TETRA TECH, INC.

June 4, 2018

Lynn Nakashima
Department of Toxic Substances Control, Berkeley Regional Office
700 Heinz Avenue, Suite 200C
Berkeley, California 94710

Sara Ziff
U.S. Environmental Protection Agency, Region 9
75 Hawthorne Street
San Francisco, California 94105

Subject: Phase IV, EPA North Meadow, Supplementary PCB Sampling Results
Richmond Field Station Site
University of California, Berkeley

Dear Ms. Nakashima and Ms. Ziff:

On behalf of the University of California, Berkeley, Tetra Tech, Inc. collected soil samples at the EPA North Meadow, Richmond Field Station (RFS) Site. The sampling was conducted in accordance with the proposed sampling approach presented in the *EPA North Meadow Field Sampling Plan, University of California, Berkeley, Richmond Field Station, Richmond, CA*, dated October 25, 2017.

This letter replaces the previous summary letter dated February 28, 2018 and addresses comments received from the Department of Toxic Substances Control (DTSC) dated April 3, 2018 and U.S. Environmental Protection Agency on March 19, 2018.

Purpose

Field sampling investigations conducted in 2014 and 2015 identified low concentrations of polychlorinated biphenyls (PCB) contaminants in two imported soil piles at the EPA North Meadow, designated as EPA Northwest (EPA NW) and EPA Northeast (EPA NE) piles, as shown on Figure 1. The two soil piles originated from construction activities associated the construction of Building 201 by Wareham Property Group in the early 1990s. It is likely that the soil originated from excavation of the historic Western Storm Drain (WSD) which was removed and relocated as part of the construction project. Subsequent field investigations in the early 2000s determined that the storm drain was contaminated with PCBs from a probable disposal of PCB oil through the storm drain. Significant PCB contamination was found in Meeker Slough sediments at the WSD outfall and much of the contaminated sediments and portions of the distal WSD were removed for off-site disposal in 2003.

While previous sampling activities have identified sample concentrations in isolated locations, the extent (total mass) of PCB contamination in the two soil piles is unknown. This sampling effort was conducted to determine the total mass PCB contamination in order to identify soil management or disposal options.

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Current Conditions

The EPA North Meadow is one of four large meadows in the western portion of the RFS separated by roadways that make up the approximately 20 acres of remnant coastal terrace prairie (CTP). EPA NE and EPA NW soil piles were placed on top of the CTP meadow and graded to an even elevation. The piles are separated by a lower area of remaining remnant native grassland that includes a seasonal wet meadow. The north edge of the meadow consists of non-native landscaping. The two soil piles are covered with mostly non-native weeds and are maintained as a mowed area through most of the year, when soils are dry enough for mowing.

The entire EPA North Meadow is approximately 81,000 square feet; 1.86 acres. Both piles cover approximately 24,000 square feet (0.56 acre) with a perimeter of 640 feet (EPA NW) and 690 feet (EPA NE). The soil piles together cover approximately 60 percent of the meadow.

The meadow slopes gently uphill from south to north at a grade of approximately 1 foot elevation in 300 feet distance from 13.5 feet to 14.5 feet NGVD29. The two piles were graded to final elevations of approximately 1.5 feet above the historic prairie. The EPA NE pile includes a higher central mounded area (~0.7 acres) approximately 2.5 in depth. EPA NW pile is approximately 1,300 cubic yards, and EPA NE pile is approximately 1,450 cubic yards, as presented in the field sampling plan, included as Attachment 1.

Previous Investigations

The EPA North Meadow was first investigated for chemicals of potential concern in October 2014 during implementation of the Phase IV Field Sampling Plan, dated October 6, 2014. Five locations were sampled using discrete sampling methodology on October 22, 2014: UM28, UM32, UM33, UM36 and UM37. Sample UM33 exhibited the most elevated concentration of total PCBs at 4.76 milligrams per kilogram (mg/kg). As a result, step-out sampling using discrete sampling methodology was conducted on September 8, 2015 at nine additional locations (UM43- UM51). All samples surrounding previous sampling location UM33 were found to contain PCBs at concentrations greater than the 1.0 mg/kg TSCA self-implementing criterion with Aroclor 1248 being the prevalent Aroclor; however, Aroclors 1254 and 1260 were also detected. Previous investigation sample results are presented on Figure 1.

Sampling Protocols

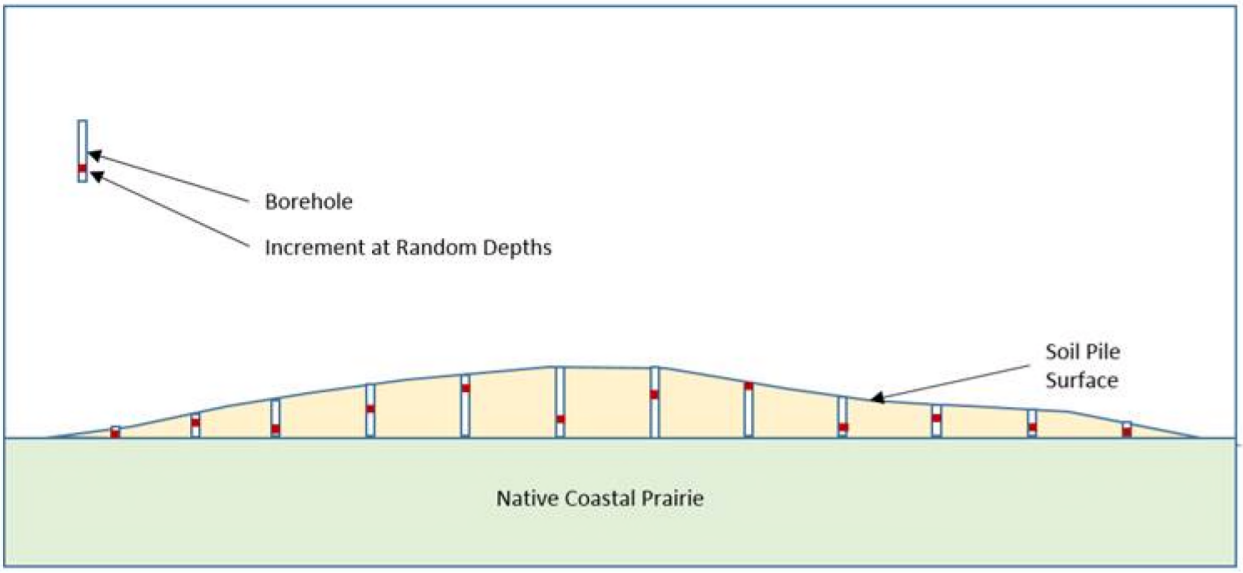
Soil samples for characterizing PCBs in the two piles were collected using incremental sampling methodology (ISM). Each soil pile was identified as a decision unit, and a 75-increment grid was generated for each decision unit using Visual Sample Plan (VSP), as shown on Figure 1. EPA NW and EPA NE samples were collected on November 14 and 15, 2017, respectively.

An ISM sample was collected from each soil pile decision unit. Each ISM sample was composed of a minimum of 75 soil increments from the soil pile material and not soil from the native prairie plain. Prior to sampling, a small cross-section was cut with the backhoe to establish a clear visual characterization of the historic prairie plain underneath the soil piles. The composition of the soil piles was observed as unconsolidated sandy silts and silty sands with intermixed gravels, and the native prairie plan was observed as highly plastic, silty clays.

Each increment was collected with the assistance of an auger attachment mounted to small Bobcat track loader. The auger attachment was forwarded through the soil piles to the native prairie plain. As the auger attachment was advanced, soil cuttings (spoils) were raised to the surface in small piles surrounding the auger. A single increment of approximately 15 grams was collected from each of the 75 spoil piles at random locations within the spoil pile, thereby representing different depths for each increment. Professional judgement was used to ensure that the 15-gram increments from each spoil pile were collected randomly.

The auger attachment was decontaminated with water and brush scrub between each decision unit. The auger attachment was not decontaminated between increment locations which is consistent with industry standards for incremental sampling. No decontamination is necessary since soil from all increments are combined into the same sample and therefore cross-contamination is not relevant.

A schematic cross-section of the soil sampling increments and the random distribution of the increment volumes collected is presented below.



Sixteen increment locations from EPA NW and seven increment locations from EPA NE identified in the original sampling plan were located on native prairie and therefore not sampled. The native prairie edges were identified with the presence of native bunchgrasses along the perimeter of the soil piles. Additional increments were identified within the soil piles to ensure a minimum of 75 increments were collected from each soil pile. The locations of increments removed from the native prairie and additional increments within the piles are shown on Figure 1.

Field triplicates also collected at the apices of a triangle centered at each of the 75 increment grid locations at the EPA NE decision unit, as described in the field sampling plan and also depicted on Figure 1. Laboratory triplicates were also conducted for one of the EPA NE triplicate samples.

In addition to the two soil pile decision unit sampling, ISM samples were collected from soil/dry sediment which had accumulated at the collars of the storm drains located downgradient of each soil pile decision

unit, as shown on Figure 1. The two ISM samples were each composed of 75-increments collected randomly from the entire soil mass present. Storm drain samples were collected on December 14, 2017. The EPA NE storm drain collar is 2-feet in diameter; the EPA NW storm drain collar is approximately 2 by 2 feet square. Each storm drain collar contained approximately 1 to 3 inches of soil/dry sediment along the edges. The storm drains are shown on the photo log included as Attachment 2.

For all ISM samples, a disposable plastic scoop was used to collect the soil increment from the locations described above. Increments for each DU and triplicates were placed within a 32-ounce glass jar (~ 1.5 kg total mass). The jars were labeled and packed into an insulated cooler. The samples were transported under chain-of custody procedures directly to Enthalpy Laboratory in Berkeley, California.

All sample collection protocols are consistent with the Final Phase IV Field Sampling Plan with the exception that ISM methodology is being used as it is acceptable to EPA Region IX. A photo log depicting the sampling protocols is included as Attachment 2.

Analysis and Results

Soil samples were processed according to Enthalpy's internal ISM protocol including sample drying, sieving, and subsampling. A minimum of 75 subsample increments were specified for collected from each dried sample to a final analytical aliquot of 30 grams. Samples were analyzed for PCBs by EPA method 8082A using EPA Method with 3540C Soxhlet extraction. One of the triplicate ISM samples from EPA NE was subsampled three times for separate analysis as a laboratory triplicate to evaluate the subsampling process and analytical variability.

Analytical results are presented below and shown on Figure 2. Complete analytical results are included as Attachment 3. Enthalpy multi-incremental sub-sampling procedures are included as Attachment 4.

	PCBs		
Screening Criterion	**Aroclor-1254**	**Aroclor-1260**	**Total Aroclors**
TSCA Cleanup Self-Implementing Goal	*1*	*1*	*1*
Disposal Criterion			
PCB Remediation Waste	*50*	*50*	*50*
Sample ID			
EPA-NW-01	**1.6**	0.4	**2.0**
EPA-NW-SI	0.81	0.3	**1.1**
EPA-NE-01-T1	**4.4**	0.65	**5.1**
EPA-NE-01-T2	**1.7**	0.29	**2.0**
EPA-NE-01-T3	**2.1**	0.34	**2.4**
EPA-NE-01-T3-L1	**2.5**	0.46	**3.0**
EPA-NE-01-T3-L2	**1.6**	0.23	**1.8**
EPA-NE-01-T3-L3	**2.2**	0.34	**2.5**
EPA-NE-SI	0.72	0.072	0.8

Notes:

- All results milligrams/kg (mg/kg)
- EPA-NE-01-T3-L1, L2, L3 are laboratory triplicates
- EPA-NE-01-T3 concentration is average result of laboratory triplicates L1, L2, L3
- **Bold values** indicate that the result exceeds the Toxic Substances Control Act (TSCA) criteria for high occupancy areas with no cap, 40 CFR 761.61 (a).
- No results exceed the PCB Remediation Waste, 40 CFR, 761.3
- All other Aroclors were non-detect in all samples.

Additionally, the sample with the most elevated total Aroclor result (EPA-NE-01-T1) was analyzed for metals by EPA Methods 6010B and 7471A, and semi-volatile organics by EPA Method 8270 SIM for waste characterization purposes in the event the soil is disposed off site.

Quality Assurance Evaluation

The collection of field and laboratory samples allows the calculation of the relative standard deviation (RSD) of the three sample results.

- The laboratory triplicate RSD provides an indication of the variability associated with the subsampling as well as analytical procedures.

- The field triplicate RSD provides an indication of the field collection variability (how well the ISM sample and increments represent the average concentration of the decision unit) as well as the laboratory variability identified in the laboratory RSD. The laboratory RSD is a subset of the field RSD.

The RSD evaluations were conducted on the total PCB concentrations.

	Triplicate 1	Triplicate 2	Triplicate 3	Mean	Standard Deviation	RSD
Laboratory Triplicates	EPA-NE-01-T3-L1	EPA-NE-01-T3-L2	EPA-NE-01-T3-L3			
	3.0 mg/kg	1.8 mg/kg	2.5 mg/kg	2.4	0.6	24.8%
Field Triplicates	EPA-NE-01-T1	EPA-NE-01-T2	EPA-NE-01-T3			
	5.1 mg/kg	2 mg/kg	2.4 mg/kg	3.2	1.7	53.2%

The calculated RSDs are considered acceptable for use of the data for decisions regarding soil management or disposal.

Conclusions and Recommendations

Soil sampling results indicate that PCBs are present at both EPA North Meadow at concentrations above 1 mg/kg. UC Berkeley will initiate the preparation of plans and specifications directed toward the removal of the soils above 1 mg/kg for proper off-site disposal. The removal action will be conducted as a TSCA removal action under 40 CFR 761.61 (c); UC Berkeley will prepare an application package for submittal to EPA and DTSC consistent with the package prepared for the Corporation Yard removal action in Fall 2017. In addition to the soil removal, any sediment identified within the existing storm drains will be removed, the storm drains flushed, and sediment traps/filters installed around the storm drain inlets.

The plans and specifications will identify the details of the removal action, including but not limited to a complete description of the scope of work and schedule, site history and sampling results summary, excavation boundaries, dusts and erosion controls, air monitoring protocols, health and safety measures, disposal requirements, truck routes, confirmation sampling, stormwater prevention, and site finishing and closure.

If you have any questions or comments regarding this submittal, please call me at (415) 497-9060.

Sincerely,

Jason Brodersen, P.G.
Project Manager

Enclosures:	Figure 1	Supplementary PCB Sample Locations
	Figure 2	Incremental Sample Results
	Attachment 1	Field Sampling Plan
	Attachment 2	Photo Log
	Attachment 3	Laboratory Reports
	Attachment 4	Enthalpy Multi-Incremental Sub-Sampling Procedures

cc: Karl Hans, UC Berkeley, Environmental Health & Safety
Bill Marsh, Edgcomb Law Group, LLP

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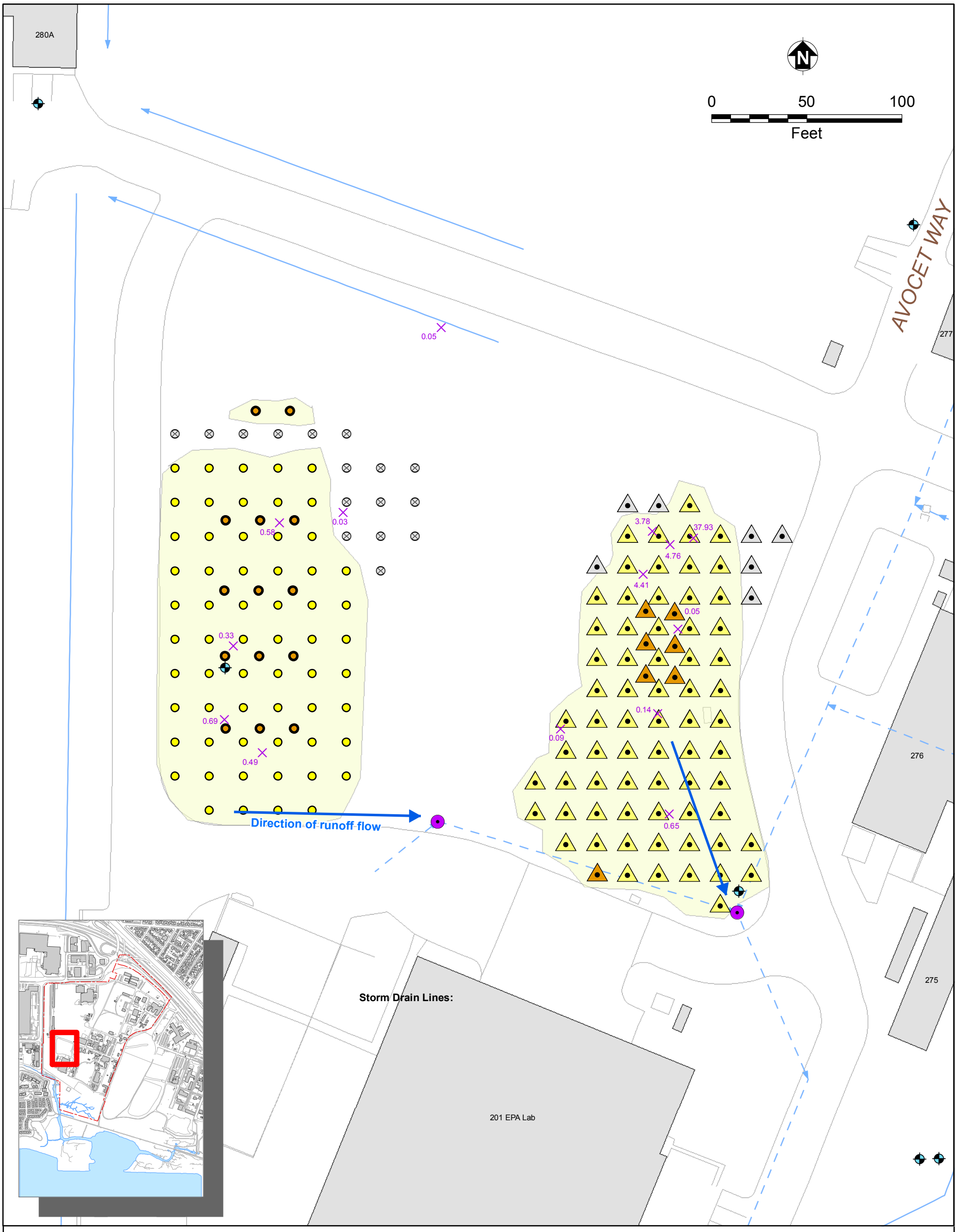

