-Metal_Hydride (24 hr capacity)	Internal Ni-Metal_Hydride (24 hr capacity)	Internal Ni-Cd batteries (5-hr capacity	Internal Lithium (5 hr capacity)	integrated 12 V batteries (6 h capacity)	Internal Ni-Metal-Hydride (6 hr capacity)	Built-in 6V, 6-12V DC (optional)	Built-in 6V, 6-12V DC (optional)
Weight	8 lbs (3.5 Kg)	5 lbs (2 Kg)	6.5 lbs (3 Kg)	7 lbs	4 lbs (1.8 Kg)	approx. 7 Kg	15.5 lbs (7 Kg)	7.5 Kg	7.5kg
Dimensions (L x W x H)	33 x 15 x 10 cm	28 x 16 x 16.5 cm	30.5 x 15.8 x 21.3 cm	33.8 x 15.6 x 10.0 cm	26.5 x 11 x 12.8 cm	45 x 15 x 35 cm	45 x 20 x 31 cm	46 x 21 x 11 cm	46 x 21 x 11 cm
Communication Interface	RS-232	USB	USB	RS-232	RS-232	RS-232	RS-232	RS-232	RS-232
Data Logging Number of Readings	External Box 1000	Internal 20000	Internal 10000	External Box 1000	Internal (SD card)	Internal 30000	Internal 15000	Info not available	External with PC Control

APPENDIX B

Mercury Spill Survey Testing Record

Mercury Spill Survey Testing Record (MSSTR)

Date: _____ Site: _____

Task Leader:_____ SERAS

Work Assignment Manager: _____ ERT/EPA

Analyst: _____

Anticipated Contaminated Area Information:

Building: _____ Room: _____ Dept: _____
Before/After Video (cross-reference): _____
Description of Spill and Surrounding Area:
_____
_____
_____
Photo of Spill and Surrounding Area (cross-reference): _____

Mercury Vapor Analyzer Survey Information:

Instrument: _____ Model: _____ Serial#: _____

Factory Calibration Date: _____ Pre Test: _____ Post Test: _____

TIME	Location	Mercury Reading ng/m^3 or $\mu g/m^3$

Comments & Recommendations

_____
_____
_____

APPENDIX C

Mercury Spill Clearance Testing Record for SKC Hydrar Tube

Mercury Spill Clearance Testing Record based on SKC Hydrar Tube Data (MSCTR-HT)

Date: _____ Site: _____

Task Leader:_____ SERAS

Work Assignment Manager: _____ ERT/EPA

Analyst: _____

Anticipated Contaminated Area Information:

Building: _____ Room: _____ Dept: _____
Before/After Video (cross-reference): _____
Action Level for Clearance: _____
Description of Spill and Surrounding Area:
_____
_____
_____
Photo of Spill and Surrounding Area (cross-reference): _____

SKC Hydrar Tube data: Catalog#: _____ Lot#:_____

Date	Pump#	Flow L/min	Sample ID / Location	Time on	Time off	Total Volume (L)	Mercury Concentration ($\mu g/m^3$)

Conclusions & Recommendations

Area Passed Test (Y/N) _____
Comments:
_____
_____

Area Released for Re-occupancy by: _____ date: _____
Name

APPENDIX D

Mercury Spill Clearance Testing Record for Direct-Reading Mercury Analyzer

Mercury Spill Clearance Testing Record Based on Direct-Reading Mercury Analyzer Data (MSCTR-DRMA)

Date: _____ Site: _____

Task Leader:_____ SERAS

Work Assignment Manager: _____ ERT/EPA

Analyst: _____

Anticipated Contaminated Area Information:

Building: _____ Room: _____ Dept: _____
Before/After Video (cross-reference): _____
Action Level for Clearance: _____
Description of Spill and Surrounding Area:
_____
_____
_____
Photo of Spill and Surrounding Area (cross-reference): _____

Instrument: _____ Model: _____ S/N:_____

Factory Calibration Date: _____ Mercury Concentration Units: _____

Date	Sample ID / Location	Time on	Time off	Total hrs	Average Mercury Concentration

Conclusions & Recommendations

Area Passed Test (Y/N) _____
Comments:
_____
_____

Area Released for Re-occupancy by: _____ date: _____
Name

Appendix C: Templates and Reference Documents

1. Action Levels for Evacuation of Work Zone Pending Reassessment of Conditions

HEALTH AND SAFETY MONITORING						
Instrument	**Task Number**	**Contaminant(s)**	**Monitoring Location**	**Monitoring Frequency**	**Action Levels**	
PID (e.g.,MultiRAE, TVA-1000B) FID (e.g., TVA-1000B)					**Unknown Vapors** Background to 1 ppm: Level D 1 to 5 ppm above background: Level C 5 to 500 ppm above background: Level B >500 ppm above background: Level A	**Contaminant-Specific**
Oxygen Meter/Explosimeter (e.g.,MultiRAE, MultiWarn)					**Oxygen** <19.5% or >25.0%: Evacuate area; eliminate ignition sources; reassess conditions. 19.5 to 25.0%: Continue work in accordance with action levels for other instruments.	**Explosivity** <10% LEL: Continue work in accordance with action levels for other instruments; monitor continuously for combustible atmospheres. >10% LEL: Evacuate area; eliminate ignition sources; reassess conditions.
Radiation Alert Monitor (Rad-mini or RAM-4)					<0.1 mR/hr: Continue work in accordance with action levels for other instruments. >0.1 mR/hr: Evacuate area; reassess work plan and contact radiation safety specialist.	
Mini-Ram Particulate Monitor					**General/Unknown** Evaluate health and safety measures when dust levels exceed 2.5 milligrams per cubic meter.	**Contaminant-Specific**
Draeger Colorimetric Tubes					**Tube Action Level Action**	

HEALTH AND SAFETY MONITORING					
Instrument	**Task Number**	**Contaminant(s)**	**Monitoring Location**	**Monitoring Frequency**	**Action Levelsa**
Air Monitor/Sampler Type:_____ Sampling medium:					**Action Level Action**
Micro R Meter (Ludlum 192,)					<2 mR/hr: Continue work in accordance with action levels for other instruments. 2 to 5 mR/hr: In conjunction with a radiation safety specialist, continue work and perform stay-time calculations to ensure compliance with dose limits and ALARA policy. >5 mR/hr: Evacuate area to reassess work plan and evaluate options to maintain personnel exposures ALARA and within dose limits.
Ion Chamber (Ludlum 2241)					See micro R meter action levels above.
Radiation Survey Ratemeter/Scaler with External Detector(s)					**Detector Action Level Action**
Noise Dosimeter (Sound Level Meter)					<85 decibels as measured using the A-weighed network (dBa): Use hearing protection if exposure will be sustained throughout work shift. >85 dBA: Use hearing protection. >120 dBA: Leave area and consult with safety personnel.
Other: Lumex mercury Vapor Analyzer	1	Mercury	Residence, yards, storm drain	Continuous	Level B – >100,000 ng/m3 Level C - >25,000 ng/m3 Residential occupancy levels - <1,000 ng/m3 Residents isolation level - >10,000 ng/m3 Re-occupancy levels - <3,000 ng/m3

