TETRA TECH, INC.

December 18, 2020

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Sara Ziff
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Via electronic mail

Subject: Corporation Yard, Triplicates Sampling Approach, Revised
Richmond Field Station
University of California, Berkeley

Dear Ms. Nakashima and Ms. Ziff:

On behalf of the University of California Berkeley, Tetra Tech, Inc. proposes to conduct additional data gap sampling as a follow-up to the removal action conducted at the Corporation Yard in 2017-2018 and data gap sampling presented in the Corporation Yard Data Gaps Sampling Results letter, dated November 22, 2019. At the request of DTSC, this letter also provides clarifications regarding the results presented in the November 2019 letter and discussions at a meeting conducted on May 8, 2020 regarding relative standard deviations (RSD) and the calculations of a weighted 95 percent upper confidence limit of the mean (weighted-95UCL).

This letter has been updated to incorporate comments received from DTSC on October 27, 2020 and discussions held on December 14, 2020. The comments and response-to-comments are provided as Attachment A.

BACKROUND INFORMATION FOR THE PROPOSED SUPPLEMENTAL NESTED DU-TRIPLICATES

The purpose of this follow-on investigation is to further determine the mean concentrations of polychlorinated biphenyls (PCB) within the near surface (0-2 inches below ground surface) within the Corporation Yard area located between Building 120 and the fence line south of Building 185. This area is covered by decision units (DU) designated as DU09 through DU17, shown on Figure 1. Samples were collected from these DUs for PCB analysis using incremental sampling methodology (ISM) in November 2019, and those data results are displayed in Figure 1. At that time, DU11 had been selected for the nested triplicate quality control (QC). When the laboratory results were received, DU11 exhibited lower PCB concentrations, including one non-detect (ND) result, than several of the other DUs. This combination of factors: a low concentration and an ND result, raised the question of whether DU11 results as measured

by the RSD were sufficiently representative of the internal variability of other DUs with significantly different concentrations. The ability to accurately represent the internal variability of all the DUs is important when calculating a weighted-95UCL. The proposed weighted-95UCL will be a numerical value that represents a conservative upper limit on the estimated PCB concentration for the entire area covered by DU09 through DU17. The weighted-95UCL will be compared to the action level of 1 mg/kg. If it exceeds 1 ppm, additional actions (such as options for cleanup) will be considered for this area.

Given the results of DU11, on May 15, 2020 and in comments provided on June 17, 2020, DTSC recommended that additional DUs be selected for nested triplicate analysis with the goal of better representing the concentration levels found in the 2019 samples. In response to DTSC's recommendations, UC Berkeley proposes to collect a set of nested triplicates (i.e., both field and laboratory subsampling triplicates) from DU09, DU10, and DU17. These DUs are selected for the following reasons:

- DU09, with a sampled concentration of 0.68 mg/kg, was selected to represent those DUs having concentrations approximately half to two-thirds of the action level value.