Storm Drain Inlet Sample

Groundwater Well

PCBs Discrete Sample Results (mg/kg)

EPA NW relocated or removed increments- previous locations

EPA NW relocated increment locations (11/14/17 sample)

EPA NE moved increments- previous locations

EPA NE relocated increments locations (11/15/17 samples)

EPA NE triplicate locations (triangle apices) (11/15/17 samples)

EPA NW Increments (11/14/17 sample)

Open Swale

Underground Culvert

EPA North Final Decision Units

Buildings

Roads and other Landscape Features

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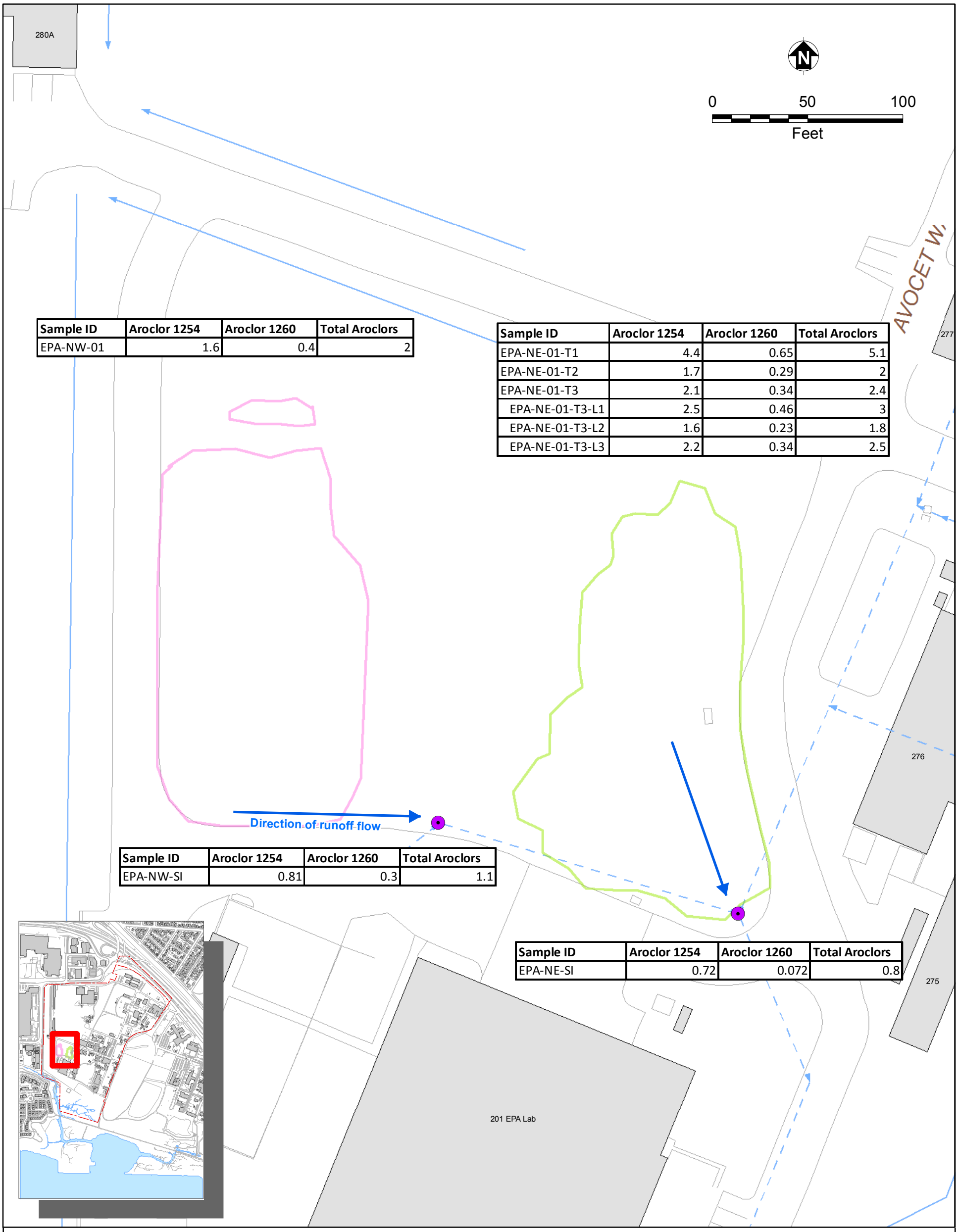
Richmond Field Station Site
University of California, Berkeley

FIGURE 1
RFS FIELD SAMPLING PLAN, PHASE V
EPA NORTH MEADOW
SUPPLEMENTARY PCB SAMPLE LOCATIONS



Sample ID	Aroclor 1254	Aroclor 1260	Total Aroclors
EPA-NW-01	1.6	0.4	2

Sample ID	Aroclor 1254	Aroclor 1260	Total Aroclors
EPA-NE-01-T1	4.4	0.65	5.1
EPA-NE-01-T2	1.7	0.29	2
EPA-NE-01-T3	2.1	0.34	2.4
EPA-NE-01-T3-L1	2.5	0.46	3
EPA-NE-01-T3-L2	1.6	0.23	1.8
EPA-NE-01-T3-L3	2.2	0.34	2.5

Sample ID	Aroclor 1254	Aroclor 1260	Total Aroclors
EPA-NW-SI	0.81	0.3	1.1

Sample ID	Aroclor 1254	Aroclor 1260	Total Aroclors
EPA-NE-SI	0.72	0.072	0.8

Storm Drain Inlet Sample

EPA Northwest Decision Unit

EPA Northeast Decision Unit (in triplicate)

Storm Drain Lines:

Open Swale

Underground Culvert

Buildings

Roads and other Landscape Features

Notes:
1. All results in milligrams per kilogram (mg/kg).
2. EPA-NE-01-T3-L1, L2 and L3 are laboratory triplicate samples.
3. EPA-NE-01-T3 concentration is the average result of laboratory triplicates L1, L2 and L3.

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Richmond Field Station Site
University of California, Berkeley

FIGURE 2
EPA NORTH MEADOW
INCREMENTAL SAMPLE RESULTS

Attachment 1

EPA North Meadow Field Sampling Plan

University of California, Berkeley
Richmond Field Station, Richmond, CA

October 25, 2017

EPA North Meadow Field Sampling Plan
University of California, Berkeley
Richmond Field Station, Richmond, CA
October 25, 2017

Introduction

Field sampling investigations conducted in 2014 and 2015 discovered low concentrations of polychlorinated biphenyls (PCBs) contaminants in two imported soil piles in the UC Berkeley Richmond Field Station (RFS) EPA North Meadow (EPA N), designated as EPA Northwest (EPA NW) and EPA Northeast (EPA NE) piles [See Figure 1 and Attachment 1]. The two soil piles originated from construction activities associated the construction of Building 201 by Wareham Property Group in the early 1990s. It is likely that the soil originated from excavation of the historic Western Storm Drain (WSD) which was removed and relocated as part of the construction project. Subsequent field investigations in the early 2000s determined that the storm drain was contaminated with PCBs from a probable disposal of PCB oil through the storm drain. Significant PCB contamination was found in Meeker Slough sediments at the WSD outfall and much of the contaminated sediments and portions of the distal WSD were removed for off-site disposal in 2003.

The extent (total mass) of PCB contamination in the two EPA N soil piles is unknown. In order to determine how the soil piles can be managed and whether off-site disposal is needed, additional sampling is required, which is the purpose of this proposed sampling plan.

Figure 1: EPA North Meadow soil piles (PCBs in mg/kg in yellow, NGVD elevations in light blue)

EPA North Meadow Soil Piles Current Conditions

The EPA North Meadow is one of four large meadows in the western portion of the RFS separated by roadways that make up the approximately 20 acres of remnant coastal terrace prairie (CTP). EPA NE and EPA NW soil piles were placed on top of the CTP meadow and graded to an even elevation. The piles are separated by a lower area of remaining remnant native grassland that includes a seasonal wet meadow. The north edge of the meadow consists of non-native landscaping. The two soil piles are covered with mostly non-native weeds and are maintained as a mowed area through most of the year (when soils are dry enough for mowing).

The entire EPA N meadow is approximately 81,000 square feet (1.86 acre). Both piles cover approximately 24,000 square feet (0.56 acre) with a perimeter of 640 (EPA NW) and 690 (EPA NE) feet. The soil piles together cover approximately 60% of the meadow.

The EPA N Meadow slopes gently uphill from south to north at a grade of approximately 1 foot elevation in 300 feet distance from 13.5 feet to 14.5 feet NGVD29. The two piles were graded to final elevations of approximately 1.5 feet above the historic prairie. The EPA NE pile includes a higher central mounded area (~0.7 acres) approximately 2.5 in depth. Therefore, a simple upward bound on the approximate volume for the piles assuming they are slabs of uniform thickness of 1.5 feet deep, with EPA N containing an extra 0.7 acre of soil at 1.0 feet deep, is calculated as follows:

EPA NW: (24,000 SF X 1.5 F) (1 CY/27 SF) = 1,300 CY
EPA NE: [(21,000 SF X 1.5 F) + (3,000 SF X 2.5 F) = 1,450 CY

Previous Investigations

The EPA North Meadow was first investigated for chemicals of potential concern in October 2014 during implementation of the Phase IV Field Sampling Plan (FSP), dated October 6, 2014 (Tetra Tech). Five locations were sampled using discrete sampling methodology on October 22, 2014: UM28, UM32, UM33, UM36 and UM37. Due to PCBs being identified in sample UM33 at a concentration of 4.76 mg/kg, atypical of RFS background concentrations and above the Toxic Substances Control Act (TSCA) self-implementing cleanup criterion of 1 mg/kg, step out sampling using discrete sampling methodology, was conducted on September 8, 2015 at nine additional locations (UM43- UM51). All samples surrounding previous sampling location UM33 were found to contain PCBs at concentrations greater than the TSCA self-implementing criterion with Aroclor 1248 being the prevalent Aroclor; however, Aroclors 1254 and 1260 were also detected. Attachment 2 provides the October 6, 2015 sampling report Phase IV, EPA Meadow North, Supplementary PCB Sampling Results, which includes all analytical results and figures.

Field Sampling Goal

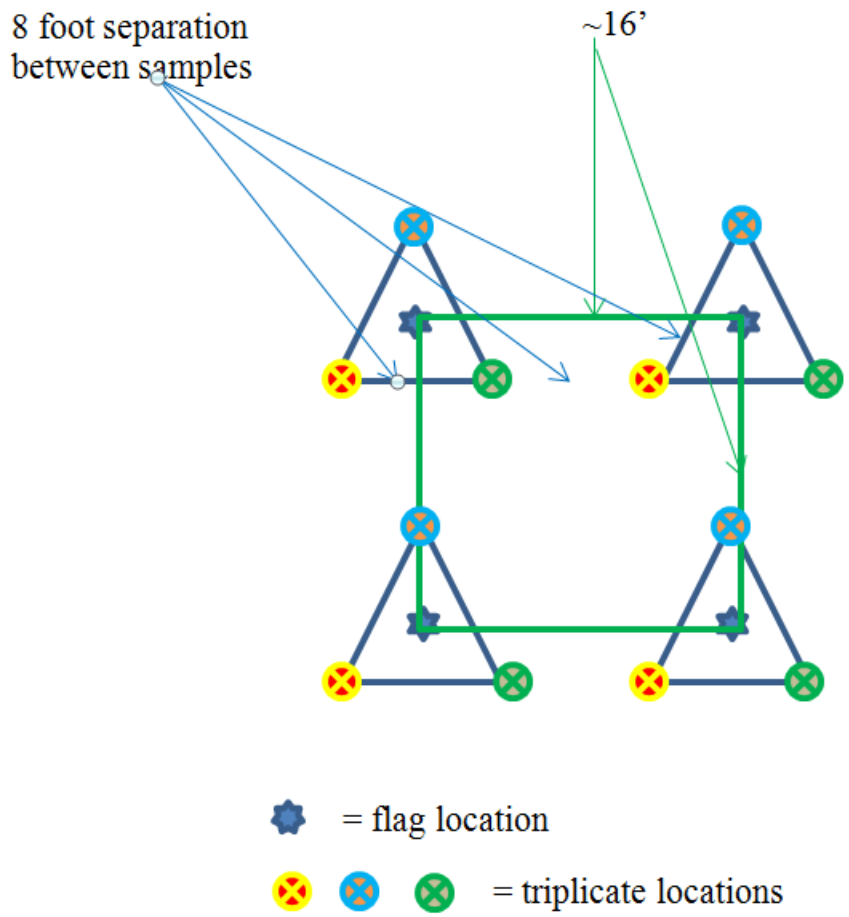
The goal of this sampling event is to determine the mean concentration (“as found”) of PCBs in the two soil piles in order to be provide data needed to inform what is required for the ultimate disposition of the soils including whether off-site disposal will be required and if so, to what disposal site.

Field Sampling Protocols

Soil for characterization of as found PCBs in the two piles will be collected using incremental sampling methodology (ISM). A 75-increment grid was generated for each soil pile (see Figure 3) using Visual Sample Plan (VSP), a software tool that supports the development of statistically defensible sampling

and data analysis plans used for site characterization developed by DOD, EPA, and DOE (see https://www.serdp-estcp.org/Tools-and-Training/Munitions-Response/Visual-Sample-Plan). For purposes of meeting the goals of this field sampling activity, each soil pile will be considered a separate decision unit (DU). Triplicate 75-increment samples will be collected in the EPA NE decision unit. One 75-increment sample will be collected from the EPA NW decision unit. Sampling points are separated by approximately 19.7 feet in EPA NW and 16.3 feet in EPA NE (to accommodate triplicates along the DU edge).

In the EPA NE DU, flags will be located at the center point of the triplicate samples. The triplicate samples will be placed equidistance from the center according to the following scheme:



A template will be created using PVC pipes to maintain consistency in spacing at each sampling location.

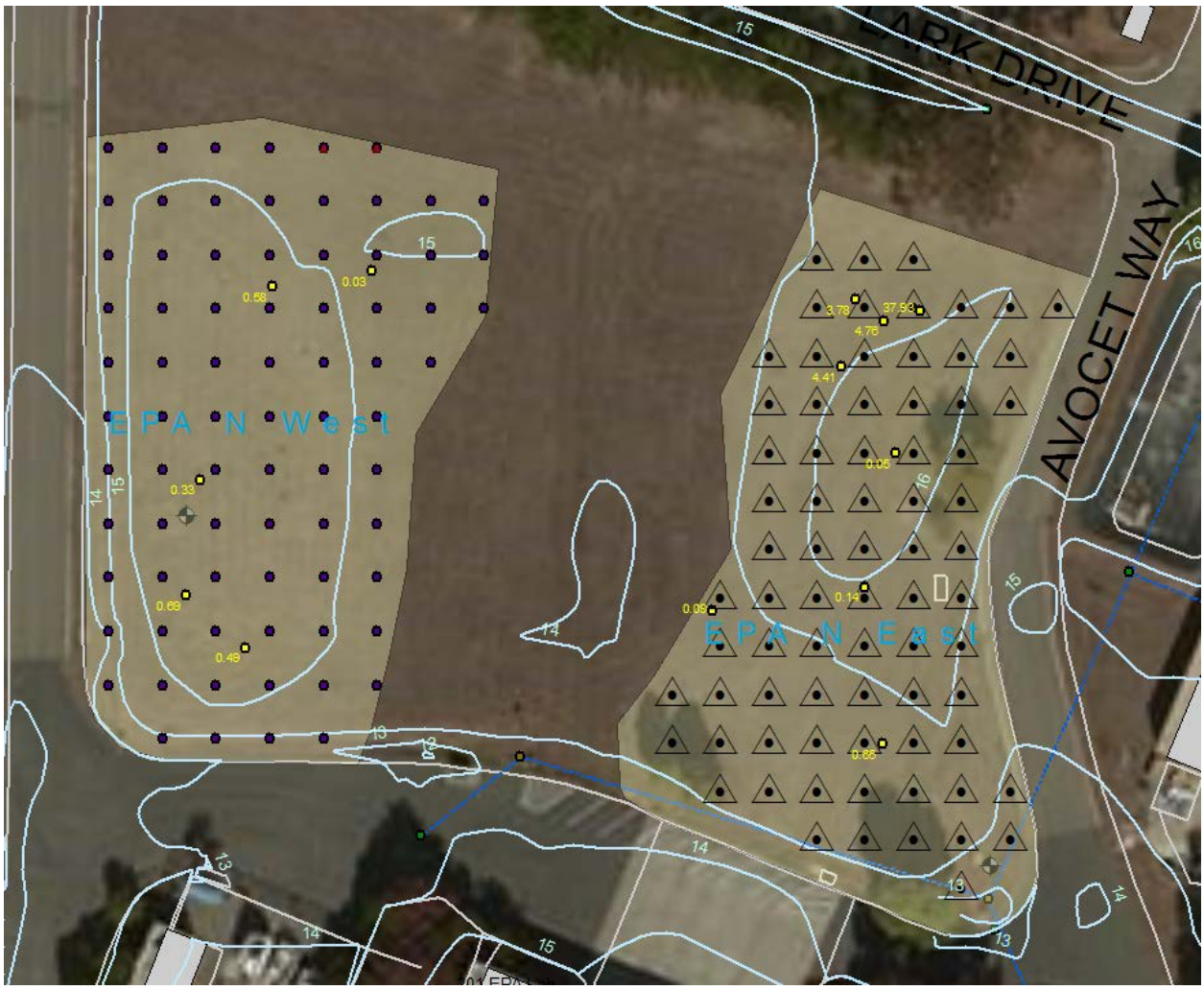


Figure 3. 75 increment grid for incremental sampling methodology increment locations.