2. Air Sampling Data Sheet

Air Sampling Data Sheet

Site: _____

Project Number: _____

Date: _____

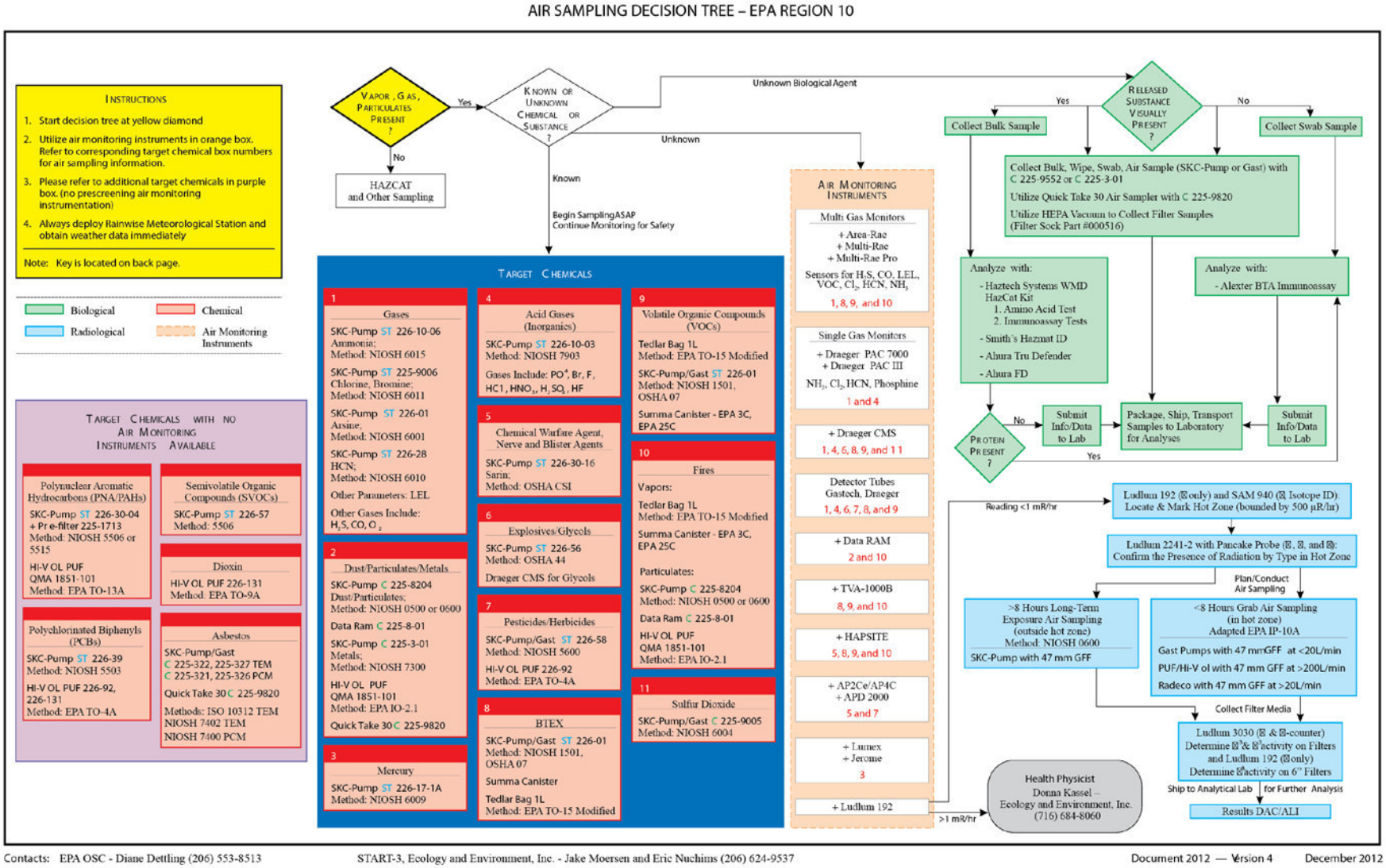
Page: _____ **of** _____

Sample Description/Location	Sample No.	Pump ID No.	Flow rate, L/min			Time		Duration, minutes	Air volume, Liters
			Start	Stop	Avg.	Start	Stop		
Entries by:						**Date:**			

Note: Take at least five airflow readings, average them, and then enter into the table before and after the sample location event.

Comment: _____

3. Air Sampling Decision Tree



Key:

+	Positive Result Above Background
α	Alpha
β	Beta
γ	Gamma
A	Anchorage Warehouse
ALI	Annual Limit Intake
APD	Advanced Portable Detector
ASTM	American Society for Testing and Materials
BTA	Bio Threat Analyzer
BTEX	Benzene, Toluene, Ethylbenzene, Xylene
C	Cassette Media for SKC Pumps
CGI	Combustible Gas Indicator
Cl	Chlorine
CMS	Chip Measuring System Draeger
CO	Carbon Monoxide
CSI	Chemical Sampling Information
CWA	Chemical Warfare Agent
DAC	Data Chem
DoD	Department of Defense
FP	Filter Paper
FTIR	Hazmat Identification System
GC-MS	Gas Chromatograph Mass Spectrometer/HAPSITE
GFF	Glass Fiber Filter
H_2S	Hydrogen Sulfide
H_2SO_4	Sulfuric Acid
H_3PO_4	Phosphoric Acid
HazCat ™	Hazardous Materials Categorization
HCl	Hydrochloric Acid
HCN	Hydrogen Cyanide
HEPA Filter	High Efficiency Particulate Air Filter
HF	Hydrofluoric Acid
HHA	Hand Held Assay
Hi-Vol	High-Volume Sampler
HP	Health Physicist
IO	Inorganics
JPO	Joint Program Office
LAT	Level-A Truck (Seattle)
LEL	Lower Explosive Limit
L/Min	Liters/Minute
MCE	Methyl Cellulose Ester
mR/hr	Milliroentgen Per Hour
NH_3	Ammonia
NIOSH	National Institute of Occupational Safety and Health
O_2	Oxygen
OSHA	Occupational Safety and Health Administration
P	Portland Warehouse
PCB	Polychlorinated Biphenyl
PCM	Phase Contrast Microscopy
PDR	Personal Data Ram
PID	Photoionization Detector
PNA and PAH	Polynuclear Aromatic Hydrocarbons
ppm	Parts Per Million
PUF	Polyurethane Foam
R	Response Truck Located at Warehouse (Seattle)
SAM	Surveillance and Monitoring
SO_2	Sulfur Dioxide
ST	Sorbent Tube Media for SKC Pumps
START	Superfund Technical Assessment and Response Team
SVOC	Semi Volatile Organic Compound
TEM	Transmission Electron Microscopy
TO	Toxic Organics
TVA	Toxic Vapor Analyzer
μR/hr	Milliroentgen Per Hour
VOC	Volatile Organic Compound
W	Warehouse South Park (Seattle)
WMD HazCat	Weapons of Mass Destruction Hazardous Materials Categorization

Disclaimer

This multimedia document was developed by field personnel for utilization by the US EPA and their contractors, and is to be used by trained personnel only. Neither the US EPA nor any of their contractors assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product or process disclosed herein. Reference to any specific commercial products, process, or service by trade name, trademark, manufacturer or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the US EPA.