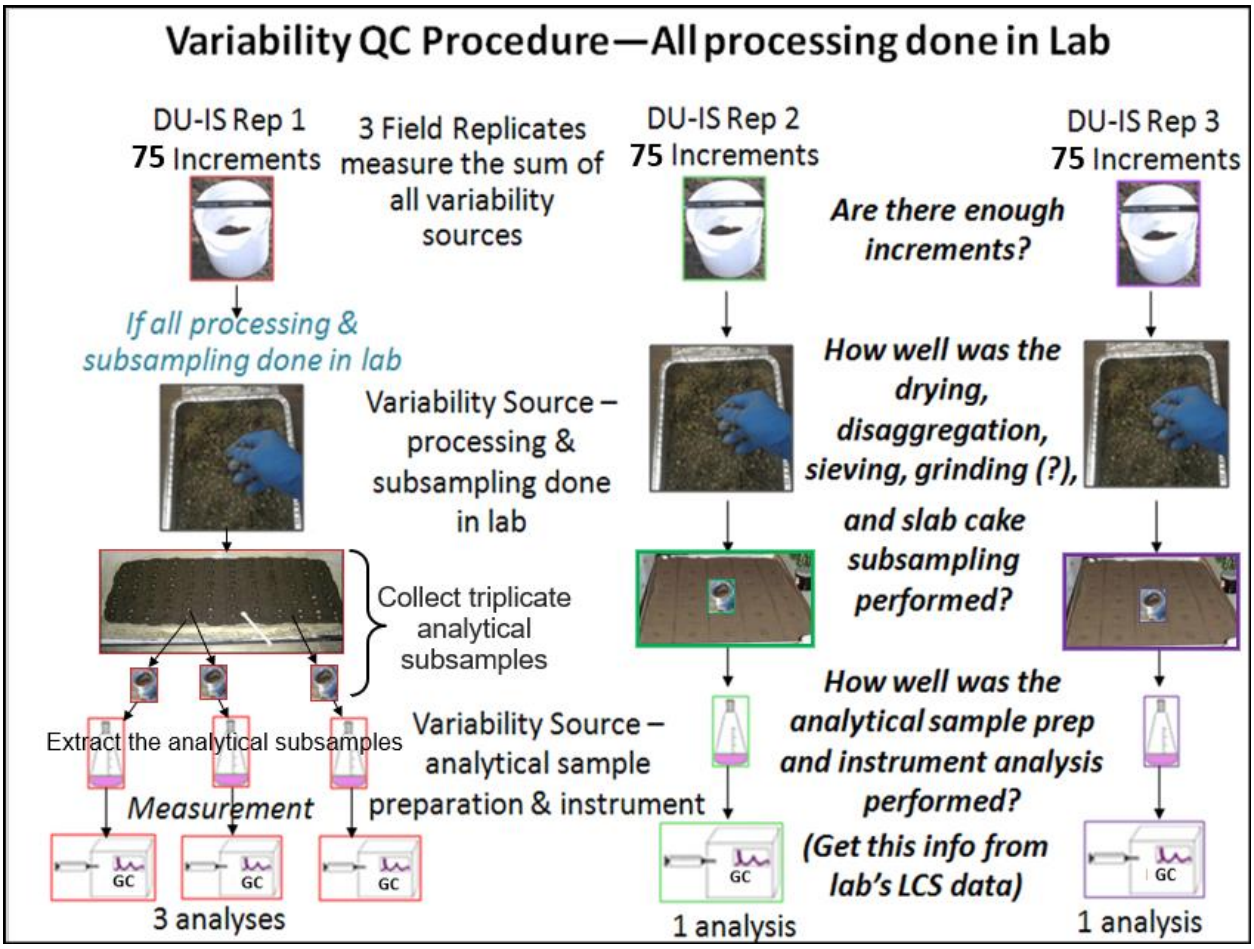
- DU10 exhibited a sample concentration of 2.76 mg/kg, which is higher than any of the other DU sample results. Establishing its internal variability is vital to a reliable weighted-95UCL.

- DU17, with a sample result of 0.92 mg/kg, was selected to represent those DUs with a concentration close to the action level.

It is likely that the new data for these three DUs may not be exactly the same as the 2019 data. Due to the heterogeneous nature of all soil contamination, an estimate of a DU's true concentrations is the best that any soil sampling approach can hope to achieve. ISM sampling approaches have been shown to provide the most reliable estimates of a DU's concentration.

PROPOSED APPROACH FOR SAMPLING DU09, DU10 AND DU17

ISM will be used to collect and analyze soil samples from DU09, DU10, and DU17. ISM involves collecting many small soil masses (called "increments") evenly across the DU and pooling them to form a DU field sample ISM was selected for this project to provide a comprehensive and thorough evaluation of chemical concentrations in a specific volume of soil, or decision unit. Field QC, in the form of three independent field samples (i.e., field triplicates) assesses the ability of an ISM sample to reliably estimate the DU concentration and quantify inherent soil and contaminant heterogeneity. When an ISM sample reaches the laboratory, it is processed to homogenize it to the degree possible given technology limitations, and then subsampled for analysis. Quality control to assess the adequacy of sample processing, subsampling and analysis is performed on three subsamples taken from the one of the field triplicates. The field and laboratory subsampling triplicates form an ISM "nested triplicate" set from which the amount of variability due to field heterogeneity and laboratory procedures can be calculated as a statistic called the RSD. An RSD is calculated for both the field triplicates and laboratory triplicates. These two RSD values measure how much field heterogeneity vs. laboratory measurement variability contribute to overall data variability. The nested triplicate scheme is diagrammed below.