Soil samples will be collected with the assistance of an auger attachment mounted to small Bobcat track loader. The auger attachment was used effectively in 2015 to loosen the soil for the shallow sample and used to arrive at the bottom sample depth for the deeper sample.

Field observations will be used to insure that clean native soils beneath the soil piles will not be included in the soil samples. Soil samples will be collected above the native prairie plain as shown in Figure 4. Native prairie can be identified due to differences in soil appearance and gravel content as well as presence of native bunchgrasses along the perimeter of the soil piles. Further, prior to sampling a number of small cross-sections will be cut with the backhoe to establish a clear visual characterization of the historic prairie plain underneath the soil pile.

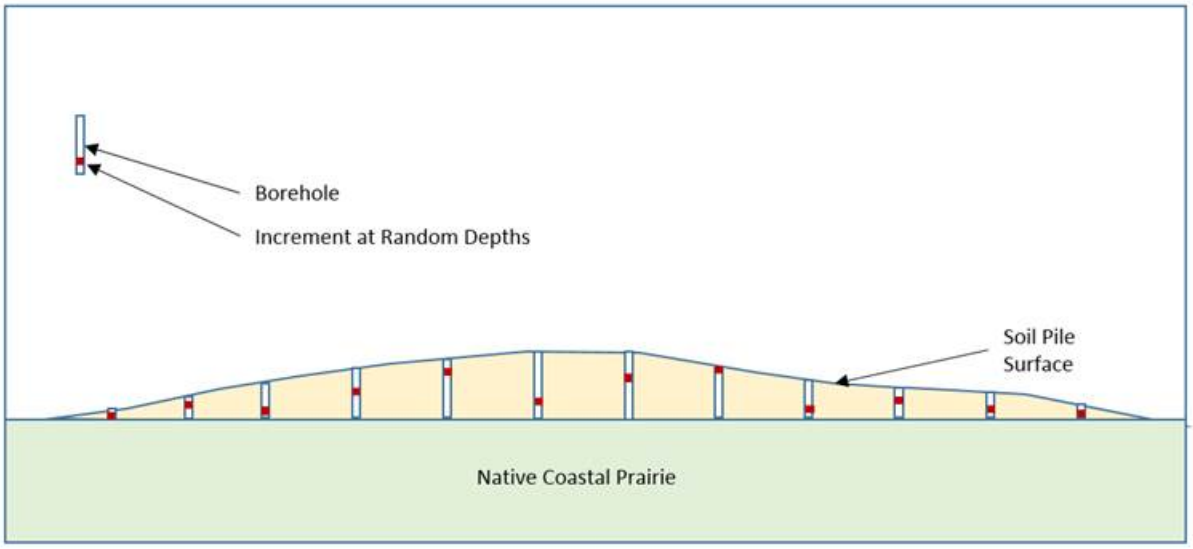


Figure 4: Schematic of soil sampling increments (red) in the soil pile (yellow) above historic native prairie (green)

At each sample increment, a disposable plastic scoop will be used to collect the soil increment from a random depth. Increments will be collected from both shallow and deeper depths, varying randomly through all of the triplicate samples. The sampling protocol follows these steps:

1. The auger bit will bring up cuttings from the entire depth of each borehole into a pile surrounding the borehole.

2. The field sampler will use a disposable plastic scoop to collect each soil increment from a random location within each cuttings pile.

3. Increments for each DU and triplicate will be placed within a 32-ounce glass jar (~ 1.5 kg total mass).

4. The jars will be labeled and packed into an insulated cooler. The sample will be transported under chain-of custody procedures directly to Enthalpy Laboratory in Berkeley, California.

All sample collection protocols are consistent with the Final Phase IV Field Sampling Plan with the exception that ISM methodology is being used as it is acceptable to EPA Region IX.

Analyses and Results

Soil samples will be processed according to Enthalpy's internal ISM protocol. UC will request that a minimum of 75 subsample increments be collected from each dried sample to a final analytical aliquot of 30 grams. Samples will be analyzed for PCBs by EPA method 8082A using EPA Method with 3540C Soxhlet extraction. One of the triplicate ISM samples will be subsampled three times for separate analysis as a laboratory triplicate to evaluate the subsampling process and analytical variability. The

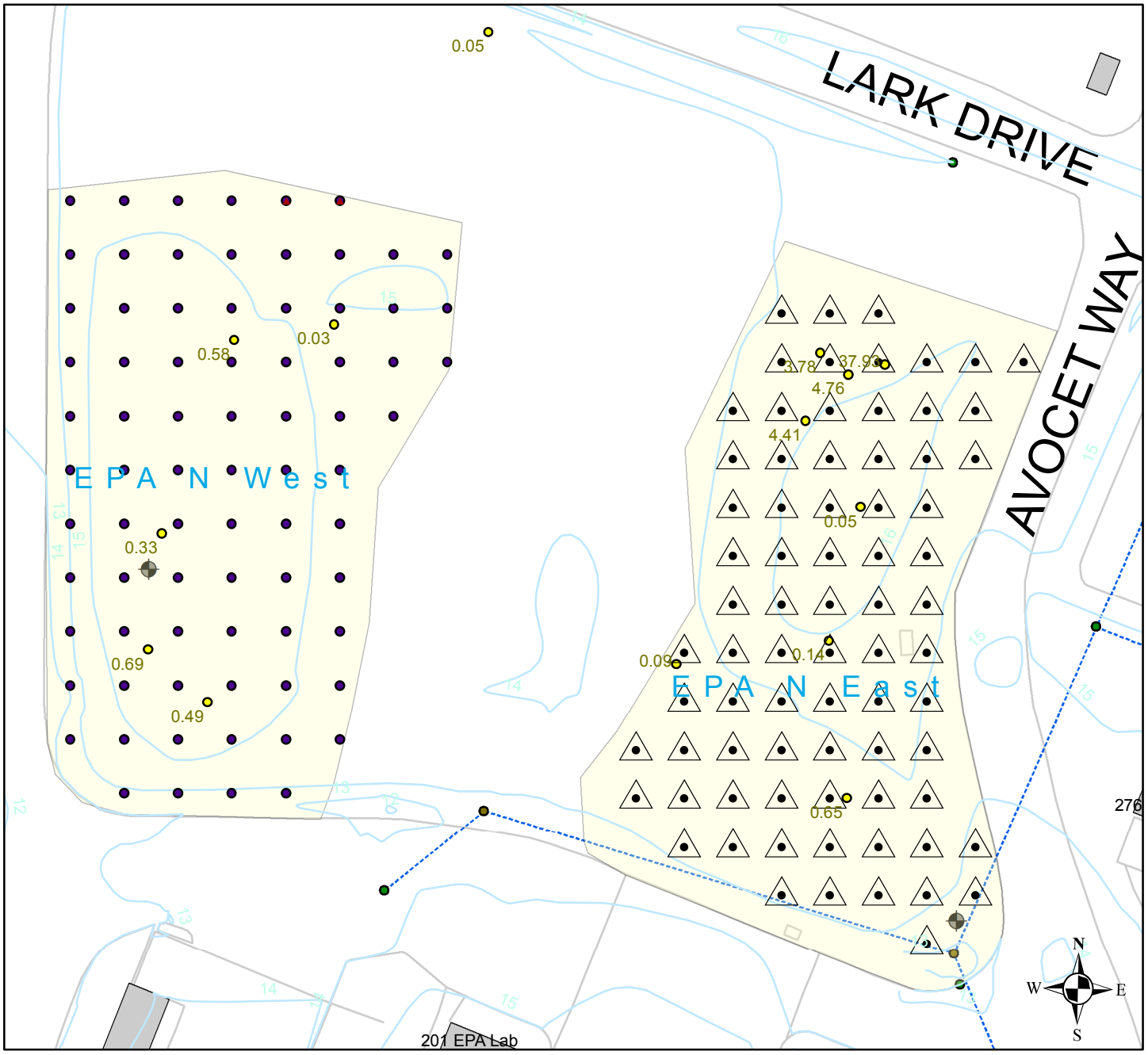
total number of analyses is six (one for the EPA NW DU, two triplicate EPA NE DU samples, and three laboratory triplicates samples collected from the third EPA NE DU triplicate sample).

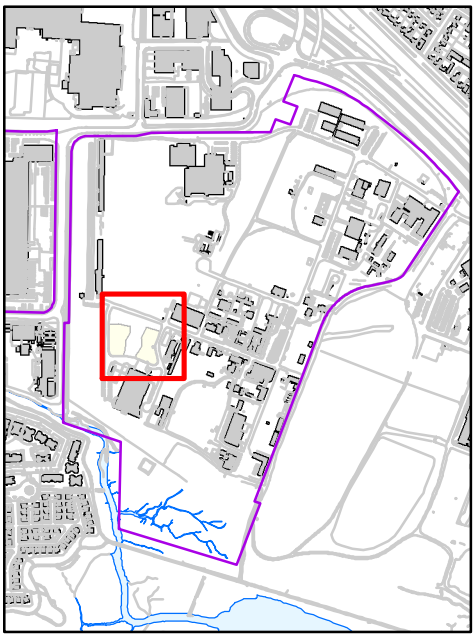
Sample results will be compared to the TSCA self-implementing cleanup criteria of 1 mg/kg and any other goals based on follow-up conference with DTSC and EPA.

Attachments

1. RFS EPA North Meadow Soil Pile ISM Figure

2. October 6, 2015 FSP Phase IV, EPA Meadow North, Supplementary PCB Sampling Results (Tetra Tech)





0 20 40 80 120 160 Feet

RFS EPA North Meadow Soil Piles ISM

- Increments for Triplicate ISM (centers)
- EPA NE triplicate locations (triangle apices)
- EPA NW increments (no triplicates)
- PCBs in soil (mg/kg)
- EPA North Meadow Soil Pile DUs
- Groundwater well
- Storm Drian Pipe
- Storm Drain Catch Basin

Berkeley EH&S

UCB EH&S KEK 2017.10.11

TETRA TECH, INC.

October 6, 2015

Lynn Nakashima
Berkeley Regional Office
700 Heinz Avenue, Suite 200C
Berkeley, California 94710

Subject: Phase IV, EPA Meadow North, Supplementary PCB Sampling Results
Richmond Field Station Site
Berkeley Global Campus at Richmond Bay
University of California, Berkeley

Dear Ms. Nakashima:

On behalf of the University of California, Berkeley, Tetra Tech, Inc. collected soil samples at the Richmond Field Station Site at the Berkeley Global Campus at Richmond Bay. The sampling was conducted as recommended in the Draft Phase IV Sampling Results Technical Memorandum, dated June 5, 2015, and incorporated comments received from DTSC on August 7, 2015. The objective of the sampling effort was to collect additional samples from the EPA Meadow North following detections of polychlorinated biphenyls (PCB) above the Toxic Substance Control Act (TSCA) self-implementing cleanup criteria of 1 milligram/kilogram (mg/kg) at sample location UM33 during the initial Phase IV sampling.

The sampling and reporting for this project were conducted consistent with the Final Phase IV Field Sampling Plan, dated October 6, 2014. Sampling was conducted on September 8, 2015. Sampling was targeted at areas consisting of fill material over existing native coastal prairie, located primarily along the eastern and western edges of the meadow. The fill material is distinguishable on the aerial within Figure 1. Three locations were identified adjacent to UM33 and six locations were spread throughout the remainder of the target area. Samples were collected at two depths at seven locations, three depths at one location, and one depth at one location for a total of 18 samples. Sample locations are presented on Figure 1; sample depths are provided in Figure 2.

Field Sampling Protocols

Soil samples were collected with the assistance of an auger attachment mounted to small Bobcat track loader. The auger attachment was used to loosen the soil for the shallow sample and used to arrive at the bottom sample depth for the deeper sample. At each sample depth interval, a disposable plastic scoop was used to collect the soil sample. The sampling protocol followed these steps:

1. The field sampler used a disposable plastic scoop to collect the soil sample.

2. One 16-ounce jar of soil was collected for each sample.

3. The jars were labeled and packed into an insulated cooler. The sample was transported under chain-of custody procedures directly to Curtis and Tompkins Laboratory in Berkeley, California.

All sample collection protocols were consistent with the Final Phase IV Field Sampling Plan.

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Analyses and Results

Soil samples were analyzed for PCBs by EPA method 8082A. Sample results were compared to the TSCA self-implementing cleanup criteria of 1 mg/kg. All sample results from the three locations adjacent to UM33 exceeded the 1 mg/kg criteria; all other results were below the criteria. Table 1 presents the complete analytical results for the PCBs detected (Aroclors 1248, 1254, and 1260.) Sample results for Aroclors 1248, 1254, and 1260 from this supplemental sampling and the Phase IV samples at the EPA Meadow North are presented on Figure 2. Complete laboratory analytical results from the supplemental sampling are presented in Attachment 1.

If you have any questions or comments regarding this submittal, please call me at (510) 302-6283.

Sincerely,

Jason Brodersen, PG
Program Manager

Enclosure: Figures 1 and 2, Table 1, Attachment 1

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Soil Sampling Locations

Sample result exceeds TSCA self-implementing cleanup criteria of 1 mg/kg.

Designated Natural Open Space

Meadow Boundary

Existing Buildings

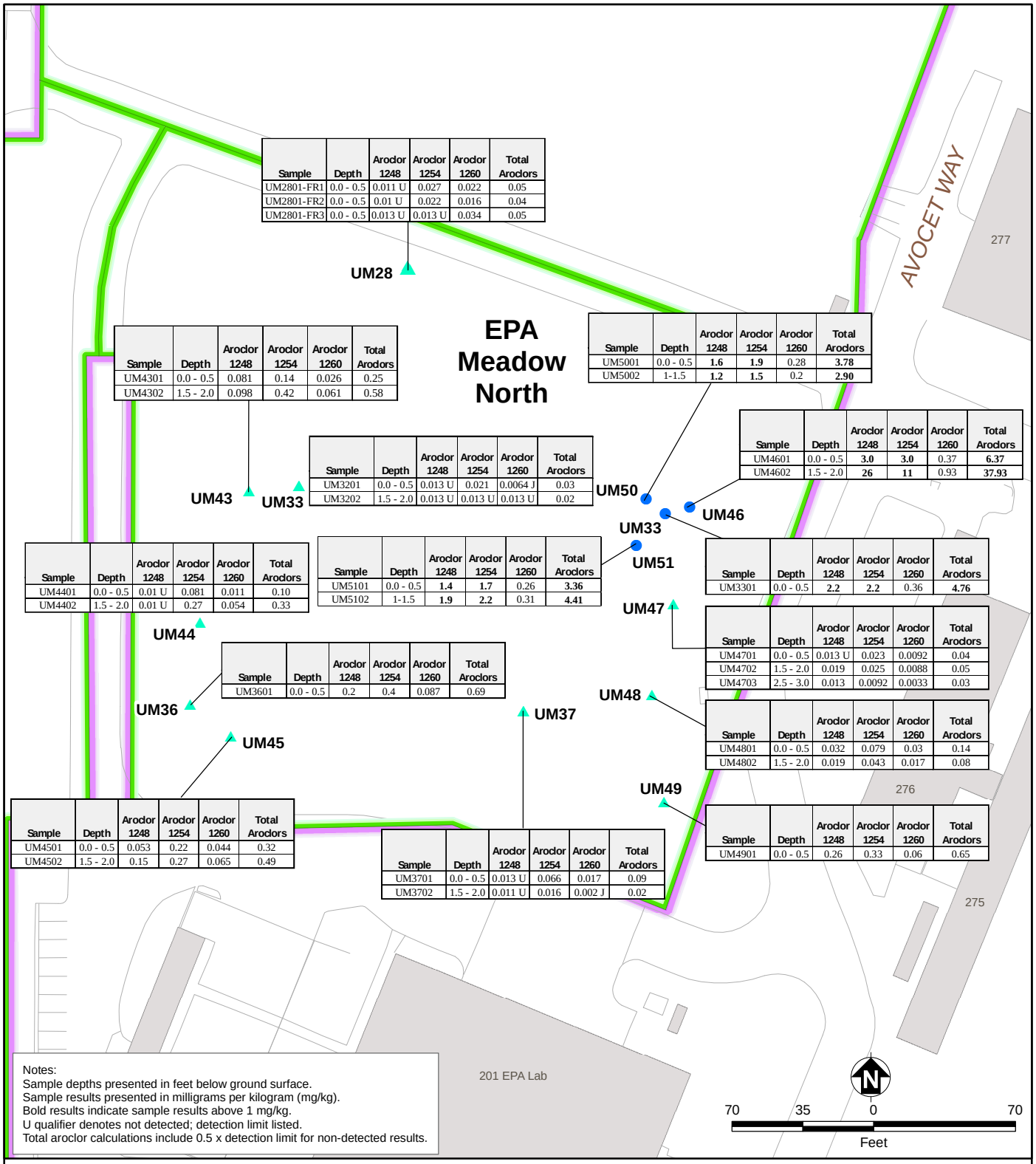
Asphalt/Concrete Pads

Roads and Other Landscape Features

TETRA TECH

Richmond Field Station Site
University of California, Berkeley

FIGURE 1
PHASE IV, EPA MEADOW NORTH
SUPPLEMENTARY PCB
SAMPLING RESULTS



Sample	Depth	Aroclor 1248	Aroclor 1254	Aroclor 1260	Total Aroclors
UM2801-FR1	0.0 - 0.5	0.011 U	0.027	0.022	0.05
UM2801-FR2	0.0 - 0.5	0.01 U	0.022	0.016	0.04
UM2801-FR3	0.0 - 0.5	0.013 U	0.013 U	0.034	0.05

Sample	Depth	Aroclor 1248	Aroclor 1254	Aroclor 1260	Total Aroclors
UM4301	0.0 - 0.5	0.081	0.14	0.026	0.25
UM4302	1.5 - 2.0	0.098	0.42	0.061	0.58

Sample	Depth	Aroclor 1248	Aroclor 1254	Aroclor 1260	Total Aroclors
UM5001	0.0 - 0.5	**1.6**	**1.9**	0.28	**3.78**
UM5002	1-1.5	**1.2**	**1.5**	0.2	**2.90**