Equipment Repr esentatives:

Alexeter – Tom Fryzel (877) 591-5571

Draeger - Tech Support – (800) 858-1739

HAPSITE Orders and Technical – (315) 434-1100

HiVolume Air Sampling Support – Jerry Winberry (919) 467-2785

Ludlum – (800) 622-0828

Lumex – Joseph Siperstein (888) 876-2611

Rae Systems – Shawn Ralton (253) 330-2141

SKC Pump – Ken Walter (206) 979-8352

Scott – Shaun Endsley (208) 818-0122 or (800) 247-7257 (tech support)

Thermo (Formerly Ahura) – (978) 657-5555 (Option #, then 1)

Laboratories:

ALS – Rand Potter (801) 884-7712

Test America – Darla Powell (206) 255-8508

Air Toxics – Karen Stempson (916) 439-3111

Pace Analytical – Michael King (877) 859-7778

Washington State Department of Health – Denny Russell
(206) 418-5562 (Biologicals)

Action Levels:

Oxygen Enriched/Deficient Envir onment

$23.5\% < O_2 < 19.5\%$

Flammable/Explosive Envir onment

CGI ≥ 10% LEL

Unknown Volatile Organic Compound

1ppm Sustained, Level-C

5ppm Sustained, Level-B

Radiation

≥1 mR/hr	Withdraw, Only Continue Monitoring with Health Physicist Advice
<1 mR/hr	Continue Monitoring for Radiation
.01 - .02 mR/hr	Typical Background Levels

4. Assessing Mercury Notifications: A Guide for OSCs

[Form needed]

5. Consent for Entry and Access to Property

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Consent for Entry and Access to Property -- Mercury

Name:	**Phone:**
Address:	
Address of property for which consent to access is granted:	
Relationship to property (i.e., owner, 5-year tenant, etc.):	

I consent to officers, employees, and authorized representatives of the United States Environmental Protection Agency (EPA) entering and having continued access to my property for the following purposes:

1. air sampling;
2. decontamination of structures, furnishings and/or personal belongings contaminated by mercury;
3. stabilization and disposal of contaminated furnishings and/or personal belongings that remain contaminated;
4. removal and disposal of carpets, baseboards, furnace filters and of drapes, blinds, and other window dressings pursuant to health department recommendations;
5. removal and disposal of food products pursuant to health department recommendations; and
6. such other actions as the EPA On-Scene Coordinator determines necessary to protect human health or welfare or the environment.

In some cases, EPA may compensate for the actual value of property disposed of by EPA. The value will be determined by an independent certified appraiser retained by EPA.

I realize that these actions by EPA are undertaken pursuant to its response authorities under the comprehensive Environmental Response, Compensation and Liability Act of 1980, as amended (CERCLA), 42 U.S.C, § 9601 et seq.

I also realize that there may be loss of or damage to property during these actions. In addition, I realize EPA will be using my utilities, including heat, water, and electricity.

To the extent that U.S. EPA does replace any item determined to be contaminated, I acknowledge that it makes no representations about the quality, aesthetics, safety, use or character of such item or its installation. Furthermore, U.S. EPA makes no warranties as to such item or its installation, including, but not limited to, merchantable warranties or warranties of fitness for purpose.

This written permission is given by me voluntarily with knowledge of my right to refuse and without threats or promises of any kind.

I certify that I am not insured under any policy that might cover costs associated with responding to mercury contamination on my property.

I certify that this Consent for Entry and Access is entered into voluntarily and constitutes an unconditional consent and grant of permission for access to the property by officers, employees and authorized representatives of EPA at reasonable times.

I have not intentionally applied mercury in order to obtain relocation-related benefits. I have not requested or permitted anyone else to release mercury so that I could obtain relocation-related benefits. I understand that intentionally applying (or arranging for the application or mercury in order to obtain relocation-related benefits is a crime punishable by a fine and/or imprisonment. I understand that making any misrepresentation in order to obtain relocation-related benefits is a crime punishable by a fine and/or imprisonment.

All statement in this document are true and correct to the best of my knowledge. I understand that intentionally making false or fraudulent statements in this document is a criminal offense punishable by a fine and/or imprisonment.

_____ _____

Date **Signature**

_____

Print Name

6. Contaminated Items Documentation Log

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Mercury Contaminated Items/Property Documentation Log

Site Name:	
Address (City, County, State):	

Description of Items	Hg Vapor Level ($\mu g/m^3$ or ng/m^3)

7. Daily Safety Meeting Record

Daily Safety Meeting Record		
General Information		
Project:		
Project No:	**TDD No.:**	
Project Location:		
Date:	**Time:**	**Weather:**
Specific Location:		
Planned Activities:		
Safety Topics Presented		
Chemical Hazards Update:		
Physical Hazards Update:		
Radiation Hazards Update:		
Review of Previous Monitoring Results:		
Protective Clothing/Equipment Modifications:		
Special Equipment/Procedures: Lumex mercury vapor analyzer as gas monitoring.		
Drilling Safety Issues (including testing the operation of drill rig emergency stop switches):		
Emergency Procedures: In case of emergency, all START and EPA team members will meet at:		
Additional Topics/Observations:		
Team Members' Comments/Suggestions:		
Initial Project Safety Checklist **1. Emergency information reviewed?_____ Made familiar to all team members?_____**		

8. Decontamination Plan Checklist

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Mercury Decontamination Plan

Address:	
Date:	**Time Started/Ended:**

_____ Health Department issues evaluation letter to resident. Health Department to post sign stating: "No Trespassing. House Unfit for Human Occupancy."

_____ Residents bag select clothes, personal items, medicine for relocation.

_____ Use a mercury vapor analyzer to screen clothes in bags. Any elevated clothing will be bagged, tagged and placed inside front door.

_____ OSC obtains keys from residents and forward to command post/IC.

_____ Pre-document conditions in the house with dedicated house video.

_____ Turn heat up to 85 degrees Fahrenheit or turn on turbo heater. Wait 4 hours.

_____ Open windows/door if possible. Use fans to ventilate for approximately 1 hour.

_____ Provide 24-hour security at unattended residences.

_____ Bag all remaining clothes, shoes, rugs, bedding, and porous items. Screen with a mercury vapor analyzer. Screen washing machines/dryer, replace air filters, and screen vacuums. A mercury vapor concentration consistently greater than 0.010 mg/m^3 (10 $\mu g/m^3$) is considered contaminated.

_____ Place bags of contaminated items outside or in a non-contaminated area.

_____ Compile a detailed inventory and photo/video document of contaminated items when all mercury-contaminated items are bagged and placed in a non-contaminated area.

_____ Use HgX® and water mixture to mop floor, rinse with water, and leave fans running.

_____ Call Command Post when completed and take bags of PPE to rolloff boxes for disposal.

_____ Prepare for post air sampling:

- Close windows
- Turn off heat (if summer) or turn heat to 70 degrees Fahrenheit (if winter)
- Turn lights out
- Close and lock doors

NOTE: Decontamination Plan may be modified if alternate methods for decontaminating contaminated clothing and other porous items is preferred over immediate disposal.

9. De-List Letter from Local Health Department

Name County Combined Health District Logo	**Health Commissioner:** Robert Brown, R.S., M.P.A. *Community Service Provider*	**Board of Health:** Barbara Johnson, MD Michael Green, PhD

March 10, 2014
John Q. Smith
On-Scene Coordinator
U.S. EPA Region X
Superfund Division (X-1)
Emergency Response Section X
123 Main Street
City, State 12345

Dear Mr. Smith:

The Name County Health District has received information from your office that the following homes have completed the clean-up and reconstruction phase or required no action regarding the mercury incident. Upon reviewing the post-cleanup sampling results, I am requesting that these homes be removed from the action list.