While ISM sampling procedures are designed to reduce both field and laboratory contributions to data variability, some small degree of variability is inevitable. Measurements provided by a nested triplicate set document whether the procedures sufficiently reduced variability for the site-specific matrix and contaminants. If this QC demonstrates that data variability is too high to support desired decision confidence at the action level, it also indicates which aspect of the sampling and analysis process (field sampling, sample processing and subsampling, or the analysis itself) needs corrective action to fix the problem. In contrast, sources of data variability are rarely used in this way in discrete sampling programs, which limits options for corrective action if discrete data variability is too high. Soils contaminated with PCB typically have both high field heterogeneity and high subsampling variability, so meticulous procedures must be used. ISM was chosen for this work because ISM procedures will produce PCB data having much lower data variability and therefore higher confidence than discrete sampling.

A field sample will consist of a minimum of 75 increments Field triplicates will be collected from each of the three decision units. In addition to providing chemical results, the field triplicate results measure the effectiveness of the ISM sample in capturing PCB contaminant variability within the decision unit. The field triplicate results will inherently include any laboratory variability, since the field triplicates are each analyzed separately by the laboratory.

The specific ISM procedures to be used for field sampling, which are the same as the procedures used previously and described in the November 2019 letter are provided below.

- The corners and edges of each decision unit will be marked with flags to identify the grids by which the triplicate increments will be collected. The number of grids for DU9, DU10, and DU17 are 84, 85, and 82, respectively, based on the geometry of each decision unit. The triplicate increments for DU9 and DU10 will be placed equidistant in a triangle formation within each grid. DU10 contains two grids which are not square, and therefore the triplicates will be spaced equidistantly along a line within the two grids. Field conditions at DU17 differ from DU9 and DU10 in that DU17 is covered with 3-6 inches of 3-inch river rocks. The majority of the area has been used for heavy truck parking, and the river rocks have been compacted in place. The river-rocks cannot be easily removed by hand or shovel and require a small backhoe bucket to uncover the original ground surface. UC Berkeley conducted several test excavations on August 25, 2020, and concluded that three separate excavations per grid introduces concerns regarding cross-contamination within triplicate locations, given the amount of movement of the river rocks within a small area. As a result, the triplicates be collected along a single, linear excavation per grid. This method would minimize potential cross contamination between the triplicates since it minimizes the movement of river rocks within the unit. Grids and increment triplicate locations for each decision unit are included on Figures 2, 3, and 4.

- Increments will be collected from the top 2 inches of the native surface with a disposable scoop or other disposable sampling apparatus. In some areas, the native surface is the current surface cover; however, where gravel is present, the gravel will be removed prior to collecting the increment. Each increment will be approximately 20 grams of soil.

- Increments from each decision unit will be placed directly into freezer-grade, 1-gallon zip-locking bags. The target weight of each ISM sample is approximately 1.5 kilograms. Each bag will be labeled and packed into an insulated cooler; ice packs will be placed on top of the samples within the cooler. The samples will be transported under chain-of custody procedures to Agriculture & Priority Pollutants Laboratories, Inc. (APPL) in Clovis, California.

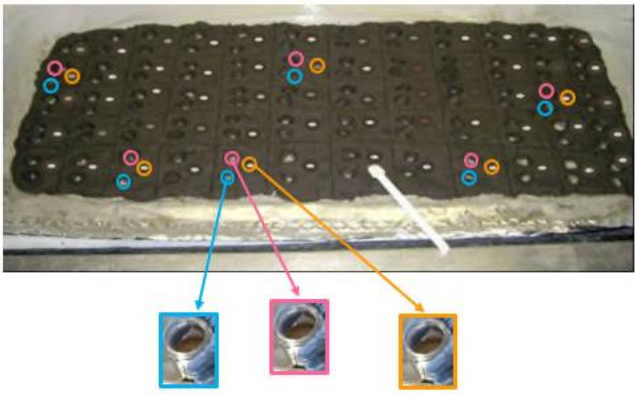
Health and safety measures will adhere to the *Final Field Sampling Workplan, Appendix B, Health and Safety Plan*, dated June 2, 2010. Protocols to be followed specific to COVID-19 protections are included as Attachment B.