Sample	Depth	Aroclor 1248	Aroclor 1254	Aroclor 1260	Total Aroclors
UM3201	0.0 - 0.5	0.013 U	0.021	0.0064 J	0.03
UM3202	1.5 - 2.0	0.013 U	0.013 U	0.013 U	0.02

Sample	Depth	Aroclor 1248	Aroclor 1254	Aroclor 1260	Total Aroclors
UM4601	0.0 - 0.5	**3.0**	**3.0**	0.37	**6.37**
UM4602	1.5 - 2.0	**26**	**11**	0.93	**37.93**

Sample	Depth	Aroclor 1248	Aroclor 1254	Aroclor 1260	Total Aroclors
UM4401	0.0 - 0.5	0.01 U	0.081	0.011	0.10
UM4402	1.5 - 2.0	0.01 U	0.27	0.054	0.33

Sample	Depth	Aroclor 1248	Aroclor 1254	Aroclor 1260	Total Aroclors
UM5101	0.0 - 0.5	**1.4**	**1.7**	0.26	**3.36**
UM5102	1-1.5	**1.9**	**2.2**	0.31	**4.41**

Sample	Depth	Aroclor 1248	Aroclor 1254	Aroclor 1260	Total Aroclors
UM3301	0.0 - 0.5	**2.2**	**2.2**	0.36	**4.76**

Sample	Depth	Aroclor 1248	Aroclor 1254	Aroclor 1260	Total Aroclors
UM4701	0.0 - 0.5	0.013 U	0.023	0.0092	0.04
UM4702	1.5 - 2.0	0.019	0.025	0.0088	0.05
UM4703	2.5 - 3.0	0.013	0.0092	0.0033	0.03

Sample	Depth	Aroclor 1248	Aroclor 1254	Aroclor 1260	Total Aroclors
UM3601	0.0 - 0.5	0.2	0.4	0.087	0.69

Sample	Depth	Aroclor 1248	Aroclor 1254	Aroclor 1260	Total Aroclors
UM4801	0.0 - 0.5	0.032	0.079	0.03	0.14
UM4802	1.5 - 2.0	0.019	0.043	0.017	0.08

Sample	Depth	Aroclor 1248	Aroclor 1254	Aroclor 1260	Total Aroclors
UM4501	0.0 - 0.5	0.053	0.22	0.044	0.32
UM4502	1.5 - 2.0	0.15	0.27	0.065	0.49

Sample	Depth	Aroclor 1248	Aroclor 1254	Aroclor 1260	Total Aroclors
UM3701	0.0 - 0.5	0.013 U	0.066	0.017	0.09
UM3702	1.5 - 2.0	0.011 U	0.016	0.002 J	0.02

Sample	Depth	Aroclor 1248	Aroclor 1254	Aroclor 1260	Total Aroclors
UM4901	0.0 - 0.5	0.26	0.33	0.06	0.65

Notes:
Sample depths presented in feet below ground surface.
Sample results presented in milligrams per kilogram (mg/kg).
Bold results indicate sample results above 1 mg/kg.
U qualifier denotes not detected; detection limit listed.
Total aroclor calculations include 0.5 x detection limit for non-detected results.

Soil Sampling Locations

Sample result exceeds TSCA self-implementing cleanup criteria of 1 mg/kg.

Designated Natural Open Space

Meadow Boundary

Existing Buildings

Asphalt/Concrete Pads

Roads and Other Landscape Features

J	Estimated result
mg/kg	Milligram per kilogram
PCB	Polychlorinated biphenyl
U	Not detected

TETRA TECH

Richmond Field Station Site
University of California, Berkeley

FIGURE 2
PHASE IV, EPA MEADOW NORTH SUPPLEMENTARY PCB SAMPLING RESULTS

TABLE 1
PCB SOIL SAMPLING RESULTS

	PCBs (mg/kg)			
Screening Criteria	**Aroclor-1248**	**Aroclor-1254**	**Aroclor-1260**	**Total Aroclors**
Commercial worker	*0.528*	*0.528*	*0.528*	*NA*
Construction worker	*3.50*	*2.02*	*3.50*	*NA*
Maintenance worker	*3.50*	*3.50*	*3.50*	*NA*
Off-Site Receptor	*5,620*	*5,620*	*5,620*	*NA*
TSCA Cleanup Criteria (1)	*1*	*1*	*1*	*1*
UM2801-FR1	0.011 U	0.027	0.022	0.05
UM2801-FR2	0.01 U	0.022	0.016	0.04
UM2801-FR3	0.013 U	0.013 U	0.034	0.05
UM3201	0.013 U	0.021	0.0064	0.03
UM3202	0.013 U	0.013 U	0.013 U	0.02
UM3301	**2.2**	**2.2**	0.36	**4.76**
UM3601	0.2	0.4	0.087	0.69
UM3701	0.013 U	0.066	0.017	0.09
UM3702	0.011 U	0.016	0.002	0.02
UM4301	0.081	0.14	0.026	0.25
UM4302	0.098	0.42	0.061	0.58
UM4401	0.01 U	0.081	0.011	0.10
UM4402	0.01 U	0.27	0.054	0.33
UM4501	0.053	0.22	0.044	0.32
UM4502	0.15	0.27	0.065	0.49
UM4601	**3.0**	**3.0**	0.37	**6.37**
UM4602	**26**	**11**	0.93	**37.93**

	PCBs (mg/kg)			
Screening Criteria	**Aroclor-1248**	**Aroclor-1254**	**Aroclor-1260**	**Total Aroclors**
Commercial worker	*0.528*	*0.528*	*0.528*	*NA*
Construction worker	*3.50*	*2.02*	*3.50*	*NA*
Maintenance worker	*3.50*	*3.50*	*3.50*	*NA*
Off-Site Receptor	*5,620*	*5,620*	*5,620*	*NA*
TSCA Cleanup Criteria (1)	*1*	*1*	*1*	*1*
UM4701	0.013 U	0.023	0.0092	0.04
UM4702	0.019	0.025	0.0088	0.05
UM4703	0.013	0.0092	0.0033	0.03
UM4801	0.032	0.079	0.03	0.14
UM4802	0.019	0.043	0.017	0.08
UM4901	0.26	0.33	0.06	0.65
UM5001	**1.6**	**1.9**	0.28	**3.78**
UM5002	**1.2**	**1.5**	0.2	**2.90**
UM5101	**1.4**	**1.7**	0.26	**3.36**
UM5102	**1.9**	**2.2**	0.31	**4.41**

Notes:
Bold values indicate that the result exceeds the TSCA Self-Implementing Cleanup Criteria.
Screening criteria based on the Final Soil Management Plan, Table C-1, July 18, 2014.

1 Toxic Substances Control Act (TSCA) criteria for high occupancy areas with no cap (EPA 2005).

mg/kg Milligrams per kilogram
NA Not available
J Estimated value
U Not detected

References:
RWQCB. 2013. "February 2013 Update to Environmental Screening Levels." February. Available on-line at: http://www.waterboards.ca.gov/rwqcb2/water_issues/programs/esl.shtml.
EPA. 2005. Polychlorinated Biphenyl (PCB) Site Revitalization Guidance Under the Toxic Substances Control Act. November. Available on-line at: http://www.epa.gov/osw/hazard/tsd/pcbs/pubs/pcb-guid3-06.pdf

Attachment 1

Analytical Results


Curtis & Tompkins, Ltd.
Analytical Laboratories, Since 1878

Curtis & Tompkins, Ltd., Analytical Laboratories, Since 1878
2323 Fifth Street, Berkeley, CA 94710, Phone (510) 486-0900

Laboratory Job Number 269650
ANALYTICAL REPORT
PCBs

Tetra Tech EMI	Project : 103S225322.01
1999 Harrison Street	Location : Upland Meadow PCB Samp.
Oakland, CA 94612	Level : IV

Sample ID	Lab ID
20150908UM4301	269650-001
20150908UM4302	269650-002
20150908UM4401	269650-003
20150908UM4402	269650-004
20150908UM4501	269650-005
20150908UM4502	269650-006
20150908UM4601	269650-007
20150908UM4602	269650-008
20150908UM4701	269650-009
20150908UM4702	269650-010
20150908UM4703	269650-011
20150908UM4801	269650-012
20150908UM4802	269650-013
20150908UM4901	269650-014
20150908UM5001	269650-015
20150908UM5002	269650-016
20150908UM5101	269650-017
20150908UM5102	269650-018

This data package has been reviewed for technical correctness and completeness. Release of this data has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature. The results contained in this report meet all requirements of NELAC and pertain only to those samples which were submitted for analysis. This report may be reproduced only in its entirety.

Signature: _____ Date: 09/22/2015

Mike Dahlquist
Project Manager
mike.dahlquist@ctberk.com

CA ELAP# 2896, NELAP# 4044-001

Curtis & Tompkins, Ltd.

CASE NARRATIVE
PCBS (EPA 8082)

Laboratory number:	**269650**
Client:	**Tetra Tech EMI**
Project:	**103S225322.01**
Location:	**Upland Meadow PCB Samp.**
Request Date:	**09/08/15**
Samples Received:	**09/08/15**

This data package contains sample and QC results for eighteen soil samples, requested for the above referenced project on 09/08/15. See attached cooler receipt form for any sample receipt problems or discrepancies.

PCBs (EPA 8082):

All samples underwent sulfuric acid cleanup using EPA Method 3665A.

All samples underwent sulfur cleanup using the copper option in EPA Method 3660B.

Matrix spikes QC803593,QC803594 (batch 227162) were not analyzed because the parent sample required a dilution that would have diluted out the spikes.

No other analytical problems were encountered.

Chain of Custody

269650

Chain of Custody Record No. 5369

Page 1 of 2

Tetra Tech EM Inc.
San Francisco Office

135 Main St. Suite 1800
San Francisco. CA 94105
415-543-4880
Fax 415-543-5480

5369

Lab PO#: 150AK33	Lab: C+T	
Project name: Upland Meadows PCB Samp	TtEMI technical contact: Sara Woolley	Field samplers: Dayna Aragen
Project (CTO) number: 103S2253.22.01	TtEMI project manager: Jason Brodersen	Field samplers' signatures: [signature]

Preservative Added: Na2

	Sample ID	Sample Location (Pt. ID)	Date	Time	Matrix	MS / MSD	40 ml VOA	1 liter Amber	500 ml Poly	Sleeve	Glass Jar 4oz				VOA	SVOA	PCBs	Metals	TPH Purgeables	TPH Extractables										
1	20150908UM4301		9/8/15	1000	soil						1						X													
2	4302		↓	1003	↓						1						X													
3	4401			1005							1						X													
4	4402			1008							1						X													
5	4501			1010							1						X													
6	4502			1012							1						↓													
7	4601			1014							1																			
8	4602			1016							1																			
9	4701			1017							1																			
10	4702			1018							1																			
11	4703			1026							1																			
12	↓ 4801		↓	1020	↓						1						↓													

	Name (print)	Company Name	Date	Time
Relinquished by: [signature]	Dayna Aragen	Tetra Tech	9/8/15	1130
Received by: [signature]	Pat Gonzalez	C&T	9/18/15	11:30
Relinquished by:				
Received by:				
Relinquished by:				
Received by:				

Turnaround time/remarks:

Fed Ex #:

WHITE-Laboratory Copy YELLOW-Sample Tracker PINK-File Copy

269650

Tetra Tech EM Inc.
San Francisco Office

135 Main St. Suite 1800
San Francisco. CA 94105
415-543-4880
Fax 415-543-5480

Chain of Custody Record No. 6084

6084

Project name: Upland Meadows PCB Sampling	**Lab PO#:** 150AK33
Project (CTO) number: 10352253.22.01	**TtEMI technical contact:** Sara Woolley
	TtEMI project manager: Jason Brodersen
	Lab: CT
	Field samplers: Dayna Aragon
	Field samplers' signatures: Dayna

	Sample ID	Sample Location (Pt. ID)	Date	Time	Matrix	MS / MSD	40 ml VOA	1 liter Amber	500 ml Poly	Sleeve	Glass Jar 4oz	VOA	SVOA	Test PCBs	Metals	TPH Purgeables	TPH Extractables
13	20150908UM4802		9/8/15	1022	soil						1			X			
14	4901			1024							1			X			
15	5001			1028							1			X			
16	5002			1030							1			X			
17	5101			1032							1			X			
18	5102			1034							1			X			

Preservative Added: Ice

Analysis Required

	Name (print)	Company Name	Date	Time
Relinquished by: Dayna	Dayna Aragon	Tetra Tech	9/8/15	1130
Received by:	Pat Gonzalez	Pat Hamilton, CT	9/8/15	1130
Relinquished by:				
Received by:				
Relinquished by:				
Received by:				

Turnaround time/remarks:

Fed Ex #:

WHITE-Laboratory Copy YELLOW-Sample Tracker PINK-File Copy

COOLER RECEIPT CHECKLIST

Curtis & Tompkins, Ltd.

Login # 269650 Date Received 9/8/15 Number of coolers 1
Client Tetra Tech Project

Date Opened 9/8 By (print) SL (sign)
Date Logged in ↓ By (print) ↓ (sign) ↓

1. Did cooler come with a shipping slip (airbill, etc) YES (NO)
Shipping info

2A. Were custody seals present? .... ☐ YES (circle) on cooler on samples ☒ NO
How many Name Date
2B. Were custody seals intact upon arrival? YES NO (N/A)
3. Were custody papers dry and intact when received? (YES) NO
4. Were custody papers filled out properly (ink, signed, etc)? (YES) NO
5. Is the project identifiable from custody papers? (If so fill out top of form) (YES) NO
6. Indicate the packing in cooler: (if other, describe)

☐ Bubble Wrap ☐ Foam blocks ☐ Bags ☐ None
☐ Cloth material ☒ Cardboard ☐ Styrofoam ☐ Paper towels

7. Temperature documentation: * Notify PM if temperature exceeds 6°C

Type of ice used: ☒ Wet ☐ Blue/Gel ☐ None Temp(°C) 5.6

☐ Samples Received on ice & cold without a temperature blank; temp. taken with IR gun

☐ Samples received on ice directly from the field. Cooling process had begun

8. Were Method 5035 sampling containers present? YES (NO)
If YES, what time were they transferred to freezer?
9. Did all bottles arrive unbroken/unopened? (YES) NO
10. Are there any missing / extra samples? YES (NO)
11. Are samples in the appropriate containers for indicated tests? (YES) NO
12. Are sample labels present, in good condition and complete? (YES) NO
13. Do the sample labels agree with custody papers? (YES) NO
14. Was sufficient amount of sample sent for tests requested? (YES) NO
15. Are the samples appropriately preserved? YES NO (N/A)
16. Did you check preservatives for all bottles for each sample? YES NO (N/A)
17. Did you document your preservative check? YES NO (N/A)
18. Did you change the hold time in LIMS for unpreserved VOAs? YES NO (N/A)
19. Did you change the hold time in LIMS for preserved terracores? YES NO (N/A)
20. Are bubbles > 6mm absent in VOA samples? YES NO (N/A)
21. Was the client contacted concerning this sample delivery? YES (NO)
If YES, Who was called? By Date:

COMMENTS

Rev 10, 9/12

Results & QC Summary

Curtis & Tompkins, Ltd.

Polychlorinated Biphenyls (PCBs)

Lab #:	269650	Location:	Upland Meadow PCB Samp.
Client:	Tetra Tech EMI	Prep:	EPA 3550B
Project#:	103S225322.01	Analysis:	EPA 8082
Field ID:	20150908UM4301	Batch#:	227162
Lab ID:	269650-001	Sampled:	09/08/15
Matrix:	Soil	Received:	09/08/15
Units:	ug/Kg	Prepared:	09/14/15
Basis:	dry	Analyzed:	09/15/15
Diln Fac:	1.000		

Moisture: 4%

Analyte	Result	RL	MDL
Aroclor-1016	ND	10	2.5
Aroclor-1221	ND	20	6.7
Aroclor-1232	ND	10	3.3
Aroclor-1242	ND	10	3.0
Aroclor-1248	81	10	3.2
Aroclor-1254	140	10	2.6
Aroclor-1260	26	10	1.6

Surrogate	%REC	Limits
TCMX	100	46-141
Decachlorobiphenyl	79	25-135

ND= Not Detected at or above MDL
RL= Reporting Limit
MDL= Method Detection Limit

Curtis & Tompkins, Ltd.

Polychlorinated Biphenyls (PCBs)

Lab #:	269650	Location:	Upland Meadow PCB Samp.
Client:	Tetra Tech EMI	Prep:	EPA 3550B
Project#:	103S225322.01	Analysis:	EPA 8082
Field ID:	20150908UM4302	Batch#:	227162
Lab ID:	269650-002	Sampled:	09/08/15
Matrix:	Soil	Received:	09/08/15
Units:	ug/Kg	Prepared:	09/14/15
Basis:	dry	Analyzed:	09/15/15
Diln Fac:	1.000		

Moisture: 8%

Analyte	Result	RL	MDL
Aroclor-1016	ND	10	2.6
Aroclor-1221	ND	21	6.9
Aroclor-1232	ND	10	3.4
Aroclor-1242	ND	10	3.1
Aroclor-1248	98	10	3.3
Aroclor-1254	420	10	2.6
Aroclor-1260	61	10	1.7

Surrogate	%REC	Limits
TCMX	100	46-141
Decachlorobiphenyl	82	25-135

ND= Not Detected at or above MDL
RL= Reporting Limit
MDL= Method Detection Limit

Curtis & Tompkins, Ltd.

Polychlorinated Biphenyls (PCBs)

Lab #:	269650	Location:	Upland Meadow PCB Samp.
Client:	Tetra Tech EMI	Prep:	EPA 3550B
Project#:	103S225322.01	Analysis:	EPA 8082
Field ID:	20150908UM4401	Batch#:	227162
Lab ID:	269650-003	Sampled:	09/08/15
Matrix:	Soil	Received:	09/08/15
Units:	ug/Kg	Prepared:	09/14/15
Basis:	dry	Analyzed:	09/15/15
Diln Fac:	1.000		

Moisture: 5%

Analyte	Result	RL	MDL
Aroclor-1016	ND	10	2.5
Aroclor-1221	ND	20	6.8
Aroclor-1232	ND	10	3.3
Aroclor-1242	ND	10	3.0
Aroclor-1248	ND	10	3.2
Aroclor-1254	81	10	2.6
Aroclor-1260	11	10	1.6

Surrogate	%REC	Limits
TCMX	100	46-141
Decachlorobiphenyl	76	25-135

ND= Not Detected at or above MDL
RL= Reporting Limit
MDL= Method Detection Limit

Curtis & Tompkins, Ltd.