Sincerely,

Robert Q. Brown

Robert Q. Brown, R.S., M.P.A.
Health Commissioner

456 E. 1st Avenue, City, State 67890
Phone: 123-456-7890
Fax: 987-654-3210

10. De-List Letters from U.S. EPA

a. Residence that was sampled but did not require decontamination

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
CITY, STATE 12345

March 8, 2014

Robert Q. Brown, R.S., M.P.A.
Health Commissioner
Name County Combined Health District
456 E. 1st Avenue
City, State 67890

Dear Mr. Brown:

On March 6, 2014, the following locations were referred to U.S. EPA for mercury characterization and potential cleanup:

- Address 1
- Address 2
- Address 3
- Address 4
- Address 5
- Address 6
- Address 7
- Address 8
- Address 9
- Address 10

Completion of initial air sampling for mercury by U.S. EPA at these locations occurred on March 6, 2014. A copy of the sample analyses confirming that mercury levels are below the long-term action levels provided by State Department of Health and the Agency for Toxic Substances and Disease Registry is attached. The addresses noted above did not require indoor decontamination and U.S. EPA has no plans for further activity at these locations. Please contact me if you have any questions at 333-333-3333.

Sincerely,

John Q. Smith

John Q. Smith
U.S. EPA Region X
On-Scene Coordinator

Cc: Site File

b. Residence that required decontamination

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
CITY, STATE 12345

March 10, 2014

Robert Q. Brown, R.S., M.P.A.
Health Commissioner
Name County Combined Health District
456 E. 1st Avenue
City, State 67890

Dear Mr. Brown:

On March 6, 2014, the following locations were referred to U.S. EPA for mercury characterization and potential cleanup:

- Address 1
- Address 2

Completion of post decontamination air sampling for mercury by U.S. EPA at these locations occurred on March 9, 2014. A copy of the sample analyses confirming that mercury levels are below the long-term action levels provided by State Department of Health and the Agency for Toxic Substances and Disease Registry is attached. The addresses noted above required indoor decontamination, and U.S. EPA has no plans for further activity at these locations. Please contact me if you have any questions at 333-333-3333.

Sincerely,

John Q. Smith

John Q. Smith
U.S. EPA Region X
On-Scene Coordinator

Cc: Site File

11. Equipment Supplies Checklist

EQUIPMENT/SUPPLIES CHECKLIST			
INSTRUMENTATION	No.	**RESPIRATORS**	No.
Multi-gas monitor (MultiRAE Plus, AreaRAE, Multirwarn)		Air purifying	
Sensors: O_2, LEL, H_2S, CO, NH_3, Cl_2, NO_2, SO_2, HCN, PH_3		Cartridges:	
Gas Calibration Kit		SCBAs	
PID/FID (MultiRAE Plus, TVA-1000B) (probe: _____eV)		Cascade system	
Real-time cyanide monitor		**EMERGENCY EQUIPMENT**	
Real-time ammonia/chlorine (NH_3, Cl_2) monitor		Medical monitoring kit	
Chemical weapon detector (AP2Ce, APD2000)		Blood pressure monitor (with sphignomanometer)	
Draeger tube kit (tubes: _____)		Thermometer (medical)	
Hazard Categorization Kits (First Step, Orange, WMD)		Fire extinguisher	
Field Spetrometers (HazMat ID, First Defender)		Spill kit	
Personal dust monitor (MiniRam)		Portable eye wash	
Area dust monitor (DataRam 4000)		Stretcher	
Mercury monitor (Lumex, Jerome)			
Personal air sampling pumps, supplies and cal kit		**DECONTAMINATION EQUIPMENT**	
Infrared monitor (MSA Evolution 5000, Minolta Campac 3)		Wash tubs	
Weather station		Buckets	
GPS Unit (Garmon)		Scrub brushes	
Spare batteries (type: _____)		Pressurized sprayer	
		Spray bottle	
RADIATION EQUIPMENT/SUPPLIES		Detergent (type: _____)	
TLD badges		Solvent (type: _____)	
Ludlum 192 survey meter (Micro R)		Plastic sheeting	
Ludlum 2241-2 survey meter		Tarps and poles	
Probes: GM pancake, 2" NaI gamma, ZnS alpha		Trash bags	
Electronic dosimeters (Canberra MRAD 103)		Trash cans	
Eberline R020		Masking tape	
SAM 935 gamma spectrometer		Duct tape	
Documentation forms		Paper towels	
		Face mask	
PERSONAL PROTECTIVE EQUIPMENT		Face mask sanitizer	
Steel-toed boots		Step ladders	
Hard hat		Distilled water	

EQUIPMENT/SUPPLIES CHECKLIST			
Eye protection		Deionized water	
Ear protection: plugs, muffs			
Air purifying respirator			
Thieving rods with bulbs		Binoculars	
Spoons		Megaphone	
Knives		Cooling vest	
Filter paper			
Bottle labels			
		SHIPPING EQUIPMENT	
		Coolers	
MISCELLANEOUS		Paint cans with lids, 7 clips each	
Pump		Packing media (cellulose, wood chips/pet bedding)	
Surveyor's tape		Shipping labels	
100' Fiberglass tape		DOT labels:	
300' Nylon rope		"Up"	
Nylon string		"Danger"	
Surveying flags		"Inside Container Complies ..."	
Camera		Hazard Group	
Film		Strapping tape	
Bung wrench		Baggies	
Soil auger		Custody seals	
Pick		Chain-of-custody forms	
Shovel		Express shipment forms	
Catalytic heater		Clear packing tape	
Propane gas		Permanent markers	
Banner tape			
Surveying meter stick			
Chaining pins and ring			
Logbooks (_____ large, _____ small)			
Required MSDSs			
Intrinsically safe flashlight			
Potable water			

12. Letter to Request U.S. EPA Assistance

State EPA Logo
State of Name Environmental Protection Agency

Mr. John Q. Smith
Emergency Response Branch, Chief
U.S. EPA, Room X
123 Main Street
City, State 12345

Re: 2014 City Mercury Spill

Dear Mr. Smith:

State EPA requests U.S. EPA's assistance in conducting an emergency removal action involving mercury contamination in City, State. ER was notified Saturday, March 4th, by the City Fire Department that several children had smashed switches containing mercury from an old abandoned drum located at 456 Street in City. On Saturday, representatives from State EPA Emergency Response, Special Investigations, and Barbara Q. Johnson from U.S. EPA began investigations as to the extent and severity of the contamination. State EPA's contractor was activated to place plastic over contaminated areas while State EPA staff worked with U.S. EPA to screen houses for contamination. At present, six houses have levels exceeding removal standards and several areas outside have been identified for cleanup. Barbara Q. Johnson is currently conducting emergency cleanup activities.

Meanwhile, State EPA and the City Health Department collected names of individuals possibly exposed to the mercury. Testing of those individuals exposed to mercury was conducted by the Health Department.

State EPA is formally requesting U.S. EPA's assistance in assessing contamination and conducting the appropriate removal actions.

Please let me know if you have any questions and feel free to call me at 555-555-5555 with any questions. Bob Q. Green, State EPA OSC is the contact for this site.