Laboratory Processing, Subsampling and Analyses

Soil samples will be processed according to APPL's internal ISM protocol, included as Attachment C. The protocol specifies that the 1.5 kilogram sample will be air-dried as necessary, then passed through a 10-mesh sieve to remove non-soil material (i.e., particles larger than a 2-mm diameter). The sieved soil is then ground to the consistency of sifted flour. The ground soil is spread into a shallow layer in a pan to form a "slab cake" which is divided into 30 equal-sized grid cells. A 1-gram increment is taken from each grid cell and the 30 increments pooled to form an analytical subsample weighing 30 grams. Each 30-gram subsample will be analyzed for PCBs by EPA Method 8082 with 3540C Soxhlet extraction.

One of the field samples from each field triplicate set will be subsampled and analyzed two additional times (for a total of three subsample analyses) to create the laboratory triplicate set. The second subsample is collected after the first by taking a second round of increments from the same 30 grid cells.

A third round creates the third of the triplicate set. In this way, three independent representative subsamples are collected. After triplicate subsampling a slab cake looks similar to the photograph below.



The primary purpose of the laboratory triplicate set is to evaluate the effectiveness of the processing and subsampling protocols for site-specific contaminants and the soil matrix. If the procedures are effective, the three subsamples should provide results that are close numerically. The closer the agreement among the results, the lower the data variability and RSD for the triplicate set. Variability in the analytical processes of sample extraction, extract cleanup and instrumental measurement is necessarily included in the subsampling variability. If necessary, the contribution made by analytical variability to subsampling variability can be determined using various analytical QC checks, such as laboratory control samples (LCS) and surrogate recoveries.

Together, the field triplicate set and laboratory triplicates from one of the field triplicates constitute a nested triplicate.

Laboratory Triplicate Evaluation

Laboratory triplicates will be evaluated quantitatively and qualitatively to determine overall data usability. Quantitative evaluation involves calculating an RSD on the three laboratory replicate results as a measure of variability. Qualitative evaluation involves assessing whether laboratory triplicate concentrations agree generally in their concentrations ranges (low, moderate, or elevated) and with respect to whether the action level is exceeded. Consistent patterns in laboratory triplicate sets, such as a pattern of low or high variability can provide an indication of the complexity of the matrix. Consistently high variability may indicate a complex matrix with “particle effects” that cannot be fully eliminated, even by increased laboratory protocols, such as milling the sample. A data usability determination will be recommended based on the quantitative and qualitative analyses.

High subsampling variability propagates up to create high variability in field sample results. If the variability in field samples is found too high to meet desired decision confidence, a mathematical determination of the relative contributions of field, subsampling and analytical variability can be performed. If subsampling variability is determined to be a significant contributor to overall data variability, corrective action may be required. Corrective action to reduce variability could include modifying the procedures used for sample processing and subsampling.

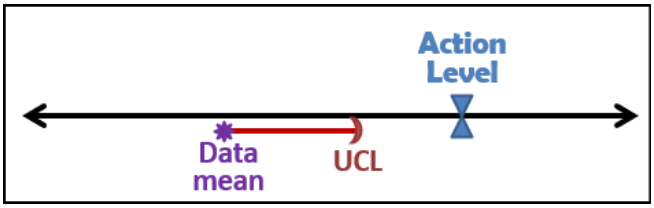
Field Triplicate Evaluation

In their QC role, a field triplicate set provides statistics that, in conjunction with the statistics from the laboratory triplicate set, allow their respective contributions to overall data variability to be determined. Knowledge of a project's data variability is important because high data variability is detrimental to efficient site investigations and cleanup.

High data variability is detrimental when it leads to high rates of false positive decision errors when UCLs are the basis for cleanup and other decisions. A UCL is an upper bound (or "limit") on the estimated DU concentration. The sampled concentration (i.e., the average concentration determined from DU samples) is an estimate of the true DU concentration. In contrast, a UCL estimates an upper bound on the true DU concentration. A UCL is calculated by adding a safety factor to the average obtained from sample results. The size of this safety factor is increased by high data variability, pushing the UCL farther away (higher) from the average. When variability is high, the distance between the average or mean, and the UCL can be so large that the UCL exceeds an action level even the true DU concentration (as suggested by the sample mean) is well below. Therefore, decisions based on the UCL can lead to false positive decision errors when data variability is high. This scenario is exemplified in the graphic below.