Polychlorinated Biphenyls (PCBs)

Lab #:	269650	Location:	Upland Meadow PCB Samp.
Client:	Tetra Tech EMI	Prep:	EPA 3550B
Project#:	103S225322.01	Analysis:	EPA 8082
Field ID:	20150908UM4402	Batch#:	227162
Lab ID:	269650-004	Sampled:	09/08/15
Matrix:	Soil	Received:	09/08/15
Units:	ug/Kg	Prepared:	09/14/15
Basis:	dry	Analyzed:	09/15/15
Diln Fac:	1.000		

Moisture: 8%

Analyte	Result	RL	MDL
Aroclor-1016	ND	10	2.6
Aroclor-1221	ND	21	6.9
Aroclor-1232	ND	10	3.4
Aroclor-1242	ND	10	3.1
Aroclor-1248	ND	10	3.3
Aroclor-1254	270	10	2.6
Aroclor-1260	54	10	1.7

Surrogate	%REC	Limits
TCMX	107	46-141
Decachlorobiphenyl	75	25-135

ND= Not Detected at or above MDL
RL= Reporting Limit
MDL= Method Detection Limit

Curtis & Tompkins, Ltd.

Polychlorinated Biphenyls (PCBs)

Lab #:	269650	Location:	Upland Meadow PCB Samp.
Client:	Tetra Tech EMI	Prep:	EPA 3550B
Project#:	103S225322.01	Analysis:	EPA 8082
Field ID:	20150908UM4501	Batch#:	227162
Lab ID:	269650-005	Sampled:	09/08/15
Matrix:	Soil	Received:	09/08/15
Units:	ug/Kg	Prepared:	09/14/15
Basis:	dry	Analyzed:	09/15/15
Diln Fac:	1.000		

Moisture: 4%

Analyte	Result	RL	MDL
Aroclor-1016	ND	10	2.5
Aroclor-1221	ND	20	6.7
Aroclor-1232	ND	10	3.2
Aroclor-1242	ND	10	3.0
Aroclor-1248	53	10	3.2
Aroclor-1254	220	10	2.5
Aroclor-1260	44	10	1.6

Surrogate	%REC	Limits
TCMX	99	46-141
Decachlorobiphenyl	74	25-135

ND= Not Detected at or above MDL
RL= Reporting Limit
MDL= Method Detection Limit

Curtis & Tompkins, Ltd.

Polychlorinated Biphenyls (PCBs)

Lab #:	269650	Location:	Upland Meadow PCB Samp.
Client:	Tetra Tech EMI	Prep:	EPA 3550B
Project#:	103S225322.01	Analysis:	EPA 8082
Field ID:	20150908UM4502	Batch#:	227337
Lab ID:	269650-006	Sampled:	09/08/15
Matrix:	Soil	Received:	09/08/15
Units:	ug/Kg	Prepared:	09/18/15
Basis:	dry	Analyzed:	09/19/15
Diln Fac:	1.000		

Moisture: 8%

Analyte	Result	RL	MDL
Aroclor-1016	ND	13	3.3
Aroclor-1221	ND	26	8.8
Aroclor-1232	ND	13	4.3
Aroclor-1242	ND	13	3.9
Aroclor-1248	150	13	4.2
Aroclor-1254	270	13	3.4
Aroclor-1260	65	13	2.1

Surrogate	%REC	Limits
TCMX	97	46-141
Decachlorobiphenyl	80	25-135

ND= Not Detected at or above MDL
RL= Reporting Limit
MDL= Method Detection Limit

Curtis & Tompkins, Ltd.

Polychlorinated Biphenyls (PCBs)

Lab #:	269650	Location:	Upland Meadow PCB Samp.
Client:	Tetra Tech EMI	Prep:	EPA 3550B
Project#:	103S225322.01	Analysis:	EPA 8082
Field ID:	20150908UM4601	Batch#:	227337
Lab ID:	269650-007	Sampled:	09/08/15
Matrix:	Soil	Received:	09/08/15
Units:	ug/Kg	Prepared:	09/18/15
Basis:	dry	Analyzed:	09/20/15
Diln Fac:	10.00		

Moisture: 4%

Analyte	Result	RL	MDL
Aroclor-1016	ND	88	31
Aroclor-1221	ND	180	84
Aroclor-1232	ND	88	41
Aroclor-1242	ND	88	38
Aroclor-1248	3,000	88	40
Aroclor-1254	3,000	88	32
Aroclor-1260	370	88	20

Surrogate	%REC	Limits
TCMX	DO	46-141
Decachlorobiphenyl	DO	25-135

DO= Diluted Out
ND= Not Detected at or above MDL
RL= Reporting Limit
MDL= Method Detection Limit

Curtis & Tompkins, Ltd.

Polychlorinated Biphenyls (PCBs)

Lab #:	269650	Location:	Upland Meadow PCB Samp.
Client:	Tetra Tech EMI	Prep:	EPA 3550B
Project#:	103S225322.01	Analysis:	EPA 8082
Field ID:	20150908UM4602	Batch#:	227337
Lab ID:	269650-008	Sampled:	09/08/15
Matrix:	Soil	Received:	09/08/15
Units:	ug/Kg	Prepared:	09/18/15
Basis:	dry	Analyzed:	09/20/15
Diln Fac:	50.00		

Moisture: 5%

Analyte	Result	RL	MDL
Aroclor-1016	ND	440	160
Aroclor-1221	ND	890	430
Aroclor-1232	ND	440	210
Aroclor-1242	ND	440	190
Aroclor-1248	26,000	440	200
Aroclor-1254	11,000	440	160
Aroclor-1260	930	440	100

Surrogate	%REC	Limits
TCMX	DO	46-141
Decachlorobiphenyl	DO	25-135

DO= Diluted Out
ND= Not Detected at or above MDL
RL= Reporting Limit
MDL= Method Detection Limit

Curtis & Tompkins, Ltd.

Polychlorinated Biphenyls (PCBs)

Lab #:	269650	Location:	Upland Meadow PCB Samp.
Client:	Tetra Tech EMI	Prep:	EPA 3550B
Project#:	103S225322.01	Analysis:	EPA 8082
Field ID:	20150908UM4701	Batch#:	227337
Lab ID:	269650-009	Sampled:	09/08/15
Matrix:	Soil	Received:	09/08/15
Units:	ug/Kg	Prepared:	09/18/15
Basis:	dry	Analyzed:	09/19/15
Diln Fac:	1.000		

Moisture: 7%

Analyte	Result	RL	MDL
Aroclor-1016	ND	13	3.2
Aroclor-1221	ND	26	8.6
Aroclor-1232	ND	13	4.2
Aroclor-1242	ND	13	3.9
Aroclor-1248	ND	13	4.1
Aroclor-1254	23	13	3.3
Aroclor-1260	9.2 J	13	2.1

Surrogate	%REC	Limits
TCMX	100	46-141
Decachlorobiphenyl	86	25-135

J= Estimated value
ND= Not Detected at or above MDL
RL= Reporting Limit
MDL= Method Detection Limit

Curtis & Tompkins, Ltd.

Polychlorinated Biphenyls (PCBs)

Lab #:	269650	Location:	Upland Meadow PCB Samp.
Client:	Tetra Tech EMI	Prep:	EPA 3550B
Project#:	103S225322.01	Analysis:	EPA 8082
Field ID:	20150908UM4702	Batch#:	227337
Lab ID:	269650-010	Sampled:	09/08/15
Matrix:	Soil	Received:	09/08/15
Units:	ug/Kg	Prepared:	09/18/15
Basis:	dry	Analyzed:	09/19/15
Diln Fac:	1.000		

Moisture: 6%

Analyte	Result	RL	MDL
Aroclor-1016	ND	13	3.2
Aroclor-1221	ND	26	8.5
Aroclor-1232	ND	13	4.2
Aroclor-1242	ND	13	3.8
Aroclor-1248	19	13	4.1
Aroclor-1254	25	13	3.3
Aroclor-1260	8.8 J	13	2.1

Surrogate	%REC	Limits
TCMX	119	46-141
Decachlorobiphenyl	97	25-135

J= Estimated value
ND= Not Detected at or above MDL
RL= Reporting Limit
MDL= Method Detection Limit

Curtis & Tompkins, Ltd.

Polychlorinated Biphenyls (PCBs)

Lab #:	269650	Location:	Upland Meadow PCB Samp.
Client:	Tetra Tech EMI	Prep:	EPA 3550B
Project#:	103S225322.01	Analysis:	EPA 8082
Field ID:	20150908UM4703	Batch#:	227337
Lab ID:	269650-011	Sampled:	09/08/15
Matrix:	Soil	Received:	09/08/15
Units:	ug/Kg	Prepared:	09/18/15
Basis:	dry	Analyzed:	09/19/15
Diln Fac:	1.000		

Moisture: 6%

Analyte	Result	RL	MDL
Aroclor-1016	ND	13	3.1
Aroclor-1221	ND	25	8.4
Aroclor-1232	ND	13	4.1
Aroclor-1242	ND	13	3.8
Aroclor-1248	13	13	4.0
Aroclor-1254	9.2 J	13	3.2
Aroclor-1260	3.3 J	13	2.0

Surrogate	%REC	Limits
TCMX	108	46-141
Decachlorobiphenyl	86	25-135

J= Estimated value
ND= Not Detected at or above MDL
RL= Reporting Limit
MDL= Method Detection Limit

Curtis & Tompkins, Ltd.

Polychlorinated Biphenyls (PCBs)

Lab #:	269650	Location:	Upland Meadow PCB Samp.
Client:	Tetra Tech EMI	Prep:	EPA 3550B
Project#:	103S225322.01	Analysis:	EPA 8082
Field ID:	20150908UM4801	Batch#:	227337
Lab ID:	269650-012	Sampled:	09/08/15
Matrix:	Soil	Received:	09/08/15
Units:	ug/Kg	Prepared:	09/18/15
Basis:	dry	Analyzed:	09/19/15
Diln Fac:	1.000		

Moisture: 5%

Analyte	Result	RL	MDL
Aroclor-1016	ND	13	3.2
Aroclor-1221	ND	25	8.5
Aroclor-1232	ND	13	4.1
Aroclor-1242	ND	13	3.8
Aroclor-1248	32	13	4.1
Aroclor-1254	79	13	3.3
Aroclor-1260	30	13	2.1

Surrogate	%REC	Limits
TCMX	99	46-141
Decachlorobiphenyl	80	25-135

ND= Not Detected at or above MDL
RL= Reporting Limit
MDL= Method Detection Limit

Curtis & Tompkins, Ltd.

Polychlorinated Biphenyls (PCBs)

Lab #:	269650	Location:	Upland Meadow PCB Samp.
Client:	Tetra Tech EMI	Prep:	EPA 3550B
Project#:	103S225322.01	Analysis:	EPA 8082
Field ID:	20150908UM4802	Batch#:	227337
Lab ID:	269650-013	Sampled:	09/08/15
Matrix:	Soil	Received:	09/08/15
Units:	ug/Kg	Prepared:	09/18/15
Basis:	dry	Analyzed:	09/19/15
Diln Fac:	1.000		

Moisture: 6%

Analyte	Result	RL	MDL
Aroclor-1016	ND	13	3.2
Aroclor-1221	ND	26	8.6
Aroclor-1232	ND	13	4.2
Aroclor-1242	ND	13	3.8
Aroclor-1248	19	13	4.1
Aroclor-1254	43	13	3.3
Aroclor-1260	17	13	2.1

Surrogate	%REC	Limits
TCMX	100	46-141
Decachlorobiphenyl	74	25-135

ND= Not Detected at or above MDL
RL= Reporting Limit
MDL= Method Detection Limit

Curtis & Tompkins, Ltd.

Polychlorinated Biphenyls (PCBs)

Lab #:	269650	Location:	Upland Meadow PCB Samp.
Client:	Tetra Tech EMI	Prep:	EPA 3550B
Project#:	103S225322.01	Analysis:	EPA 8082
Field ID:	20150908UM4901	Batch#:	227337
Lab ID:	269650-014	Sampled:	09/08/15
Matrix:	Soil	Received:	09/08/15
Units:	ug/Kg	Prepared:	09/18/15
Basis:	dry	Analyzed:	09/19/15
Diln Fac:	1.000		

Moisture: 5%

Analyte	Result	RL	MDL
Aroclor-1016	ND	13	3.1
Aroclor-1221	ND	25	8.4
Aroclor-1232	ND	13	4.1
Aroclor-1242	ND	13	3.8
Aroclor-1248	260	13	4.0
Aroclor-1254	330	13	3.2
Aroclor-1260	60	13	2.1

Surrogate	%REC	Limits
TCMX	101	46-141
Decachlorobiphenyl	71	25-135

ND= Not Detected at or above MDL
RL= Reporting Limit
MDL= Method Detection Limit

Curtis & Tompkins, Ltd.

Polychlorinated Biphenyls (PCBs)

Lab #:	269650	Location:	Upland Meadow PCB Samp.
Client:	Tetra Tech EMI	Prep:	EPA 3550B
Project#:	103S225322.01	Analysis:	EPA 8082
Field ID:	20150908UM5001	Batch#:	227337
Lab ID:	269650-015	Sampled:	09/08/15
Matrix:	Soil	Received:	09/08/15
Units:	ug/Kg	Prepared:	09/18/15
Basis:	dry	Analyzed:	09/21/15
Diln Fac:	10.00		

Moisture: 6%

Analyte	Result	RL	MDL
Aroclor-1016	ND	89	31
Aroclor-1221	ND	180	85
Aroclor-1232	ND	89	41
Aroclor-1242	ND	89	38
Aroclor-1248	1,600	89	41
Aroclor-1254	1,900	89	32
Aroclor-1260	280	89	21

Surrogate	%REC	Limits
TCMX	DO	46-141
Decachlorobiphenyl	DO	25-135

DO= Diluted Out
ND= Not Detected at or above MDL
RL= Reporting Limit
MDL= Method Detection Limit

Curtis & Tompkins, Ltd.

Polychlorinated Biphenyls (PCBs)

Lab #:	269650	Location:	Upland Meadow PCB Samp.
Client:	Tetra Tech EMI	Prep:	EPA 3550B
Project#:	103S225322.01	Analysis:	EPA 8082
Field ID:	20150908UM5002	Batch#:	227337
Lab ID:	269650-016	Sampled:	09/08/15
Matrix:	Soil	Received:	09/08/15
Units:	ug/Kg	Prepared:	09/18/15
Basis:	dry	Analyzed:	09/21/15
Diln Fac:	10.00		

Moisture: 8%

Analyte	Result	RL	MDL
Aroclor-1016	ND	92	33
Aroclor-1221	ND	180	88
Aroclor-1232	ND	92	43
Aroclor-1242	ND	92	39
Aroclor-1248	1,200	92	42
Aroclor-1254	1,500	92	34
Aroclor-1260	200	92	21

Surrogate	%REC	Limits
TCMX	DO	46-141
Decachlorobiphenyl	DO	25-135

DO= Diluted Out
ND= Not Detected at or above MDL
RL= Reporting Limit
MDL= Method Detection Limit

Curtis & Tompkins, Ltd.

Polychlorinated Biphenyls (PCBs)

Lab #:	269650	Location:	Upland Meadow PCB Samp.
Client:	Tetra Tech EMI	Prep:	EPA 3550B
Project#:	103S225322.01	Analysis:	EPA 8082
Field ID:	20150908UM5101	Batch#:	227337
Lab ID:	269650-017	Sampled:	09/08/15
Matrix:	Soil	Received:	09/08/15
Units:	ug/Kg	Prepared:	09/18/15
Basis:	dry	Analyzed:	09/21/15
Diln Fac:	10.00		

Moisture: 6%

Analyte	Result	RL	MDL
Aroclor-1016	ND	89	32
Aroclor-1221	ND	180	85
Aroclor-1232	ND	89	42
Aroclor-1242	ND	89	38
Aroclor-1248	1,400	89	41
Aroclor-1254	1,700	89	33
Aroclor-1260	260	89	21

Surrogate	%REC	Limits
TCMX	DO	46-141
Decachlorobiphenyl	DO	25-135

DO= Diluted Out
ND= Not Detected at or above MDL
RL= Reporting Limit
MDL= Method Detection Limit

Curtis & Tompkins, Ltd.

Polychlorinated Biphenyls (PCBs)

Lab #:	269650	Location:	Upland Meadow PCB Samp.
Client:	Tetra Tech EMI	Prep:	EPA 3550B
Project#:	103S225322.01	Analysis:	EPA 8082
Field ID:	20150908UM5102	Batch#:	227337
Lab ID:	269650-018	Sampled:	09/08/15
Matrix:	Soil	Received:	09/08/15
Units:	ug/Kg	Prepared:	09/18/15
Basis:	dry	Analyzed:	09/21/15
Diln Fac:	10.00		

Moisture: 6%

Analyte	Result	RL	MDL
Aroclor-1016	ND	89	32
Aroclor-1221	ND	180	85
Aroclor-1232	ND	89	42
Aroclor-1242	ND	89	38
Aroclor-1248	1,900	89	41
Aroclor-1254	2,200	89	33
Aroclor-1260	310	89	21

Surrogate	%REC	Limits
TCMX	DO	46-141
Decachlorobiphenyl	DO	25-135

DO= Diluted Out
ND= Not Detected at or above MDL
RL= Reporting Limit
MDL= Method Detection Limit

Curtis & Tompkins, Ltd.