Sincerely

Jane Q. Davis

Jane Q. Davis, Manager
Emergency Response & Special Investigations

Cc: Bob Q. Green ER, SSWDO

13. Mercury Screening Form for Land or Structures

MERCURY SCREENING FORM FOR LAND OR STRUCTURES

Site Name:_____ TDD #:_____

Date of Screening:_____ Time initiated:_____

Name of Contact:_____Phone:_____

Address:_____

_____

Type of structure (circle one): Residential, commercial, school, other (specify)_____

Number of occupants:_____ Ages (if a residence):_____

Suspected date of spill:_____

Current outdoor ambient temperature:_____

Status of ventilation (check one):
_____ 1. Outside windows/doors open.
_____ 2. Windows closed, interior doors open.
_____ 3. Door and windows to spill area closed.

Was there any attempt to clean spill? Y N

Any mercury-related illnesses reported? Y N

_____

Screening: Instrument (check): Jerome_____ Lumex _____

Write peak reading for each room listed below. Specify units.

_____

Room Type:_____ Specific Location:_____

Floors:	_____
Breathing Zone:	_____
Vents:	_____
Other:	
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

Other Readings:

Area/Item:	**Reading (specify units)**

14. Post-Decontamination Team Checklist

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Post-Decontamination Team

Address:	
Date:	**Time Started/Ended:**

_____ Analytical received and below the ATSDR level of 1.0 µg/m^3.

_____ Obtain house key from Command Post lock box and U-haul boxes from ERRS contractor. Obtain initial predocumentation video and inventory sheets.

_____ Post-decontamination team unpack indoor "clean" bags into boxes. Leave filled boxes on floor.

_____ Gather used "clean" bags from house for disposal at Command Post rolloff boxes.

_____ Utilizing initial pre-documentation videotape, post-document all rooms in house and outdoor areas.

_____ Photodocument and provide a detailed inventory of contaminated items (in bags located on back porch or back of house); less than or equal to four items per photo. If a mattress is contaminated, measure the mattress. Provide good details on the items. For example: one twin mattress measuring 6 feet by 4 feet by 8 inches, or one pair of boys Levi jeans size medium. After documenting the items, place back into the bags.

_____ Call ERRS contractor to transfer bagged contaminated items to Command Post rolloff boxes.

_____ Inform U.S. EPA OSC of completion of post-documentation of house.

_____ Return house key, videotape, and inventory log to Command Post.

_____ Forward copy of contaminated item log and photolog to local health department.

15. Post-Evacuation Letter to Health Department

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
CITY, STATE 12345

March 23, 2014

Jane Q. Smith, RN, BSN
Director of Nursing
Name County Combined Health District
456 E. 1st Avenue
City, State 67890

Dear Ms. Smith:

U.S. EPA completed soil excavation activities at the Name Street Mercury site on March 10 and 13, 2014. The following areas contained soil contaminated with mercury and were excavated:

- The property located at 123 Name Street (Sample ID: S-1)
- A small portion of soil adjacent to the detached garage of the home at 123 Name Avenue and the alley (Sample ID: S-2)
- The east/west alley between 123 Name Lane and 123 Name Drive (Sample ID: S-3 and S-4)
- The backyard of 456 Name Street (Sample ID: S-5)
- The east/west alley between 456 Name Avenue and the 1st east/west cross alley (Sample ID: S-6)
- The backyard of 456 Name Lane (Sample ID: S-7)
- A small portion of soil located near the 456 Name Drive backyard fence gate and the alley (Sample ID: S-8)
- A portion of the front yard under a tree located between the homes 789 and 791 Name Street (Sample ID: S-9)
- A small portion of soil in the rear of the backyard of 789 Name Avenue adjacent to the dividing metal fence (Sample ID: S-10)

U.S. EPA technical consultants collected post excavation soil samples for total mercury analysis. The samples were prepared and analyzed in accordance with U.S. EPA method 7471 using a Varian SpectrAA 300. The results can be found in Attachment A.

All samples showed total mercury concentrations below the State EPA residential soil action level of X milligrams per kilogram. U.S. EPA has no plans for further activity at these locations. Please contact me if you have any questions at 333-333-3333.

Sincerely,

John Q. Smith

John Q. Smith
U.S. EPA Region X
On-Scene Coordinator

Cc: Site File

16. Public Outreach Documents

The following are examples of documents from a previous mercury response distributed to local residents for informational purposes:

For Immediate Release: April 30, 2014

Name County Health Department (NCHD)

Health Contacts: John Q. Smith
Solid Waste Coordinator
Name County Health Department
888-888-8888

Name County Medical Director, Dr. Barbara Q. Johnson said today, "The preliminary results of sampling at the Name School found low levels of mercury contamination in several isolated areas. Several agencies and school officials are working rapidly but carefully to ensure a safe condition for the return of the students and faculty."

On April 19th, 2014, a U.S. EPA Emergency Response Team and a Name County Health Department Official visited a house that had been contaminated after the owner's child brought mercury home from school.

Representatives from U.S. EPA and officials from State and County health departments have been aggressively investigating the situation, taking advantage of the schools being closed for spring vacation. As of April 28, 2014, thirty-four buses have been inspected for mercury vapors. Four buses have been found with small amounts of mercury. The school hired contractors to clean up the contamination on four buses. EPA and health officials are continuing to conduct air sampling and evaluating the results for the entire Name School building.

Mercury is a naturally occurring metal that has several forms. Metallic mercury is a shiny, silver, odorless liquid metal, which if heated, is a colorless, odorless gas. Mercury is a highly toxic, cumulative poison and a major health threat to humans. Exposure usually occurs by inhalation or by skin contact, but there is also a small risk of exposure through ingestion. Children living in or frequenting contaminated buildings are particularly at risk of exposure. At high levels, mercury may damage the brain, kidneys, and a developing fetus, according to the Agency for Toxic Substances and Disease Registry.

The Name County Health Department is encouraging the public to properly dispose of any mercury they may have in their home. The Health Department will accept mercury by appointment and properly dispose of it free of charge, with no questions asked. John Q. Smith, Name County Solid Waste Coordinator said "mercury poses a threat to human health and should never be kept in your home or garage." Residents who may have mercury are encouraged to call the Name County Health Department at 888-888-8888 to make arrangements for free disposal.

The officials involved with this cleanup are concerned about the health risks to community members who may not even know they are being exposed to mercury in their homes or vehicles. The school says there will be no action taken against students who help take care of this unfortunate situation. "We don't want to give out punishment, we want absolute safety to return to the Name School," said Mary Q. Davis, Assistant Superintendent of Name School District.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION X
EMERGENCY RESPONSE BRANCH
1234 MAIN STREET, ROOM 123
CITY, STATE 12345

REPLY TO ATTENTION OF:

NAME MERCURY SPILL
MAY 2014

Dear Resident,

As you may be aware, the United States Environmental Protection Agency (U.S. EPA) is in the process of decontaminating a home in Name County, State, that has been contaminated with mercury. U.S. EPA would like to discuss with you the cleanup that may take place in your home.

In April 2014, metallic mercury was taken from a middle school in Name County, State, and was used in and outside of Name School by a group of students. As a result, your home may also be contaminated with small amounts of mercury.

Representatives from U.S. EPA, Name school officials, and state and county health departments have been aggressively investigating the situation, taking advantage of the schools being closed for spring vacation. As of April 28, 2014, thirty-four buses have been inspected for mercury vapors. Three buses have been found with small amounts of mercury. The school hired contractors to clean up the contamination on the buses and in the school. U.S. EPA is conducting air sampling and are evaluating the results for the entire Name School building and the buses.