A large distance between the mean and UCL indicates there is significant uncertainty about the true DU concentration; however, this large data uncertainty might not cause decision uncertainty or decision errors if the mean is far enough below the action level. If a confident decision can be made, corrective action to reduce data variability may not be necessary. The previous graphic exemplifies elevated decision uncertainty: the location of the data mean with respect to the action level indicates the true DU mean should be below the action level, but a UCL exceedance suggests that high data variability makes that conclusion uncertain.

Field triplicates are three independent measures of the DU concentration that provide a measure of data variability in the form of an RSD calculated from the three results. When field triplicate results are close (i.e., precise), data variability and the RSD are low. Low RSDs contribute to a narrow mean-to-UCL width, which gives higher confidence that the true mean is near the data mean. As illustrated in the graphic below, that allows decisions based on the UCL to produce fewer false positive decision errors.



If high data variability is causing large mean-to-UCL widths and excessive decision uncertainty, the QC (i.e., the field and laboratory triplicate sets) can target where corrective action will be most effective. If the laboratory subsampling variability is high, that problem needs to be corrected first using options described previously. If subsampling variability is low but field triplicates variability is high, corrective

actions need to target ISM field sampling procedures. Options include reassessing the size and layout of DUs; increasing the number of field increments and/or the mass of those increments; and collecting triplicates from more, or all, of the DUs. The mathematics of the UCL calculation means the adding additional replicates to DU data sets (e.g., using four replicates rather than three) will lower the UCL even if the mean and RSD remain the same.

One of the laboratory triplicate results are used as the concentration of the parent field sample. By convention and to parallel the data from the other two field triplicate samples, the project will use the first subsample result as the concentration for the parent field sample. It is possible that under some circumstances the field sample concentration may be better represented by averaging all three laboratory triplicate results. an example might be if the first result, and only that result, is a nondetect. The best way to evaluate the results cannot be determined until the data are received. The convention of using the first laboratory triplicate result will avoid the temptation to "cherry-pick" the laboratory triplicate data to obtain the lowest RSD for the field triplicate set.

Field Triplicates and Calculating the Weighted-95UCL

The ultimate objective for this proposed data collection is enable determination of the mean and UCL concentrations for the large area composed of DU09 through DU17. A non-weighted simple average assumes that areas of all DUs are the same, which is not appropriate since the DUs are of various sizes. Logically, a large area should have more influence on the overall concentration than a small area; so an area-weighted mean, which is not difficult to calculate, better represents the true mean over the large area. Obtaining an area-weighted UCL, however, to go with the area-weighted mean involves complicated calculations that will be performed in a specially designed spreadsheet called the "Combining DUs Calculator." The spreadsheet was first designed by Philip Goodrum, Ph.D., a statistician and toxicologist with GSI Environmental, and contributor to with the Interstate Technology and Regulatory Council for 2012 and 2020 ISM guidances. The spreadsheet was structured to accept ISM field replicate data as the only inputs. The Calculator would then compute the mean and variability from the raw sample data. The Calculator was modified in 2020 by Deana Crumbling of Tetra Tech in collaboration with Mr. Goodrum into a version that can accept DU means, as determined from one or more ISM samples, and RSDs as the inputs. This is the calculator that has been discussed previously with DTSC and EPA.

An estimate of the within-DU (i.e., internal) variability is required for each of the component DUs to compute a weighted-UCL over the large area. Field triplicates provide that measure of within-DU variability. Performing field triplicates on each and every DU is a straightforward option, but can be costly and unnecessary when many DUs are involved. Where it is applicable, a more efficient approach is to collect field triplicates from a subset of DUs (termed "triplicate-DUs") with the goal that the variability found in those DUs can be applied to DUs having only a single ISM sample (termed "singlet-DUs"). As a starting point, it is reasonable to assume that within-DU variability (as measured by an RSD) will be similar for DUs that are equivalent from a conceptual site model (CSM) perspective. "CSM-equivalent" DUs are those that were subjected to the same contaminant release and transport mechanisms, are in reasonably close proximity, and can be expected to have similar concentrations in relation to the action level.