Batch QC Report

Polychlorinated Biphenyls (PCBs)

Lab #:	269650	Location:	Upland Meadow PCB Samp.
Client:	Tetra Tech EMI	Prep:	EPA 3550B
Project#:	103S225322.01	Analysis:	EPA 8082
Type:	BLANK	Diln Fac:	1.000
Lab ID:	QC803588	Batch#:	227162
Matrix:	Soil	Prepared:	09/14/15
Units:	ug/Kg	Analyzed:	09/15/15

Analyte	Result	RL	MDL
Aroclor-1016	ND	4.8	1.2
Aroclor-1221	ND	9.7	3.2
Aroclor-1232	ND	4.8	1.6
Aroclor-1242	ND	4.8	1.4
Aroclor-1248	ND	4.8	1.5
Aroclor-1254	ND	4.8	1.2
Aroclor-1260	ND	4.8	0.78

Surrogate	%REC	Limits
TCMX	110	46-141
Decachlorobiphenyl	104	25-135

ND= Not Detected at or above MDL
RL= Reporting Limit
MDL= Method Detection Limit

Curtis & Tompkins, Ltd.

Batch QC Report

Polychlorinated Biphenyls (PCBs)

Lab #:	269650	Location:	Upland Meadow PCB Samp.
Client:	Tetra Tech EMI	Prep:	EPA 3550B
Project#:	103S225322.01	Analysis:	EPA 8082
Type:	LCS	Diln Fac:	1.000
Lab ID:	QC803589	Batch#:	227162
Matrix:	Soil	Prepared:	09/14/15
Units:	ug/Kg	Analyzed:	09/15/15

Analyte	Spiked	Result	%REC	Limits
Aroclor-1016	165.8	182.5	110	64-140
Aroclor-1260	165.8	191.0	115	65-146

Surrogate	%REC	Limits
TCMX	104	46-141
Decachlorobiphenyl	104	25-135

Curtis & Tompkins, Ltd.

Batch QC Report

Polychlorinated Biphenyls (PCBs)

Lab #:	269650	Location:	Upland Meadow PCB Samp.
Client:	Tetra Tech EMI	Prep:	EPA 3550B
Project#:	103S225322.01	Analysis:	EPA 8082
Field ID:	ZZZZZZZZZZ	Batch#:	227162
MSS Lab ID:	269729-008	Sampled:	09/11/15
Matrix:	Soil	Received:	09/11/15
Units:	ug/Kg	Prepared:	09/14/15
Basis:	as received	Analyzed:	09/15/15
Diln Fac:	1.000		

Type: MS Lab ID: QC803590

Analyte	MSS Result	Spiked	Result	%REC	Limits
Aroclor-1016	<1.186	167.5	186.9	112	60-161
Aroclor-1260	1.494	167.5	198.4	118	42-166

Surrogate	%REC	Limits
TCMX	110	46-141
Decachlorobiphenyl	101	25-135

Type: MSD Lab ID: QC803591

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
Aroclor-1016	166.9	152.2	91	60-161	20	43
Aroclor-1260	166.9	184.6	110	42-166	7	51

Surrogate	%REC	Limits
TCMX	103	46-141
Decachlorobiphenyl	95	25-135

RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

Batch QC Report

Polychlorinated Biphenyls (PCBs)

Lab #:	269650	Location:	Upland Meadow PCB Samp.
Client:	Tetra Tech EMI	Prep:	EPA 3550B
Project#:	103S225322.01	Analysis:	EPA 8082
Type:	BLANK	Diln Fac:	1.000
Lab ID:	QC804306	Batch#:	227337
Matrix:	Soil	Prepared:	09/18/15
Units:	ug/Kg	Analyzed:	09/19/15

Analyte	Result	RL	MDL
Aroclor-1016	ND	12	2.9
Aroclor-1221	ND	24	7.9
Aroclor-1232	ND	12	3.8
Aroclor-1242	ND	12	3.5
Aroclor-1248	ND	12	3.8
Aroclor-1254	ND	12	3.0
Aroclor-1260	ND	12	1.9

Surrogate	%REC	Limits
TCMX	122	46-141
Decachlorobiphenyl	98	25-135

ND= Not Detected at or above MDL
RL= Reporting Limit
MDL= Method Detection Limit

Curtis & Tompkins, Ltd.

Batch QC Report

Polychlorinated Biphenyls (PCBs)

Lab #:	269650	Location:	Upland Meadow PCB Samp.
Client:	Tetra Tech EMI	Prep:	EPA 3550B
Project#:	103S225322.01	Analysis:	EPA 8082
Type:	LCS	Diln Fac:	1.000
Lab ID:	QC804307	Batch#:	227337
Matrix:	Soil	Prepared:	09/18/15
Units:	ug/Kg	Analyzed:	09/19/15

Analyte	Spiked	Result	%REC	Limits
Aroclor-1016	169.4	212.6	126	64-140
Aroclor-1260	169.4	212.7	126	65-146

Surrogate	%REC	Limits
TCMX	120	46-141
Decachlorobiphenyl	99	25-135

Curtis & Tompkins, Ltd.

Batch QC Report

Polychlorinated Biphenyls (PCBs)

Lab #:	269650	Location:	Upland Meadow PCB Samp.
Client:	Tetra Tech EMI	Prep:	EPA 3550B
Project#:	103S225322.01	Analysis:	EPA 8082
Field ID:	ZZZZZZZZZZ	Batch#:	227337
MSS Lab ID:	269777-001	Sampled:	09/14/15
Matrix:	Soil	Received:	09/14/15
Units:	ug/Kg	Prepared:	09/18/15
Basis:	dry	Analyzed:	09/19/15
Diln Fac:	1.000		

Type: MS Moisture: 10%
Lab ID: QC804308

Analyte	MSS Result	Spiked	Result	%REC	Limits
Aroclor-1016	<3.299	187.9	254.3	135	60-161
Aroclor-1260	<2.157	187.9	254.2	133	42-166

Surrogate	%REC	Limits
TCMX	118	46-141
Decachlorobiphenyl	79	25-135

Type: MSD Moisture: 10%
Lab ID: QC804309

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
Aroclor-1016	185.4	271.2	146	60-161	8	43
Aroclor-1260	185.4	268.3	145	42-166	7	51

Surrogate	%REC	Limits
TCMX	123	46-141
Decachlorobiphenyl	90	25-135

RPD= Relative Percent Difference

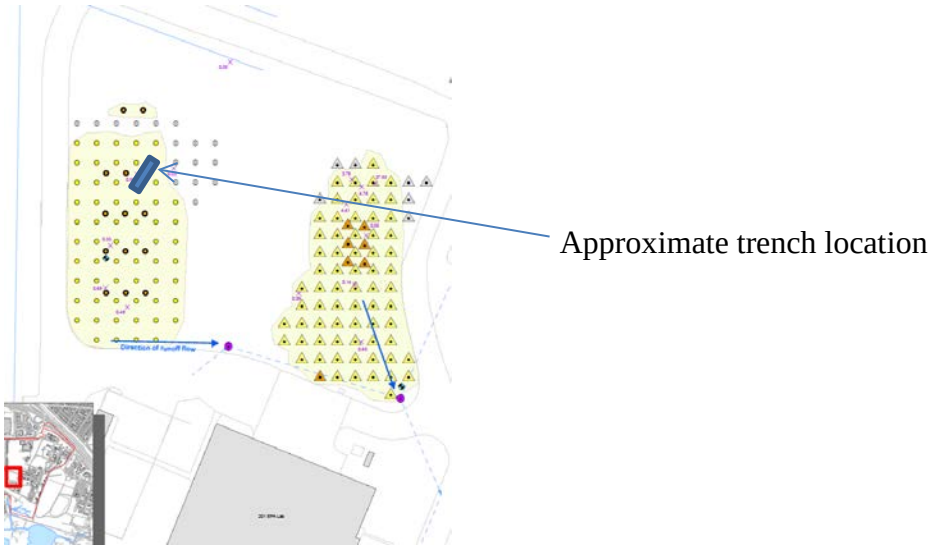
Attachment 2

EPA North Meadow
Soil Piles Sampling

November 2017

Photo Log

EPA Northwest soil pile trench pothole created November 9, 2017 to demonstrate that there is still a clearly visible interface of historic native prairie soils and the imported soil material placed on the prairie in ~ 1992. The highly plastic, silty clays of the native soils are clearly visible relative to the gravelly, silty sands of the imported material above.



Example of distinction between native highly plastic silty clay prairie soils and gravelly fill material with auger tip showing above the hole. Samplers were instructed to avoid collecting native soils in increments if they did appear in the borings.

November 14, 2017 EPA Northeast pile decision unit showing use of auger bit.

EPA Northeast decision unit with drilled sampling holes. November 14, 2017.

Example of an auger bit boring.

Some borings showed debris such as brick chips and broken plastic.

EPA Northeast Decision Unit with triplicate locations

Triplicates centers were marked with a white flag. The Berkeley triplicate template was then used to locate the triplicate locations equidistance from the center and equidistance from neighboring increment locations. Increments were collected from the same colored flags per sample (yellow, green, pink).

The decision unit borders were defined by observations of vegetation transition from ruderal non-native (mostly Harding Grass (*Phalaris aquatica*), Bristly Ox-Tongue (*Picris echioides*), and Milk Thistle (*Silybrum marianum*)] to native coastal prairie bunchgrasses [mostly California oatgrass (*Danthonia californica*) and Purple needlegrass (*Stipa pulchra*)]. Some planned increment locations were moved to fill material based on these field observations.

Placing ISM increment locations using the triplicate template

Final arrangement of colored flags centered on white flag (below)

The template is readily transportable by bicycle.

A 100’ tape measure and ropes facilitated increment placement.

Sampling EPA Northeast Decision Unit November 15, 2017.

EPA NE Storm Drain, 2-Foot Diameter

EPA NW Storm Drain, Approximately 2 x 2 Feet

Attachment 3

Laboratory Reports

ENTHALPY

ANALYTICAL

Enthalpy Analytical

2323 Fifth Street, Berkeley, CA 94710, Phone (510) 486-0900

Laboratory Job Number 294430
ANALYTICAL REPORT
PCBs

Tetra Tech EMI	Project : 103S225331.02
1999 Harrison Street	Location : RFS EPA MEADOW
Oakland, CA 94612	Level : IV

Sample ID	Lab ID
20171115-EPA-NW-01	294430-001
20171115-EPA-NE-01-T1	294430-002
20171115-EPA-NE-01-T2	294430-003
20171115-EPA-NE-01-T3	294430-005
20171115-EPA-NE-01-T3	294430-006
20171115-EPA-NE-01-T3	294430-007

This data package has been reviewed for technical correctness and completeness. Release of this data has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature. The results contained in this report meet all requirements of NELAP and pertain only to those samples which were submitted for analysis. This report may be reproduced only in its entirety.

Signature: _____ Date: 12/04/2017

Patrick McCarthy
Project Manager
patrick.mccarthy@enthalpy.com
(510) 204-2236

CA ELAP# 2896, NELAP# 4044-001

ENTHALPY ANALYTICAL

CASE NARRATIVE
PCBS (EPA 8082)

Laboratory number:	**294430**
Client:	**Tetra Tech EMI**
Project:	**103S225331.02**
Location:	**RFS EPA MEADOW**
Request Date:	**11/15/17**
Samples Received:	**11/15/17**

This data package contains sample and QC results for six soil samples, requested for the above referenced project on 11/15/17. See attached cooler receipt form for any sample receipt problems or discrepancies.

PCBs (EPA 8082):

All samples underwent sulfuric acid cleanup using EPA Method 3665A.

All samples underwent sulfur cleanup using the copper option in EPA Method 3660B.

Matrix spikes were not performed for this analysis in batch 254192 due to insufficient sample amount.

No other analytical problems were encountered.

Chain of Custody

CHAIN OF CUSTODY

ENTHALPY ANALYTICAL
Formerly Curtis & Tompkins Labs
2323 Fifth Street
Berkeley, CA 94710
Phone (510) 486-0900
Fax (510) 486-0532

Chain of Custody # _____

C&T LOGIN # 294430

Project No: 103S225331.02 Sampler: J BRODERSON

Project Name: RFS EPA MEADOW Report To: JBRODERSEN

Project P. O. No: Company: TETRA TECH

EDD Format: Report Level ☐ II ☐ III ☐ IV Telephone: 415 497 9060

Turnaround Time: ☐ RUSH _____ ☒ Standard Email:

Lab No.	Sample ID.	SAMPLING		MATRIX				# of Containers	CHEMICAL PRESERVATIVE					ANALYTICAL REQUEST			
		Date Collected	Time Collected	Water	Solid				HCl	H2SO4	HNO3	NaOH	None	15M PREP / 7S SUBSTANCES	3540C SOXHLET EXTRACTION	PCB 8082	
	2017 1114-EPA-NW-01	11/14/17	1400		✓			1					✓	X	X	X	
	2017 1115-EPA-NE-01-T1	11/15/17	0800		✓			1					✓	X	X	X	
	2017 1115-EPA-NE-01-T2	11/15/17	0900		✓			1					✓	X	X	X	
(1)	2017 1115-EPA-NE-01-T3A	11/15/17	1000		✓			1					✓	X	X	X	
	2017 1115-EPA-NE-01-T3B	11/15/17	1000		✓								✓		X	X	
	2017 1115-EPA-NE-01-T3C	11/15/17	1000		✓								✓		X	X	

Notes:

(1) SUBSAMPLE T3 THREE TIMES FOR 3 ANALYSES

(2) PLEASE WEIGH SOIL SAMPLES BEFORE ISM PREP.

SAMPLE RECEIPT
☐ Intact
☐ Cold
☐ On Ice
☐ Ambient

RELINQUISHED BY:
DATE: 11/15/17 TIME: 1117
DATE: TIME:
DATE: TIME:

RECEIVED BY:
Pat Hanafin 11/15/17
DATE: TIME: 11:17
DATE: TIME:
DATE: TIME:

COOLER RECEIPT CHECKLIST

ENTHALPY
Berkeley

Login # 294430 Date Received 11/15/17 Number of coolers —
Client Tetra Tech Project RFS EPA Meadow

Date Opened 11/15/17 By (print) EM (sign)
Date Logged in " By (print) " (sign) "
Date Labelled " By (print) " (sign) "

1. Did cooler come with a shipping slip (airbill, etc) YES NO
   Shipping info
2A. Were custody seals present? .... ☐ YES (circle) on cooler on samples ☒ NO
   How many Name Date
2B. Were custody seals intact upon arrival? YES NO N/A
3. Were custody papers dry and intact when received? YES NO
4. Were custody papers filled out properly (ink, signed, etc)? YES NO
5. Is the project identifiable from custody papers? (If so fill out top of form) YES NO
6. Indicate the packing in cooler: (if other, describe)

☐ Bubble Wrap ☐ Foam blocks ☐ Bags ☐ None
☐ Cloth material ☒ Cardboard ☐ Styrofoam ☐ Paper towels

7. Temperature documentation: * Notify PM if temperature exceeds 6°C

Type of ice used: ☐ Wet ☐ Blue/Gel ☒ None Temp(°C)

☐ Temperature blank(s) included? ☐ Thermometer# ☐ IR Gun#

☐ Samples received on ice directly from the field. Cooling process had begun

8. Were Method 5035 sampling containers present? YES NO
   If YES, what time were they transferred to freezer?
9. Did all bottles arrive unbroken/unopened? YES NO
10. Are there any missing / extra samples? YES NO
11. Are samples in the appropriate containers for indicated tests? YES NO
12. Are sample labels present, in good condition and complete? YES NO
13. Do the sample labels agree with custody papers? YES NO
14. Was sufficient amount of sample sent for tests requested? YES NO
15. Are the samples appropriately preserved? YES NO N/A
16. Did you check preservatives for all bottles for each sample? YES NO N/A
17. Did you document your preservative check? (pH strip lot#) YES NO N/A
18. Did you change the hold time in LIMS for unpreserved VOAs? YES NO N/A
19. Did you change the hold time in LIMS for preserved terracores? YES NO N/A
20. Are bubbles > 6mm absent in VOA samples? YES NO N/A
21. Was the client contacted concerning this sample delivery? YES NO
   If YES, Who was called? By Date:

COMMENTS

Rev 14, 8/01/17

Results & QC Summary

ENTHALPY ANALYTICAL

Polychlorinated Biphenyls (PCBs)

Lab #:	294430	Location:	RFS EPA MEADOW
Client:	Tetra Tech EMI	Prep:	EPA 3540C
Project#:	103S225331.02	Analysis:	EPA 8082
Field ID:	20171115-EPA-NW-01	Batch#:	254192
Lab ID:	294430-001	Sampled:	11/14/17
Matrix:	Soil	Received:	11/15/17
Units:	ug/Kg	Prepared:	11/28/17
Basis:	air dried	Analyzed:	12/01/17
Diln Fac:	1.000		

Analyte	Result	RL	MDL
Aroclor-1016	ND	93	33
Aroclor-1221	ND	190	88
Aroclor-1232	ND	93	43
Aroclor-1242	ND	93	40
Aroclor-1248	ND	93	42
Aroclor-1254	1,600	93	34
Aroclor-1260	400	93	21

Surrogate	%REC	Limits
Decachlorobiphenyl	112	26-153

ND= Not Detected at or above MDL
RL= Reporting Limit
MDL= Method Detection Limit

ENTHALPY ANALYTICAL

Polychlorinated Biphenyls (PCBs)

Lab #:	294430	Location:	RFS EPA MEADOW
Client:	Tetra Tech EMI	Prep:	EPA 3540C
Project#:	103S225331.02	Analysis:	EPA 8082
Field ID:	20171115-EPA-NE-01-T1	Batch#:	254182
Lab ID:	294430-002	Sampled:	11/15/17
Matrix:	Soil	Received:	11/15/17
Units:	ug/Kg	Prepared:	11/29/17
Basis:	air dried	Analyzed:	12/01/17
Diln Fac:	1.000		

Analyte	Result	RL	MDL
Aroclor-1016	ND	100	37
Aroclor-1221	ND	210	99
Aroclor-1232	ND	100	48
Aroclor-1242	ND	100	44
Aroclor-1248	ND	100	47
Aroclor-1254	4,400	100	38
Aroclor-1260	650	100	24

Surrogate	%REC	Limits
Decachlorobiphenyl	90	26-153

ND= Not Detected at or above MDL
RL= Reporting Limit
MDL= Method Detection Limit

ENTHALPY ANALYTICAL

Polychlorinated Biphenyls (PCBs)