The involved agencies screened and conducted air sampling at two homes. As of today, one home has been qualified for decontamination. Additional homes will be screened for mercury as they are identified.

Mercury is a naturally occurring metal that has several forms. Metallic mercury, also known as quick silver, is a shiny, silver, odorless liquid metal, which if heated, is a colorless, odorless gas. Mercury is a highly toxic, cumulative poison and a major health threat to humans. Exposure usually occurs by inhalation or by skin contact, but there is also a small risk of exposure through ingestion. Children living in or frequenting contaminated buildings are particularly at risk of exposure. At high levels, mercury may damage the brain, kidneys, and a developing fetus, according to the Agency for Toxic Substances and Disease Registry.

Clean up of your home is expected to take approximately one week after work begins. Clean up may take longer if mercury contamination levels are higher than expected, or if the mercury has spread to other areas of your home. The cleanup team working in your home will work from about 7:00 am to 7:00 pm Monday through Saturday.

Every precaution is being taken to insure that public health and safety throughout the cleanup is a priority. As you will see, the workers will be wearing protective clothing during the cleanup project. U.S. EPA will be particularly careful in making sure your home is cleaned as safely and quickly as possible.

Thank you for your patience and cooperation on this matter. If you have any questions or concerns about this clean up action, please call Michael Q. Smith at 222-222-2222 or Jane Q. Johnson of the Name County Health Department at 888-888-8888.

Matthew Q. Green,
Public Affairs

Mercury Incident Fact Sheet

Name County, State *May 3, 2014*

[Insert Photo of Mercury Cleanup at a School.]

Introduction

The purpose of this fact sheet is to provide information regarding the Name School Mercury Incident. Also included are phone numbers of the Name School Offices, Name County Health Department, and the U.S. EPA representatives should the public have further health or environmental concerns about the incident.

History

On April 6th, a family notified the Name County Health Department about some mercury that their child brought home from school. Since this event, the Health Department and the U.S. EPA have been aggressively working with the Name School Officials, investigating the situation by interviewing students and residents to determine the extent of contamination. Additionally, the U.S. EPA provided air monitoring and took air samples for confirmatory analysis. The U.S. EPA also tested all 34 buses used by the Name schools. Three buses had levels of mercury that required decontamination. Some mercury was also detected in the school. Name school officials hired an environmental contractor to decontaminate the buses and the school. The U.S. EPA is continuing to investigate and test all of the schools in the Name school district for mercury.

Mercury was also detected in one home and it needs to be decontaminated.

What is Mercury? And the Health Risks

Mercury is a naturally occurring metal that has several forms. Metallic mercury is a shiny, silver odorless liquid metal, which if heated, becomes a colorless, odorless gas. Mercury is a highly toxic, cumulative poison and a major health threat to humans. Exposure usually occurs by inhalation or by skin contact, but there is also a small risk of exposure through ingestion. Children living in or frequenting contaminated buildings are particularly at risk of exposure. At high levels, mercury may damage the brain, kidneys, and a developing fetus, according to the agency for Toxic Substance and Disease Registry. The Name County Health Department is accepting mercury from residents who may have mercury stored in their home. The disposal is free and no questions will be asked about how the mercury was obtained.

Current Status

As a result of mercury contamination, some items in the school have been disposed. They include lockers, vacuum cleaners and sink traps. Lab data on air samples collected in the school building have shown that no mercury contamination remains. There is no human health or environmental threat. Three buses are currently being decontaminated.

Next Steps

The Health Department will continue to encourage parents to report any incidences of mercury that they may have knowledge of. The U.S. EPA will clean up the home that has elevated levels of mercury and will work with school and health officials and continue to offer assistance during the ongoing investigation.

17. Residential Mercury Contamination Screening Checklist

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Residential Mercury Contamination Screening Checklist

(to be used when residence is known to be contaminated)

	(√) or (N/A)		
Vacuum cleaner (bag)		Car (both sides floor and seat in front and back)	
Furnace filter		Tool boxes	
Heating ducts		Baseboard areas	
Clothing (bag and screen)		Tile crevices	
Shoes (especially tongue areas)		Cracks in floor	
Clothes hamper		Concrete floors	
Bedding (between sheets, especially at level of feet)		Near bottom of brick wall	
Clothes washer (inside)		Lower shelving and items on shelf	
Clothes dryer (inside and lint trap)		Dusty areas	
Heavy traffic areas of floor		Under edge of linoleum or vinyl tile	
Heavy traffic areas of carpet (especially near bed, TV viewing area)		Crevices of hardwood flooring	
Sink drains		Above drop ceiling tiles (especially if spill occurred on floor above)	
Jewelry (bag and screen)		All garage areas	
Porous items (books, wooden objects, etc.)		Throw rugs	
Coins (bag and screen)		Welcome mats	
Food-related items in contaminated areas (bag and screen)		Furniture	
Electronics		Under major appliances	

18. Sample Relocation Letter

Name County Combined Health District Logo	**Health Commissioner:** Robert Brown, R.S., M.P.A. *Community Service Provider*	**Board of Health:** Barbara Johnson, MD Michael Green, PhD

March 7, 2014

To the residents of 123 Main Street:

We have received the air sampling results from the U.S. EPA taken at your home. The results of the air sampling have shown mercury levels above the acceptable levels for a residential setting. Therefore, we are asking for your cooperation so that we may decontaminate your home.

You will be asked to leave your home for a period of approximately 1 day. You will be allowed to take enough clothing and personal items for this period. Anything you take must be screened by the U.S. EPA to assure that you are not taking anything which might be contaminated with mercury.

The Red Cross will provide housing and a food allowance for those individuals who are being evacuated if needed. If you have other family members or friends that you wish to stay with during this time that is also acceptable. If you choose to stay with family or friends, the food allowance cannot be offered.

The City Police Department will be notified and additional security checks will be performed during this time period. We will need a set of keys to gain access to your home for the decontamination process. The keys will be kept secure with the U.S. EPA.

In an effort to help you with the evacuation of your home, we will be giving you plastic bags to put clothing and any other items you wish to take with you. Please put those items in the bags and twist them shut. A representative from the U.S. EPA will come by and check these bags with an instrument as you are leaving your home to assure you are not taking any mercury or mercury vapors with you. Please take any valuables, rings, jewelry, etc.

To briefly explain the decontamination process, a team of professionals from the U.S. EPA will perform an initial screening of your home by putting clothes into plastic bags and checking them with their equipment. Any clothing that has tested positive for mercury will be removed from the home. A list of anything removed will be given to you. When you go back into your home you will find your clothes in bags up off the floor.