DUs suspected to have a different CSM and significantly different concentrations should be segregated into their own group or even isolated as a lone DU. Each DU group needs its own subset of triplicate-DUs; a lone DU will be its own triplicate-DU. Note that not all DUs with field triplicates require laboratory triplicates. How well the assumptions behind the CSM-equivalent DU group(s) hold true will not be known until there is at least one ISM sample from each DU. If the results do not support the

hypotheses, DUs may need to be regrouped by concentration and additional triplicate-DUs identified for a follow-on sampling effort. As discussed earlier, this scenario was encountered in the November 2019 data set, which has prompted this proposed sampling effort.

Application of RSDs in the Combining DUs Calculator

Once representative field triplicate sets have been obtained and confirmed, their RSDs will be evaluated. There are two primary permutations for how RSDs can be applied toward the goal of a weighted-UCL which depend on sample results:

1. If only a single RSD is applicable to a particular group of CSM-equivalent DUs, that RSD value can be used to represent the variability of each singlet-DU in the group. The Combining DUs Calculator will be populated with each DU's ISM result (for singlet-DUs) or the average of a set of field samples (in the case of a triplicate-DU), along with that RSD value.

2. If two or more RSDs are applicable to a particular DU group, the RSDs will be pooled to obtain a single "averaged" RSD value to be applied in the Calculator to singlet-DUs. The Excel formula for pooling two RSDs is <Pooled RSD = sqrt(sumsq(RSD#1, RSD#2)/2)>. Three RSDs are pooled by the equation <Pooled RSD = sqrt(sumsq(RSD#1, RSD#2, RSD#3)/3)>. DU concentrations are addressed as in item 1 above. The pooled RSD value will be entered for the applicable singlet-DUs. Although it is possible that actual data will suggest a different option, it is anticipated that their actual RSDs will be entered into the spreadsheet for triplicate-DUs. An example arrangement is shown in the below which is from a populated Combining DUs Calculator.

IDs (of the small DUs)	DU Area (sq ft)	Data Entry	
		Trip or Singlet Concentration	Actual or Borrowed RSD
NE-CS07	701	0.45	0.206
NE-CS08	644	0.086	0.206
NE-CS10	760	0.27	0.206
NE-CS12	1288	0.593	0.108
NE-CS13	1241	0.15	0.206
NE-CS14	1219	0.22	0.206
NE-CS17	1598	2.9	0.206
NE-CS18	1580	0.81	0.206
NE-CS19	3183	0.56	0.206
NE-CS20	2099	0.25	0.206
NE-CS21	2265	0.004	0.206
NE-CS22	2294	0.004	0.206
NE-CS23	2598	0.004	0.206
NE-CS24	2246	0.68	0.206
NE-CS25	1808	0.12	0.206
NE-CS26	2478	0.75	0.206
NE-CS27	1926	0.4	0.206
NE-CS28	2142	0.593	0.271
NE-CS29	2181	0.34	0.206
NE-CS30	1987	0.4	0.206
NE-CS31	710	2.8	0.206

The red entries are triplicate-DUs for which the average of the triplicates is used for the DU concentration and the actual RSD from those triplicates is used in the RSD column. The RSDs from the two triplicate-DUs (0.108 and 0.271) were pooled to produce an RSD of 0.206 that is applied to the singlet-DUs. Note that an RSD is a unitless number.

It is possible that different methods for handling the RSDs may be suggested if the data have unanticipated statistical characteristics.

The following describes the anticipated grouping of DU09 through DU17:

- If the average concentration of triplicate-DU09 remains near the 2019 result of 0.68 mg/kg, the RSD from DU09 will be applied to the group of DUs with 2019 results near or below that concentration. That group is anticipated to include the following singlet DUs: DU12, DU14 and DU15 (0.61, 0.20 and 0.40 mg/kg, respectively) in addition to DU09.
- Similarly, the RSD from triplicate-DU17 (0.92 mg/kg) will be applied to singlet-DU16 (0.84 mg/kg) in addition to DU17.
- The RSD from the 2019 triplicate-DU11 (approx. 0.07 mg/kg) will be applied to singlet-DU13 (0.06 mg/kg) as well as DU11.
- The RSD for triplicate-DU10 (2.76 mg/kg) will apply only to DU10 since that is the only DU with such a high concentration.