Lab #:	294430	Location:	RFS EPA MEADOW
Client:	Tetra Tech EMI	Prep:	EPA 3540C
Project#:	103S225331.02	Analysis:	EPA 8082
Field ID:	20171115-EPA-NE-01-T2	Batch#:	254182
Lab ID:	294430-003	Sampled:	11/15/17
Matrix:	Soil	Received:	11/15/17
Units:	ug/Kg	Prepared:	11/29/17
Basis:	air dried	Analyzed:	12/01/17
Diln Fac:	1.000		

Analyte	Result	RL	MDL
Aroclor-1016	ND	100	37
Aroclor-1221	ND	210	99
Aroclor-1232	ND	100	48
Aroclor-1242	ND	100	44
Aroclor-1248	ND	100	47
Aroclor-1254	1,700	100	38
Aroclor-1260	290	100	24

Surrogate	%REC	Limits
Decachlorobiphenyl	125	26-153

ND= Not Detected at or above MDL
RL= Reporting Limit
MDL= Method Detection Limit

ENTHALPY ANALYTICAL

Polychlorinated Biphenyls (PCBs)

Lab #:	294430	Location:	RFS EPA MEADOW
Client:	Tetra Tech EMI	Prep:	EPA 3540C
Project#:	103S225331.02	Analysis:	EPA 8082
Field ID:	20171115-EPA-NE-01-T3	Batch#:	254182
Lab ID:	294430-005	Sampled:	11/15/17
Matrix:	Soil	Received:	11/15/17
Units:	ug/Kg	Prepared:	11/29/17
Basis:	air dried	Analyzed:	12/02/17
Diln Fac:	1.000		

Analyte	Result	RL	MDL
Aroclor-1016	ND	110	38
Aroclor-1221	ND	210	100
Aroclor-1232	ND	110	50
Aroclor-1242	ND	110	46
Aroclor-1248	ND	110	49
Aroclor-1254	2,500	110	39
Aroclor-1260	460	110	25

Surrogate	%REC	Limits
Decachlorobiphenyl	122	26-153

ND= Not Detected at or above MDL
RL= Reporting Limit
MDL= Method Detection Limit

ENTHALPY ANALYTICAL

Polychlorinated Biphenyls (PCBs)

Lab #:	294430	Location:	RFS EPA MEADOW
Client:	Tetra Tech EMI	Prep:	EPA 3540C
Project#:	103S225331.02	Analysis:	EPA 8082
Field ID:	20171115-EPA-NE-01-T3	Batch#:	254182
Lab ID:	294430-006	Sampled:	11/15/17
Matrix:	Soil	Received:	11/15/17
Units:	ug/Kg	Prepared:	11/29/17
Basis:	air dried	Analyzed:	12/02/17
Diln Fac:	1.000		

Analyte	Result	RL	MDL
Aroclor-1016	ND	110	39
Aroclor-1221	ND	220	110
Aroclor-1232	ND	110	51
Aroclor-1242	ND	110	47
Aroclor-1248	ND	110	50
Aroclor-1254	1,600	110	40
Aroclor-1260	230	110	26

Surrogate	%REC	Limits
Decachlorobiphenyl	111	26-153

ND= Not Detected at or above MDL
RL= Reporting Limit
MDL= Method Detection Limit

ENTHALPY ANALYTICAL

Polychlorinated Biphenyls (PCBs)

Lab #:	294430	Location:	RFS EPA MEADOW
Client:	Tetra Tech EMI	Prep:	EPA 3540C
Project#:	103S225331.02	Analysis:	EPA 8082
Field ID:	20171115-EPA-NE-01-T3	Batch#:	254182
Lab ID:	294430-007	Sampled:	11/15/17
Matrix:	Soil	Received:	11/15/17
Units:	ug/Kg	Prepared:	11/29/17
Basis:	air dried	Analyzed:	12/02/17
Diln Fac:	1.000		

Analyte	Result	RL	MDL
Aroclor-1016	ND	100	37
Aroclor-1221	ND	210	100
Aroclor-1232	ND	100	49
Aroclor-1242	ND	100	45
Aroclor-1248	ND	100	48
Aroclor-1254	2,200	100	38
Aroclor-1260	340	100	24

Surrogate	%REC	Limits
Decachlorobiphenyl	115	26-153

ND= Not Detected at or above MDL
RL= Reporting Limit
MDL= Method Detection Limit

ENTHALPY ANALYTICAL

Batch QC Report

Polychlorinated Biphenyls (PCBs)

Lab #:	294430	Location:	RFS EPA MEADOW
Client:	Tetra Tech EMI	Prep:	EPA 3540C
Project#:	103S225331.02	Analysis:	EPA 8082
Type:	BLANK	Diln Fac:	1.000
Lab ID:	QC910787	Batch#:	254182
Matrix:	Soil	Prepared:	11/29/17
Units:	ug/Kg	Analyzed:	11/30/17
Basis:	air dried		

Analyte	Result	RL	MDL
Aroclor-1016	ND	100	35
Aroclor-1221	ND	200	96
Aroclor-1232	ND	100	47
Aroclor-1242	ND	100	43
Aroclor-1248	ND	100	46
Aroclor-1254	ND	100	37
Aroclor-1260	ND	100	23

Surrogate	%REC	Limits
Decachlorobiphenyl	111	26-153

ND= Not Detected at or above MDL
RL= Reporting Limit
MDL= Method Detection Limit

ENTHALPY ANALYTICAL

Batch QC Report

Polychlorinated Biphenyls (PCBs)

Lab #:	294430	Location:	RFS EPA MEADOW
Client:	Tetra Tech EMI	Prep:	EPA 3540C
Project#:	103S225331.02	Analysis:	EPA 8082
Matrix:	Soil	Batch#:	254182
Units:	ug/Kg	Prepared:	11/29/17
Basis:	air dried	Analyzed:	11/30/17
Diln Fac:	1.000		

Type: BS Lab ID: QC910788

Analyte	Spiked	Result	%REC	Limits
Aroclor-1016	2,500	2,922	117	56-152
Aroclor-1260	2,500	3,496	140	52-165

Surrogate	%REC	Limits
Decachlorobiphenyl	123	26-153

Type: BSD Lab ID: QC910789

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
Aroclor-1016	2,500	2,961	118	56-152	1	48
Aroclor-1260	2,500	2,933	117	52-165	17	39

Surrogate	%REC	Limits
Decachlorobiphenyl	123	26-153

RPD= Relative Percent Difference

ENTHALPY ANALYTICAL

Batch QC Report

Polychlorinated Biphenyls (PCBs)

Lab #:	294430	Location:	RFS EPA MEADOW
Client:	Tetra Tech EMI	Prep:	EPA 3540C
Project#:	103S225331.02	Analysis:	EPA 8082
Type:	BLANK	Diln Fac:	1.000
Lab ID:	QC910827	Batch#:	254192
Matrix:	Soil	Prepared:	11/28/17
Units:	ug/Kg	Analyzed:	11/30/17
Basis:	air dried		

Analyte	Result	RL	MDL
Aroclor-1016	ND	100	35
Aroclor-1221	ND	200	96
Aroclor-1232	ND	100	47
Aroclor-1242	ND	100	43
Aroclor-1248	ND	100	46
Aroclor-1254	ND	100	37
Aroclor-1260	ND	100	23

Surrogate	%REC	Limits
Decachlorobiphenyl	137	26-153

ND= Not Detected at or above MDL
RL= Reporting Limit
MDL= Method Detection Limit

ENTHALPY ANALYTICAL

Batch QC Report

Polychlorinated Biphenyls (PCBs)

Lab #:	294430	Location:	RFS EPA MEADOW
Client:	Tetra Tech EMI	Prep:	EPA 3540C
Project#:	103S225331.02	Analysis:	EPA 8082
Matrix:	Soil	Batch#:	254192
Units:	ug/Kg	Prepared:	11/28/17
Basis:	air dried	Analyzed:	11/30/17
Diln Fac:	1.000		

Type: BS Lab ID: QC910828

Analyte	Spiked	Result	%REC	Limits
Aroclor-1016	2,500	2,772	111	56-152
Aroclor-1260	2,500	2,818	113	52-165

Surrogate	%REC	Limits
Decachlorobiphenyl	119	26-153

Type: BSD Lab ID: QC910829

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
Aroclor-1016	2,500	3,189	128	56-152	14	48
Aroclor-1260	2,500	3,275	131	52-165	15	39

Surrogate	%REC	Limits
Decachlorobiphenyl	132	26-153

RPD= Relative Percent Difference

ENTHALPY

ANALYTICAL

Enthalpy Analytical

2323 Fifth Street, Berkeley, CA 94710, Phone (510) 486-0900

Laboratory Job Number 295582
ANALYTICAL REPORT
PCBs

Tetra Tech EMI	Project : 103S225331.02
1999 Harrison Street	Location : EPA MEADOW NORTH
Oakland, CA 94612	Level : IV

Sample ID	Lab ID
RFS-EPAN-W-SI	295582-001
RFS-EPAN-E-SI	295582-002

This data package has been reviewed for technical correctness and completeness. Release of this data has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature. The results contained in this report meet all requirements of NELAP and pertain only to those samples which were submitted for analysis. This report may be reproduced only in its entirety.

Signature: _____ Date: 01/05/2018

Mike Dahlquist
Project Manager
mike.dahlquist@enthalpy.com
(510) 204-2225 Ext 13101

CA ELAP# 2896, NELAP# 4044-001

ENTHALPY ANALYTICAL

CASE NARRATIVE
PCBS (EPA 8082)

Laboratory number:	**295582**
Client:	**Tetra Tech EMI**
Project:	**103S225331.02**
Location:	**EPA MEADOW NORTH**
Request Date:	**12/19/17**
Samples Received:	**12/19/17**

This data package contains sample and QC results for two soil samples, requested for the above referenced project on 12/19/17. See attached cooler receipt form for any sample receipt problems or discrepancies.

PCBs (EPA 8082):

All samples underwent sulfuric acid cleanup using EPA Method 3665A.

All samples underwent sulfur cleanup using the copper option in EPA Method 3660B.

Matrix spikes were not performed for this analysis in batch 255189 due to insufficient sample amount.

295582-001 and 295582-002 were prepared outside of hold time; affected data was qualified with "b".

RFS-EPAN-W-SI (lab # 295582-001) and RFS-EPAN-E-SI (lab # 295582-002) were diluted due to the color of the sample extracts.

No other analytical problems were encountered.

Chain of Custody

CHAIN OF CUSTODY

Curtis & Tompkins Laboratories
ENVIRONMENTAL ANALYTICAL TESTING LABORATORY
In Business Since 1878

2323 Fifth Street
Berkeley, CA 94710

Phone (510) 486-0900
Fax (510) 486-0532

Chain of Custody # _____

C&T LOGIN # 295582

Project No: 103S2253.31.02
Project Name: EPA MEADOW NORTH
Project P. O. No:
EDD Format: Report Level ☐ II ☐ III ☐ IV
Turnaround Time: ☐ RUSH _____ ☒ Standard

Sampler: J B RODGERSON
Report To: JASON.BRODERSON@TETRATECH.COM
Company: TETRA TECH
Telephone: 415 497 9060
Email:

Lab No.	Sample ID.	SAMPLING		MATRIX				# of Containers	CHEMICAL PRESERVATIVE					ANALYTICAL REQUEST																		
		Date Collected	Time Collected	Water	Solid				HCl	H2SO4	HNO3	NaOH	None	ISM PAEP 75 SUBSAMPLES		SOXHLET EXTRACTION 3540C		PCBS 8082		STD 10 DAY TAT												
	RFS-EPAN-W-SI	12/14/17	1330		X			1					X	X		X		X														
	RFS-EPAN-E-SI	12/14/17	1300		X			1					X	X		X		X														

Notes:

SAMPLE RECEIPT
☐ Intact
☐ Cold
☐ On Ice
☐ Ambient

RELINQUISHED BY:
DATE: 12/19 TIME: 1650
DATE: TIME:
DATE: TIME:

RECEIVED BY:
DATE: 12/19 TIME: 1650
DATE: TIME:
DATE: TIME:

COOLER RECEIPT CHECKLIST

ENTHALPY
Berkeley

Login # 295582 Date Received 12/19/17 Number of coolers —
Client Tetra Tech Project EPA Meadow North

Date Opened 12/19/17 By (print) Emi (sign)
Date Logged in By (print) (sign)
Date Labelled By (print) (sign)

1. Did cooler come with a shipping slip (airbill, etc) YES (NO)
   Shipping info
2A. Were custody seals present? .... ☐ YES (circle) on cooler on samples ☒ NO
   How many Name Date
2B. Were custody seals intact upon arrival? YES NO (N/A)
3. Were custody papers dry and intact when received? (YES) NO
4. Were custody papers filled out properly (ink, signed, etc)? (YES) NO
5. Is the project identifiable from custody papers? (If so fill out top of form) (YES) NO
6. Indicate the packing in cooler: (if other, describe)

☐ Bubble Wrap ☐ Foam blocks ☐ Bags ☒ None
☐ Cloth material ☐ Cardboard ☐ Styrofoam ☐ Paper towels

7. Temperature documentation: * Notify PM if temperature exceeds 6°C

Type of ice used: ☐ Wet ☐ Blue/Gel ☒ None Temp(°C)

☐ Temperature blank(s) included? ☐ Thermometer# ☐ IR Gun#

☐ Samples received on ice directly from the field. Cooling process had begun

8. Were Method 5035 sampling containers present? YES (NO)
   If YES, what time were they transferred to freezer?
9. Did all bottles arrive unbroken/unopened? (YES) NO
10. Are there any missing / extra samples? YES (NO)
11. Are samples in the appropriate containers for indicated tests? (YES) NO
12. Are sample labels present, in good condition and complete? (YES) NO
13. Do the sample labels agree with custody papers? (YES) NO
14. Was sufficient amount of sample sent for tests requested? (YES) NO
15. Are the samples appropriately preserved? YES NO (N/A)
16. Did you check preservatives for all bottles for each sample? YES NO (N/A)
17. Did you document your preservative check? (pH strip lot#) YES NO (N/A)
18. Did you change the hold time in LIMS for unpreserved VOAs? YES NO (N/A)
19. Did you change the hold time in LIMS for preserved terracores? YES NO (N/A)
20. Are bubbles > 6mm absent in VOA samples? YES NO (N/A)
21. Was the client contacted concerning this sample delivery? YES (NO)
   If YES, Who was called? By Date:

COMMENTS

Rev 14, 8/01/17

Results & QC Summary

ENTHALPY ANALYTICAL

Polychlorinated Biphenyls (PCBs)

Lab #:	295582	Location:	EPA MEADOW NORTH
Client:	Tetra Tech EMI	Prep:	EPA 3540C
Project#:	103S225331.02	Analysis:	EPA 8082
Field ID:	RFS-EPAN-W-SI	Batch#:	255189
Lab ID:	295582-001	Sampled:	12/14/17
Matrix:	Soil	Received:	12/19/17
Units:	ug/Kg	Prepared:	01/02/18
Basis:	air dried	Analyzed:	01/04/18
Diln Fac:	5.000		

Analyte	Result	RL	MDL
Aroclor-1016	ND b	17	5.9
Aroclor-1221	ND b	32	16
Aroclor-1232	ND b	17	7.8
Aroclor-1242	ND b	17	7.2
Aroclor-1248	ND b	17	7.6
Aroclor-1254	81 b	17	6.1
Aroclor-1260	30 b	17	3.9

Surrogate	%REC	Limits
Decachlorobiphenyl	106 b	26-153

b= See narrative
ND= Not Detected at or above MDL
RL= Reporting Limit
MDL= Method Detection Limit

ENTHALPY ANALYTICAL

Polychlorinated Biphenyls (PCBs)

Lab #:	295582	Location:	EPA MEADOW NORTH
Client:	Tetra Tech EMI	Prep:	EPA 3540C
Project#:	103S225331.02	Analysis:	EPA 8082
Field ID:	RFS-EPAN-E-SI	Batch#:	255189
Lab ID:	295582-002	Sampled:	12/14/17
Matrix:	Soil	Received:	12/19/17
Units:	ug/Kg	Prepared:	01/02/18
Basis:	air dried	Analyzed:	01/04/18
Diln Fac:	5.000		

Analyte	Result	RL	MDL
Aroclor-1016	ND b	17	5.9
Aroclor-1221	ND b	32	16
Aroclor-1232	ND b	17	7.8
Aroclor-1242	ND b	17	7.2
Aroclor-1248	ND b	17	7.6
Aroclor-1254	720 b	17	6.1
Aroclor-1260	72 b	17	3.9

Surrogate	%REC	Limits
Decachlorobiphenyl	103 b	26-153

b= See narrative
ND= Not Detected at or above MDL
RL= Reporting Limit
MDL= Method Detection Limit

ENTHALPY ANALYTICAL

Batch QC Report

Polychlorinated Biphenyls (PCBs)

Lab #:	295582	Location:	EPA MEADOW NORTH
Client:	Tetra Tech EMI	Prep:	EPA 3540C
Project#:	103S225331.02	Analysis:	EPA 8082
Type:	BLANK	Diln Fac:	1.000
Lab ID:	QC914875	Batch#:	255189
Matrix:	Soil	Prepared:	01/02/18
Units:	ug/Kg	Analyzed:	01/03/18
Basis:	air dried		

Analyte	Result	RL	MDL
Aroclor-1016	ND	100	35
Aroclor-1221	ND	200	96
Aroclor-1232	ND	100	47
Aroclor-1242	ND	100	43
Aroclor-1248	ND	100	46
Aroclor-1254	ND	100	37
Aroclor-1260	ND	100	23

Surrogate	%REC	Limits
Decachlorobiphenyl	127	26-153

ND= Not Detected at or above MDL
RL= Reporting Limit
MDL= Method Detection Limit

ENTHALPY ANALYTICAL

Batch QC Report

Polychlorinated Biphenyls (PCBs)

Lab #:	295582	Location:	EPA MEADOW NORTH
Client:	Tetra Tech EMI	Prep:	EPA 3540C
Project#:	103S225331.02	Analysis:	EPA 8082
Matrix:	Soil	Batch#:	255189
Units:	ug/Kg	Prepared:	01/02/18
Basis:	air dried	Analyzed:	01/03/18
Diln Fac:	1.000		

Type: BS Lab ID: QC914876

Analyte	Spiked	Result	%REC	Limits
Aroclor-1016	5,000	4,815	96	56-152
Aroclor-1260	5,000	5,941	119	52-165

Surrogate	%REC	Limits
Decachlorobiphenyl	126	26-153

Type: BSD Lab ID: QC914877

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
Aroclor-1016	5,000	4,630	93	56-152	4	48
Aroclor-1260	5,000	5,747	115	52-165	3	39

Surrogate	%REC	Limits
Decachlorobiphenyl	123	26-153

RPD= Relative Percent Difference

ENTHALPY

ANALYTICAL

Enthalpy Analytical

2323 Fifth Street, Berkeley, CA 94710, Phone (510) 486-0900

Laboratory Job Number 295602
ANALYTICAL REPORT
Semivolatile Organics by GC/MS SIM

Tetra Tech EMI	Project : 103S225331.02
1999 Harrison Street	Location : RFS EPA MEADOW
Oakland, CA 94612	Level : IV

Sample ID	Lab ID
20171115-EPA-NE-01-T1	295602-001

This data package has been reviewed for technical correctness and completeness. Release of this data has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature. The results contained in this report meet all requirements of NELAP and pertain only to those samples which were submitted for analysis. This report may be reproduced only in its entirety.