456 E. 1st Avenue, City, State 67890
Phone: 123-456-7890
Fax: 987-654-3210

19. Mercury Specific Vacuum Comparison Table

Manufacturer	Minuteman International					Nilfisk Advance	
Web Address	www.minutemanintl.com					www.pa.nilfisk-advance.com	
Model Number	MRS-1	MRS-2	MRS-3	MRS-4	MRS-6 (Maxi-Guard II)	SS Mercury Vac	VT Mercury Vac
Static Lift	110 Inches	110 Inches	110 Inches	110 Inches	88 Inches	102 Inches	117 Inches
Airflow	115 CFM	115 CFM	115 CFM	115 CFM	95 CFM	99 CFM	99 CFM
Power (Watts)	1480	1480	1480	1480	1480	1100	1000
Cord	16/3' - 50'	16/3' - 50'	16/3' - 50'	16/3' - 50'	16/3' - 50'	30 Feet	30 Feet
Wet Capacity	N/A	N/A	N/A	10 Gallon	N/A	N/A	N/A
Dry Capacity	.82 ft^2	.82 ft^2	.82 ft^2	2.1 ft^2	.62 ft^2	2.25 Gallons/1 quart	12 Gallon
Filter Area	3,234 in^2	3,234 in^2	3,234 in^2	N/A	552 in^2	DNP "Honeycomb" Design	DNP "Honeycomb" Design
Height	41 Inches	48 Inches	46 Inches	46 Inches	25 Inches	30 Inches	40 Inches
Width	21 Inches	21 Inches	21 Inches	21 Inches	21 Inches	18.5 inches	21 Inches
Voltage	115 (220)	115 (220)	115 (220)	115 (220)	115 (220)	110-120/220	110-120/220
Wet / Dry	No	No	No	Yes	No	No	No
Weight	62 Pounds	73 Pounds	78 Pounds	70 Pounds	24 Pounds	44 Pounds	107 Pounds
Design	Liquid Mercury	Mercury Contaminated Dust	Liquid Mercury & Dust	Mercury Contaminated Liquids (Wet Only)	Liquid Mercury & Dust	Liquid Mercury & Granular Compounds	Liquid Mercury & Granular Compounds
Stages of Filtration	5	5	5	5	5	4	4
Disposable Bag Capacity	15 Gallon	15 Gallon	15 Gallon	15 Gallon	6 Gallon	2.25 Gallon	12 Gallon
Mercury Separator	Yes	Yes	Yes	Yes	Yes	No	Yes
Accessories Available	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Hour Meter	Yes	Yes	Yes	Yes	No	No	No
Carbon Filter Weight	DNP	DNP	DNP	DNP	DNP	31 Pounds	54 Pounds
Other	DNP	DNP	DNP	DNP	DNP	DNP	DNP
Photo Use	Photos courtesy of Minuteman International					Photos courtesy of Nilfisk Advance	

Manufacturer	Nikro Industries				Tiger-Vac				
Web Address	www.nikro.com				www.tiger-vac.com				
Model Number	MV00688-SS	MV15110-PLY	MV15110-PTD	MV15110-SS	MRV-8 Poly	MRV-8 Poly Tank Air	MRV-8 CR Air	MRV-15 (Electric)	MRV-16 (4W) SS
Static Lift	88 Inches	110 Inches	110 Inches	110 Inches	95 Inches	DNP	DNP	110 Inches	110 Inches
Airflow	95 CFM	115 CFM	115 CFM	115 CFM	120 CFM	120 CFM	120 CFM	110 CFM	110 CFM
Power (Watts)	DNP	DNP	DNP	DNP	1000	DNP	DNP	1050	1050
Cord	DNP	DNP	DNP	DNP	DNP	DNP	DNP	DNP	DNP
Wet Capacity	N/A	N/A	N/A	N/A	DNP	DNP	DNP	20 Gallons	20 Gallons
Dry Capacity	DNP	DNP	DNP	DNP	4 Gallons	4 Gallons	4 Gallons	10 Gallons	10 Gallons
Filter Area	DNP	DNP	DNP	DNP	1368 in^2	DNP	DNP	DNP	DNP
Height	DNP	DNP	DNP	DNP	26 Inches	DNP	DNP	48 Inches	DNP
Width	DNP	DNP	DNP	DNP	18 Inches	DNP	DNP	24 Inches	DNP
Voltage	115 (220 Optional)	115 (220 Optional)	115 (220 Optional)	115 (220 Optional)	120/240	DNP	DNP	120/240	120/240
Wet / Dry	No	No	No	No	DNP	DNP	DNP	Yes	Yes
Weight	20 Pounds	32 Pounds	32 Pounds	32 Pounds	44 Pounds	DNP	DNP	92 Pounds	DNP
Design	Liquid Mercury & Granular Compounds	Liquid Mercury & Granular Compounds	Liquid Mercury & Granular Compounds	Liquid Mercury & Granular Compounds	Liquid Mercury	DNP	DNP	Liquid Mercury, Mercury Contaminated Debris & Liquids	Liquid Mercury, Mercury Contaminated Debris & Liquids
Stages of Filtration	5	5	5	5	3	DNP	DNP	4	4
Disposable Bag Capacity	6 Gallon	15 Gallon	15 Gallon	15 Gallon	DNP	DNP	DNP	5 Gallons	5 Gallons
Mercury Separator	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Accessories Available	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Hour Meter	DNP	DNP	DNP	DNP	Yes	DNP	DNP	Yes	Yes
Carbon Filter Weight	20 Pounds	32 Pounds	32 Pounds	32 Pounds	7.5 Pounds	DNP	DNP	DNP	DNP
Other	DNP	DNP	DNP	DNP	DNP	DNP	DNP	Available in Electric & Air	DNP
Photo Use	Photos courtesy of Nikro Industries				Photos courtesy of Tiger-Vac				

DNP = Manufacturer did not provide information

NOTE: This list is not inclusive of all commercially available mercury-specific vacuums. This comparison is provided for informational purposes only and is not a certification, endorsement, recommendation, claim, or declaration of any company or of the products and services they provide or claim to provide. EPA makes no guarantees regarding the accuracy of the information provided in this table.

Appendix D: Additional Mercury Resources

1. EPA

a. National Mercury Website

- www.epa.gov/mercury/

b. Regional Resources

Region 1

- www.epa.gov/region1/topics/pollutants/mercury.html

Region 2

- www.epa.gov/region02/mercury/

Region 3

- www.epa.gov/region03/mercury/index.htm

Region 4

- www.epa.gov/region4/mercury/index.htm

Region 5

- www.epa.gov/mercury/

Region 6

- http://www.epaosc.org/site/doc_list.aspx?site_id=0001

Region 7

- www.epa.gov/region7/mercury/index.htm
- EPA Region 7 Mercury Task Force http://mercury.p2ric.org/: The Region 7 Mercury Task Force was initiated in November 2002 to identify regional and national mercury pollution prevention resources, promote program partnerships, and work towards minimizing the public health and environmental impact of mercury.

Region 8

- http://www2.epa.gov/region8/mercury

Region 9

- www.epa.gov/region9/toxic/mercury/index.html

Region 10

- http://yosemite.epa.gov/r10/homepage.nsf/bcd405ea472282c08825674a0067c667/f60e8f81c53471ed88256eef00747a17!OpenDocument

c. Environmental Response Team (ERT)

- http://www.epaosc.org/site/site_profile.aspx?site_id=ERTMERCURY

Mercury Analyzer Evaluation

- [Eric Nold to get link from Raj Singhvi once document is finalized]

Modified NIOSH 6009

- http://www.epaosc.org/sites/ERTMERCURY/files/HGNIOSH.pdf

d. Emergency Response Technical Group (ERTG)