From the DU data inputs of DU area, concentration and the actual or borrowed RSDs, the Calculator provides two types of overall weighted-95UCL: the Student's t UCL is used for normal data distributions and the Chebyshev UCL is used for nonnormal distributions. The Calculator also recommends which of the two UCL options to use, as shown in example below.

Student's-t or Chebychev 95% UCL may be appropriate.	Recommended UCL*	
	Student's t 95% UCL	0.326
*Student's t UCL is acceptable if the overall DU's adj'd CV is <1.5 (i.e., the qualitative variability between a DU's increments is "Low"). Otherwise the Chebyshev UCL should be used. Consult the instructions for additional information on which 95% UCL is recommended for specific data sets.		

Evaluation of all triplicate results and application of RSDs should always be evaluated on a case-by-case basis, and will be discussed with EPA and DTSC following receipt of the results.

The above procedures for determining the weighted-95UCL are consistent with the information presented at the May 8, 2020 meeting.

UC Berkeley will provide preliminary recommendations regarding the appropriate use of the triplicate results in conjunction with all previous sampling results for the area, including previous ISM results for DU09, DU10, and DU17, and discrete samples presented in the Site Characterization Report, Figure 6-8, attached to this letter. The calculation of a weighted 95UCL for the size of the area represented by DU09 through DU17 is consistent with the Corporation Yard boundary evaluated in the risk assessment conducted in support of the RAW, as shown on RAW Figure 2-3, included as an attachment to this letter. The proposed approach will be discussed with EPA and DTSC prior to issuance of a sample results summary or formal weighted 95UCL calculations to ensure concurrence regarding the approach.

Following discussion with DTSC and EPA, the sample results will be presented in a sampling letter report providing complete details regarding the updated weighted 95UCL. Methods and equations and calculation results will be presented within the sample results summary.

The data collected during this investigation will ultimately be presented with the comprehensive data following completion of all Corporation Yard removal action activities.

NOVEMBER 2019 LETTER CLARIFICATIONS

The Corporation Yard Data Gaps Sampling Results letter, dated November 22, 2019, provided a summary of the data gaps investigation and the sampling event conducted at the East Meadow, adjacent to the Corporation Yard Boundary, as defined by the Final Removal Action Workplan, dated July 18, 2014. The purpose of the letter was to provide the mean concentrations of PCBs within the near surface (0-2 inches below ground surface) within the entire Corporation Yard, Building 185, and north of Building 197.

The November 2019 letter included a discussion of quality assurance based on the ISM results of the laboratory and field triplicate sample results. The collection of triplicates allowed for the calculation of the RSD for each triplicate set. The laboratory RSD provides an indication of the variability associated with subsampling and analytical procedures. The field RSD provides an indication of how well the sample result represents the average concentration of the area sampled. The field RSD inherently includes variability associated with subsampling and analytical procedures.

The November 2019 letter provided a qualitative summary of the triplicate results and RSDs using several lines-of-evidence to support the conclusions. The evaluation was not intended to provide the basis for applying a confidence interval to a risk-based evaluation.

Subsequent to submittal of the November 2019 letter, EPA, DTSC, and UC Berkeley have conducted several meetings to discuss the strategies and technical approaches for transitioning from a “not-to-exceed” PCB concentration compliant with the Toxic Substances Control Act (TSCA) Section 761.61(a) presented in the Removal Action Workplan (RAW) to a risk-based approach compliant with TSCA Section 761.61(c). As a part of those discussions, UC Berkeley has proposed the calculation of a weighted 95UCL to meet the needs of a risk-based approach with a confidence interval applied. DTSC requested that UC Berkeley provide clarification regarding the proposed approach and discrepancies with the November 2019 letter, as presented below.

RSD Calculations

The weighted 95UCL calculation: (1) normalizes the areal dimensions of the sample results to ensure that results from larger areas are more represented than smaller areas, (2) incorporates the variability measured in field triplicate results for those decision units with triplicates, and (3) incorporates a pooled variance(s) derived from the field triplicate results to the singlet sample results. The application of the triplicate results within the weighted 95UCL calculation is independent of the qualitative analysis of the triplicate results presented in the November 2019 letter. The approach for calculating a weighted 95UCL for the area south of Building 120 and outside of the previous excavation boundary was presented to EPA and DTSC on May 8, 2020, and is summarized and updated below. The area to be evaluated is represented by sample results from DU09 though DU17. The calculation of a weighted 95UCL for this

area is consistent with the Corporation Yard boundary evaluated in the risk assessment conducted in support of the RAW, as shown on RAW Figure 2-3, included as an attachment to this letter.