Signature: _____ Date: 01/15/2018

Mike Dahlquist
Project Manager
mike.dahlquist@enthalpy.com
(510) 204-2225 Ext 13101

CA ELAP# 2896, NELAP# 4044-001

ENTHALPY ANALYTICAL

CASE NARRATIVE
SEMIVOLATILE ORGANICS BY GC/MS SIM (EPA 8270C-SIM)

Laboratory number:	**295602**
Client:	**Tetra Tech EMI**
Project:	**103S225331.02**
Location:	**RFS EPA MEADOW**
Request Date:	**12/20/17**
Samples Received:	**11/15/17**

This data package contains sample and QC results for one soil sample, requested for the above referenced project on 12/20/17. See attached cooler receipt form for any sample receipt problems or discrepancies.

Semivolatile Organics by GC/MS SIM (EPA 8270C-SIM):

Matrix spikes QC913799,QC913800 (batch 254922) were not analyzed because the parent sample required a dilution that would have diluted out the spikes.

295602-001 was prepared outside of hold time; affected data was qualified with "b".

20171115-EPA-NE-01-T1 (lab # 295602-001) was diluted due to the dark and viscous nature of the sample extract.

No other analytical problems were encountered.

Chain of Custody

MONTROSE
AIR QUALITY SERVICES

Mike Dahlquist <mdahlquist@montrose-env.com>

RE: 103S225331.02 - Enthalpy (Berkeley) Data (294430)

Brodersen, Jason <Jason.Brodersen@tetratech.com> Wed, Dec 20, 2017 at 11:55 AM
To: Mike Dahlquist <mike.dahlquist@enthalpy.com>
Cc: "Karl Hans (khans@berkeley.edu)" <khans@berkeley.edu>

Hi Mike – can you please see if you have Sample ID 294430-002 (20171115-EPA-NE-01-T1) archived, and if so run:

CAM 17 6010/7472

PAH 8270 SIM

Thanks.

Jason Brodersen, PG, QSD | Program Manager
Cell: 415.497.9060 | Main Office: 510.302.6300

Tetra Tech, Inc.
1999 Harrison St., Suite 500 | Oakland, CA 94612 | www.tetratech.com

From: Patrick McCarthy [mailto:patrick.mccarthy@enthalpy.com]
Sent: Monday, December 04, 2017 5:52 PM
To: Brodersen, Jason <Jason.Brodersen@tetratech.com>
Subject: 103S225331.02 - Enthalpy (Berkeley) Data (294430)

Hi Jason,

Data qualifiers and additional information necessary for the interpretation of the test results are contained in the PDF file and may not be included in the EDD.

Please find attached the following files:
- PDF Level IV Deliverable
- TTEMI format with qc and MDL EDD (294430_ttemi_withqc_mdl.zip)

Results & QC Summary

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Semivolatile Organics by GC/MS SIM

Lab #:	295602	Location:	RFS EPA MEADOW
Client:	Tetra Tech EMI	Prep:	EPA 3550C
Project#:	103S225331.02	Analysis:	EPA 8270C-SIM
Field ID:	20171115-EPA-NE-01-T1	Batch#:	254922
Lab ID:	295602-001	Sampled:	11/15/17
Matrix:	Soil	Received:	11/15/17
Units:	ug/Kg	Prepared:	12/21/17
Basis:	air dried	Analyzed:	12/21/17
Diln Fac:	20.00		

Analyte	Result	RL	MDL
Naphthalene	ND b	99	22
Acenaphthylene	ND b	99	19
Acenaphthene	ND b	99	19
Fluorene	ND b	99	20
Phenanthrene	ND b	99	17
Anthracene	ND b	99	18
Fluoranthene	43 J b	99	23
Pyrene	36 J b	99	24
Benzo(a)anthracene	ND b	99	25
Chrysene	29 J b	99	13
Benzo(b)fluoranthene	50 J b	99	18
Benzo(k)fluoranthene	ND b	99	21
Benzo(a)pyrene	57 J b	99	19
Indeno(1,2,3-cd)pyrene	33 J b	99	18
Dibenz(a,h)anthracene	ND b	99	16
Benzo(g,h,i)perylene	42 J b	99	20

Surrogate	%REC	Limits
Nitrobenzene-d5	DO b	46-126
2-Fluorobiphenyl	DO b	50-120
Terphenyl-d14	DO b	53-123

J= Estimated value
b= See narrative
DO= Diluted Out
ND= Not Detected at or above MDL
RL= Reporting Limit
MDL= Method Detection Limit

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Batch QC Report

Semivolatile Organics by GC/MS SIM

Lab #:	295602	Location:	RFS EPA MEADOW
Client:	Tetra Tech EMI	Prep:	EPA 3550C
Project#:	103S225331.02	Analysis:	EPA 8270C-SIM
Type:	BLANK	Diln Fac:	1.000
Lab ID:	QC913797	Batch#:	254922
Matrix:	Soil	Prepared:	12/20/17
Units:	ug/Kg	Analyzed:	12/20/17
Basis:	air dried		

Analyte	Result	RL	MDL
Naphthalene	ND	5.0	1.1
Acenaphthylene	ND	5.0	0.98
Acenaphthene	ND	5.0	0.98
Fluorene	ND	5.0	1.0
Phenanthrene	ND	5.0	0.87
Anthracene	ND	5.0	0.89
Fluoranthene	ND	5.0	1.2
Pyrene	ND	5.0	1.2
Benzo(a)anthracene	ND	5.0	1.3
Chrysene	ND	5.0	0.65
Benzo(b)fluoranthene	ND	5.0	0.92
Benzo(k)fluoranthene	ND	5.0	1.1
Benzo(a)pyrene	ND	5.0	0.95
Indeno(1,2,3-cd)pyrene	ND	5.0	0.93
Dibenz(a,h)anthracene	ND	5.0	0.80
Benzo(g,h,i)perylene	ND	5.0	1.0

Surrogate	%REC	Limits
Nitrobenzene-d5	80	46-126
2-Fluorobiphenyl	76	50-120
Terphenyl-d14	104	53-123

ND= Not Detected at or above MDL
RL= Reporting Limit
MDL= Method Detection Limit

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Batch QC Report

Semivolatile Organics by GC/MS SIM

Lab #:	295602	Location:	RFS EPA MEADOW
Client:	Tetra Tech EMI	Prep:	EPA 3550C
Project#:	103S225331.02	Analysis:	EPA 8270C-SIM
Type:	LCS	Diln Fac:	1.000
Lab ID:	QC913798	Batch#:	254922
Matrix:	Soil	Prepared:	12/20/17
Units:	ug/Kg	Analyzed:	12/20/17
Basis:	air dried		

Analyte	Spiked	Result	%REC	Limits
Acenaphthene	33.66	24.85	74	62-120
Pyrene	33.66	26.93	80	56-130

Surrogate	%REC	Limits
Nitrobenzene-d5	78	46-126
2-Fluorobiphenyl	74	50-120
Terphenyl-d14	93	53-123

Attachment 4

Enthalpy Multi-Incremental Sub-Sampling Procedures

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MULTI-INCREMENTAL SUB-SAMPLING (MIS)

Approved by:	Signature:	Date:
John Goyette Laboratory Director		9-12-17.
Ben Phillips Operations Manager		9/12/17
Teresa Morrison QA Director		9/12/17
Reapproved:		

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Multi-Incremental Sub-Sampling (MIS)

SOP Table of Contents

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MULTI-INCREMENTAL (MIS) SUB-SAMPLING PROCEDURE

1.0 SCOPE

This procedure describes steps required for obtaining a representative subsample from materials submitted to the lab for analysis using principles developed in the mining and resource recovery industries. The objective for the procedure is to provide a more representative subsample than typical discrete subsampling practices. In summary, the entire submitted sample is air dried, sample particle sizes are reduced by grinding or milling and incremental sample reduction practices are applied to obtain a representative analytical sample from the larger submitted sample mass.

This procedure may also be called "ISM" (Incremental Sampling Methodology).

2.0 REFERENCES

Technical Guidance Manual for the Implementation of the Hawai'I State Contingency Plan, Interim-Final, Nov.12, 2008 (http://www.hawaiidoh.org/tgm.aspx)

Guidance for Obtaining Representative Laboratory Analytical Subsamples from Particulate Laboratory Samples, EPA/600/R-03/027, November 2003

ASTM. 2003. Standard Guide for Laboratory Subsampling of Media Related to Waste Management Activities. West Conshohocken, PA. D6323-98.

Improving Laboratory Performance Through Scientific Subsampling Techniques, C. Ramsey and J. Suggs, Environmental Testing & Analysis, March/April 2001

TNI Standard, Volume 1, EL-V1-2009, September 2009
DoD/DoE Consolidated Quality Systems Manual (QSM), DoD v5.1/ DoE v3.1, Jan 2017

Related Guidance Documents:
C&T SOP QA 1.4, Balance Calibration Check & Maintenance
C&T SOP QA 1.5, Calibrating & Maintaining Temperature Controls
C&T SOP QA 1.6, Pipette Calibration Check Procedures
C&T SOP CS 2.3, Subsampling & Compositing

3.0 SAMPLE PRESERVATION & HOLDING TIMES

Preservation: If samples are to be analyzed *only* for ICP or ICP-MS Metals, the samples may be stored at ambient temperature, otherwise they should be received and stored at >0.0 to 6.0°C

Holding Times: No holding time is specific to this procedure however it should be *completed* on a schedule that allows the holding times for subsequent sample preparation and analysis to be met

4.0 SAFETY

4.1 Soil samples containing as much as 2% of 2,4,6-TNT have been safely ground and composited, if the samples have been submitted from a firing range or are thought to

contain unexploded residues care should be exercises during sample preparation, particularly grinding. Samples containing higher concentrations of unexploded ordinance compounds should not be ground in the mortar and pestle or in the ring and puck mill. Lumps of material that have a chemical appearance should be suspect and not ground. Explosives are generally a very finely grayish-white material.

4.2 Assume all samples received contain hazardous chemicals. Wear gloves, lab coats and safety glasses at all times when handling samples and use of ventilation assets ((open doors, turn on fans and blowers and use fume hood hoods as needed to protect yourself from exposure to sample constituents.

5.0 QC REQUIREMENTS & DEFINITIONS

This MIS procedure is normally specified for DoD projects and those in the states of Hawaii and Alaska; other state regulators are often resistant to MIS sampling procedures substituted for traditional discrete subsampling. This procedure should *not* be applied to any analysis for volatile organic compounds, as those analytes will be lost during the sample handling steps.

Laboratory Project Managers should verify project specific guidelines for spiking specified in the project SAP or QAPP. At the time of this writing, DoD guidance on spiking (if and where in the procedure, and how much to spike) has yet to be resolved. Unless specified otherwise, spiking for purposes of creating QC samples is performed on the composited sample due to the costs of spiking standards carried through such large masses of sample material.

See the method-specific sample preparation SOPs for instructions on QC requirements particular to each analysis.

6.0 INTERFERENCES

Any sticks, leaves, rocks, or other objects must be removed as they are not part of the extraction matrix and their presence will interfere with the sample being ground to pass through a 10-mesh (2 mm) sieve.

Volatile analytes will be lost during the drying steps of this procedure and should not be requested for MIS. Certain semivolatile and otherwise unstable analytes may be subject to loss during the drying process; for these analytes, an MIS subsample is collected prior to the drying step ('MIS-NO DRY').

7.0 EQUIPMENT

Mortar & Pestle
Ring & Puck Mill
Jaw Crusher
Sieves
Sample Pans and Drying Racks

8.0 PROCEDURE

8.1 Identify if the sample requires MIS-DRY and or MIS-NODRY.

8.2 Empty entire field sample from its container into a clean, stainless steel sheet pan. Remove any extraneous materials such as twigs, large stones, etc. then distribute the sample across the pan to a depth of ¼ to ½ inches (≤ 1cm).

8.3 Label the pan with the C&T sample number.

8.4 **MIS-NODRY** applies to 8270, 8270-SIM, TEH/TEHM (TPH-Diesel) and Mercury. If the sample is logged in for MIS-NODRY, confirm that login has weighed out a moisture aliquot, then

8.4.1 Verify that the balance has been calibrated earlier in the day. If it has not, calibrate it before proceeding

8.4.2 Label a pre-cleaned jar of the appropriate size for the analysis being done with the C&T sample number.

8.4.3 Place the container on the scale and tare the scale.

8.4.4 Use a small spatula or scoop with a flat bottom and rectangular shape to insure a representative distribution of particle sizes.

8.4.5 Incrementally sample the spread-out soil using a random grid pattern by collecting 30 increments of ~1g each for a 30g subsample (extractable organics) and ~0.33g for a 10g subsample (metals).

For example, take five aliquots evenly spaced from each of six evenly-spaced rows.

8.4.6 For each analysis weigh out 2 aliquots and record in the soil aliquot log book. Paperclip a copy of the soil aliquot page to the corresponding job sheet. Put the aliquots in the pre-weighed Soil Aliquot Refrigerator 21X. Put the paper work in the bins near refrigerator 21X.

Note: If there is limited sample ask the Project Manager which analysis is a priority; if necessary, TEH can be weighed out to 25.0g instead of 50.0g. If so the final volume will be 2.0mL instead of 5.0mL.

8.5 **MIS-DRY** applies to PCB, 8081/Pesticides, 8330/Explosives and any of the 6010-Metals or 6020-Metals analyses. If the sample is MIS-DRY,

8.5.1 Place the pan in a drying rack. Let dry at room temperature until sample is visibly dry and free-flowing. This should take from overnight to as much as a week for wet or clay materials.
Some sample bags may contain extremely saturated soil and some water. For these samples, DO NOT drain the water off before placing the soil in the drying pan, rather, empty the entire contents of the bag into the pan to the extent possible.

Samples should be carefully "tilled" twice each day with a clean tool to help to speed the drying process.

8.5.2 After the sample is dry and free-flowing, sieve the entire remaining sample through a 2mm (#10) sieve (unless another procedure is specifically requested). Put the sieve into another clean stainless steel pan and pour some of the sample into the sieve. Shake vigorously back and forth to allow the smaller material to pass through the sieve.

8.5.3 Any aggregates (clumps of dirt, etc.) are considered part of the sample and need to be broken up to pass through the sieve; this can be done with a clean wooden tongue depressor for smaller chunks, larger chunks may require use of a mortar and pestle.

8.5.4 Save the material retained by the sieve in a separate clean glass jar. Labeled the jar "unsieved" and include the C&T sample number.

8.5.5 Verify that the balance has been calibrated earlier in the day. If it has not, calibrate it before proceeding.

8.5.6 Label a pre-cleaned jar of the appropriate size for the analysis being done with the C&T sample number.

8.5.7 Place the container on the scale and tare the scale.

8.5.8 In the appropriate analysis or Soil Aliquot benchbook, write the C&T sample number and analysis.

8.5.9 Redistribute the sieved sample across the pan to a uniform depth of ¼ to ½ inch (≤ 1cm).

8.5.10 Use a small spatula or scoop with a flat bottom and rectangular shape to insure a representative distribution of particle sizes.

8.5.11 Incrementally sample the spread-out soil using a random grid pattern by collecting 30 increments of ~1g each for a 30g subsample (extractable organics) and ~0.33g for a 10g subsample (metals).

For example, take five aliquots evenly spaced from each of six evenly-spaced rows.

Create QC Samples for 2 SDUPs (sample duplicates) for one sample as requested for triplicate analysis by client. If no sample is marked on the job sheet with a comment for triplicate analysis or SDUPs, check with the Project Manager as to whether this client/project requires triplicate analysis for Multi-Incremental Sampling.

8.5.12 Record the final weight and proceed to the applicable extraction or digestion procedure.

8.6 Transfer the remaining sample to a clean wide-mouth jar labelled with the sample number and "DRY MIS".

9.0 DOCUMENTATION

A. Benchbooks:
Every MIS event must be completely documented in the appropriate benchbook. Any changes must be made with a single line through the incorrect entry and initialed and dated by the chemist making the change. The benchbook entries must include the following:

Prep chemist initials and date
Sample number, accompanied by the unique container identifier (A-> Z)
Sample aliquot weight
Observations concerning unusual sample appearance, odor, behavior
Errors during the MIS procedure (spilled, possibly double spiked, etc.)

10. WASTE DISPOSAL

Dispose of the residual sample material in the sample waste stream as specified in Handling Lab Waste SOP.

11. POLLUTION PREVENTION:

Prepare only as much spiking and surrogate standard as can be used within the shelf-life of the standard.

12. REVISION HISTORY

The previous document (revision 4) was changed as follows:

- Section 2: Added Hawaii guidance document
- Section 8: Differentiate between 'MIS-DRY' and 'MIS-NO DRY'
- Appendix 1: Added login flow chart (previously CS-5 work instruction)

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APPENDIX_1: MULTI-INCREMENTAL SAMPLING LOGIN FLOW CHART