- http://www.epaosc.org/site/site_profile.aspx?site_id=0001

e. Relocation Guidance

- http://www.epa.gov/superfund/community/relocation/tempreloc.pdf

2. ATSDR

a. Chemical Specific Health Consultation and Suggested Action Levels

- http://www.atsdr.cdc.gov/emergency_response/Action_Levels_for_Elemental_Mercury_Spills_2012.pdf

b. ATSDR Mercury Website

- http://www.atsdr.cdc.gov/mercury/

c. Toxic Substances Portal: Mercury

- http://www.atsdr.cdc.gov/substances/toxsubstance.asp?toxid=24

3. National Institute for Occupational Safety and Health (NIOSH)

- NIOSH 6009: http://www.cdc.gov/niosh/docs/2003-154/pdfs/6009.pdf
- Safety and Health Topic – Mercury: http://www.cdc.gov/niosh/topics/mercury/

- Criteria for a Recommended Standard: Occupational Exposure to Inorganic Mercury: NIOSH Document #73-11024: http://www.cdc.gov/niosh/docs/1970/73-11024.html

4. Occupational Safety and Health Administration (OSHA)

- Safety and Health Topics – Mercury: https://www.osha.gov/SLTC/mercury/index.html

5. American Conference of Government Industrial Hygienists (ACGIH)

- Threshold Limit Values (TLVs®) and Biological Exposure Indices (BEIs®): http://www.acgih.org/TLV/

6. Centers for Disease Control and Prevention (CDC)

- Elemental Mercury Releases Attributed to Antiques: http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5623a2.htm?s_cid=mm5623a2_e

7. Find a Recycling Center

- Earth 911: http://earth911.org/

8. Materials Safety Data Sheet (MSDS) for Mercury (Metal)

- http://www.bethlehemapparatus.com/pdf/MSDS.pdf

9. Companies that Recycle Mercury

- Waste Management: http://www.wmsolutions.com/mercury
- Thermostat Recycling Corporation: http://www.thermostat-recycle.org/

10. Federal Hazardous Waste Regulations: 40 CFR 261.5(e)

- http://www.ecfr.gov/cgi-bin/text-idx?SID=ac3b3fcd29b1ccada4b884912f743b5e&node=se40.26.261_15&rgn=div8

11. Occupational Safety and Health Administration's Safety and Health Standard for protective gear: 29 CFR 1910.134

- http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_id=12716&p_table=standards

12. Comprehensive Environmental Response, Compensation Act's Reportable Quantities, Mercury Releases: 40 CFR 302.6 (b)

- http://www.ecfr.gov/cgi-bin/text-idx?SID=cd3072655eecaf06ad54116e6f5be8cf&node=se40.28.302_16&rgn=div8

13. Mercury in Schools

- **ATSDR's Mercury Report – Children's Exposure to Elemental Mercury**

  http://www.atsdr.cdc.gov/mercury/mercury_report.html

  A former industrial building in New Jersey used to manufacture mercury thermometers was converted in 2004 to a children's day care facility. Children and adults at the facility were exposed to residual amounts of mercury. As a result, Congress directed the U.S. Agency for Toxic Substances and Disease Registry (ATSDR) to further investigate and characterize these kinds of exposures.

- **ATSDR's Mercury Quick Facts for School Nurses**

  http://www.atsdr.cdc.gov/mercury/docs/Mercury_School_Nurse_Brochure.pdf

  Information on health effects of mercury exposure, steps to take when a spill occurs, and reducing the risk of exposure in schools.

- **EPA's Schools and Mercury**

  http://www.epa.gov/hg/schools.htm

  EPA's Schools and Mercury Web page includes links to Web sites that provide information for school administrators, faculty, staff, local health jurisdictions, and parent groups on how to reduce the hazards of mercury on children's health, avoid chemical liabilities, develop planning tools, and establish collection programs for mercury.

- **EPA's Chemical Management Resource Guide for School Administrators**

  http://www.epa.gov/oppt/pubs/chemmgmt/

  This resource guide can help your school reduce the use of dangerous chemicals and install safer chemical management practices. The guide will help school administrators set policies that protect against dangerous chemical exposures, and parents and concerned citizens determine if their children's schools are minimizing potential exposure to dangerous chemicals.

- **EPA's Mercury in Our World**

  http://www.epa.gov/hg/pdfs/mercury_conf_report_web.pdf

  A new mercury-specific chemical management manual for use by schools everywhere.

- **Mercury: An Educator's Toolkit**

http://www.epa.gov/region7/mercury/educator_toolkit.htm

This toolkit contains a variety of activities, educational videos, and other information designed to enhance students' understanding of mercury and its potential health hazards.

- **Northeast Waste Management Officials' Association (NWMOA)'s Mercury in Schools and Communities**

  http://www.newmoa.org/prevention/mercury/schools/

  NEWMOA developed outreach and assistance materials to assist communities in identifying and removing elemental mercury and products containing mercury from schools and from homes.

- **Healthy School Environments: Toolkit for Safe Chemical Management**

  http://www.epa.gov/schools/chemicals/

  Helps schools and school districts start or improve a chemical management program to reduce chemical hazards and prevent future chemical mismanagement issues.

- **Mercury Videos**

  http://www.epa.gov/mercury/videos.html

  To help schools safely find, manage, and dispose of their mercury, EPA, states, and local communities have developed a number of educational videos for middle- and high-school students.

Appendix E: Acronyms

µg/L: micrograms per liter

µg/m^3: micrograms per cubic meter

ACGIH: American Conference of Governmental Industrial Hygienists

APR: Air Purifying Respirator

ARARs: Applicable or Relavent and Appropriate Requirements

ASTM: American Society for Testing and Materials

ATSDR: Agency for Toxic Substances and Disease Registry

BEIs®: Biological Exposure Indices

BMS: Bristol-Myers Squibb

CDC: Centers for Disease Control and Prevention

CIC: Community Involvement Coordinator

DOE: U.S. Department of Energy

EERS: Emergency and Rapid Response Services

EPA: U.S. Environmental Protection Agency

ERT: Environmental Response Team

ESLI: End-of-Service-Life Indicators

FDA: U.S. Food and Drug Administration

gms/cc: grams per cubic centimeters

HASP: Health and Safety Plan

H2S04: Sulfuric Acid

HCI: Hydrochloric Acid

HGV: Health Guidance Values

HN03: Nitric Acid

HQ: Headquarters

IAG: Inter-Agency Agreement

IDLH: Immediately Dangerous to Life or Health

IRIS: Integrated Risk Information System

LOAEL: Lowest Observed Adverse Effect Level

mg/day: milligrams per day

ml: milliliters

mm: millimeters

MEBA: Mercury Export Ban Act

MRL: Minimal Risk Level

MSDS: Materials Safety Data Sheet

MVA: Mercury Vapor Analyzer

NIOSH: National Institute for Occupational Safety and Health

NWMOA: Northeast Waste Management Officials' Association

OEM: Office of Emergency Management

OSC: On-Scene Coordinator

OSHA: Occupational Safety and Health Administration

PAPR: Powered Air-Purifying Respirator

PPE: Personal Protective Equipment

ppb: parts per billion

REL: Recommended Exposure Limit

RCRA: Resource Conservation and Recovery Act

RfC: Reference Concentration

SCBA: Self-contained Breathing Apparatus

SQG: Small Quantity Generator

START: Superfund Technical Assessment and Response Team

TCLP: Toxicity Characteristic Leaching Procedure

TDD: Technical Direction Document

TLVs®: Threshold Limit Values

TMR IMACTM: Trace Mercury Removal - Immobilized Metal Affinity Chromatography

TWA: Time-weighted Average

URA: Uniform Relocation Assistance and Real Property Acquisition Policies Act

USACE: U.S. Army Corp of Engineers