- The weighted 95UCL calculation applies triplicate results from decision units which are most representative of the decision units they will be applied to. For DU09, DU10, and DU12 through 17, triplicate results from DU11 were selected because they best represent the conceptual site model for contaminant release as the other decision units, and the concentrations are similar with regards to concentrations. The triplicate results from DU9, DU10, and DU17 will be evaluated in conjunction with DU11 triplicate results and other DU results to determine the optimal application of the triplicate results.

- The weighted 95UCL applies only the field triplicate results and not the laboratory triplicate results, since the field triplicates best represent how well the sample results represent the average concentration of the area sampled.

- The weighted 95UCL applies the first laboratory triplicate sample reported, not the average of the three laboratory triplicates. This supports the statistical evaluation of the three field triplicate results since they are all singlet results, and the third is not an average. The first laboratory triplicate reported is always the result selected, regardless of concentration. If laboratory triplicate results yield poor precision, then the triplicate mean can be used if the site-specific data support such as the most representative value.

Consequently, the RSD values presented in the November 2019 letter are different than the RSD values presented in the weighted 95UCL equations presented during the May 8 meeting. The letter presented the average of the three lab results for DU11 to estimate the value of the third field triplicate to calculate the field RSD; however, the weighted 95UCL uses only the first lab triplicate DU11-T3A, which was reported as non-detect. Discussion of DU11-T3A is no longer relevant as RSD values will be reevaluated following the results of DU09, DU10, and DU17 triplicates.

During the May 8 meeting, simulated triplicate values were discussed in order to meet the requirements of the weighted 95%UCL calculator tool. The calculator tool has been updated so that the calculations no longer require the simulation of simulate triplicate data sets in order to calculate the weighted 95%UCL. The updated calculator tool will be provided to DTSC and EPA upon request.

The surrogate value for the non-detect result is based on an evaluation of half the reporting and method detection limits for Aroclor 1254 and 1260, which are the primary detected PCBs.

- The Aroclor 1254 half reporting limit was 0.065 milligrams per kilogram (mg/kg) and the method detection limit was 0.054 mg/kg. If the actual concentration was 0.065 mg/kg, then the method detection limit of 0.054 mg/kg would have resulted as 0.065 J mg/kg, which it was not. As a result, half the method detection limit of 0.027 mg/kg is the appropriate surrogate concentration for Aroclor 1254.

- The Aroclor 1260 half reporting limit was 0.065 mg/kg and method detection limit was 0.090 mg/kg. If the actual concentration was 0.065 mg/kg, then the method detection limit of 0.090 mg/kg would have resulted as a non-detect, which it was. As a result, half the reporting limit of 0.065 mg/kg is the appropriate surrogate concentration for Aroclor 1260.

The surrogate sample result used for the weighted 95UCL for DU11-T3A is 0.027 mg/kg + 0.065 mg/kg = 0.092 mg/kg.

The RSD based on the field triplicate set from DU11-T1 (0.060 mg/kg), DU11-T2 (0.070 mg/kg), and DU11-T3A (0.092 mg/kg) is 21%, which differs from the November 2019 letter presenting 80% RSD.

Note that the calculations provided in the November 2019 letter will be updated with the triplicate data collected during this investigation, including an evaluation of the pooled variances and a reevaluation of the applicability of DU11 triplicate results. Attachment D provides supporting information regarding the use of RSDs and pooled RSDs in ISM projects.

If you have any questions or comments regarding this submittal, please call me at (415) 497-9060 or Greg Haet at (510) 812-1541.

Sincerely,

Jason Brodersen, P.G.
Project Manager

Attachments: Figure 1: Site Map
Figure 6-8, Site Characterization Report
Figure 2-3, Removal Action Workplan
Attachment A: Comments and Response-to-Comments
Attachment B: COVID-19 Activity Hazard Analysis
Attachment C: APPL Standard Operating Procedure
Attachment D: Incremental Sampling Methodology, RSD Calculations and Uses

cc: Greg Haet, UC Berkeley EH&S
Bill Marsh, Edgcomb Law Group