Department of Toxic Substances Control

Matthew Rodriquez
Secretary for
Environmental Protection

Barbara A. Lee, Director
700 Heinz Avenue
Berkeley, California 94710-2721

Edmund G. Brown Jr.
Governor

September 12, 2016

Mr. Greg Haet
EH&S Associate Director, Environmental Protection
Office of Environment, Health & Safety
University of California, Berkeley
University Hall, 3rd Floor, #1150
Berkeley, California 94720

Dear Mr. Haet:

The Department of Toxic Substances Control (DTSC) received the *Draft Phase V Field Sampling Plan* (FSP), dated July 15, 2016, for the University of California, Berkeley, Berkeley Global Campus at Richmond Bay, Former Richmond Field Station Site (RFS), located at 1301 South 46th Street, Richmond, California. The FSP was prepared by Tetra Tech Inc. on behalf of the University of California, Berkeley. Investigations at the RFS were divided into five phases to address data gaps. Previous FSPs for Phases I-IV have been prepared and implemented. The scope of this FSP includes sediment and pore water sampling in the western portion of West Stege Marsh owned by UC Berkeley, and investigation of the Western Transition Area. DTSC has reviewed the FSP and has the following comments. Also enclosed are comments from DTSC's Human and Ecological Risk Office (HERO) and HERO's Ecological Risk Assessment Section.

1. Page 3, Section 1.2, Investigation Purpose: Indicate how the information collected during the Phase IV investigation will be concluded.

2. Page 9, Section 3.1 – Purpose of Investigation.
   a. The first sentence of the second paragraph should read "ecological *and human health* risk to receptors."
   b. The last sentence of the same paragraph says that soil samples collected within the Western Transition Area (WTA) will provide data to assess risk posed to human and ecological receptors. However, Section 1.2 – *Investigation Purpose*, does not discuss soil sampling. Please revise the FSP for consistency.

3. Section 3.2.1 – DQOs for Sediment and Pore Water in the Western Stege Marsh.
   a. Explain why pore water samples are proposed for metals analysis only and not polychlorinated biphenyls (PCBs) as is proposed for the sediment samples.

b. The first paragraph on page 12 states that sediment samples will be collected with a disposable plastic scoop, but it does not discuss the sludge sampler method of sample collection that is described in Section 3.3.1. Please revise the text for consistency.
c. The third paragraph on page 12 states that the 10 samples to be analyzed for methyl mercury were selected based on the highest historical concentrations of mercury and refers to Figure 4. Figure 4, however, does not specify which sediment samples will be analyzed for mercury, and the historical mercury results are not included in the FSP for confirmation. Revise the FSP to include this information.
d. The first bullet under Step 4 on page 13 states that the vertical extent of potholes will be a maximum of 10 feet below ground surface (bgs). The FSP should provide additional justification for the maximum depth of potholing. In addition, if groundwater is encountered prior to reaching 10 feet bgs or bay muds, will potholing continue?
e. The second bullet under Step 4 on page 13 states, "Additional potholing will be conducted to ensure adequate evaluation of chemical soil data throughout the WTA." This statement vague and requires further explanation. Provide specific criteria that will determine the need for additional potholing and soil sampling in the FSP.
f. The first paragraph under Step 7 on page 14 should provide the approximate minimum vertical and lateral dimensions of the potholes.

4. Section 3.3.1 – WSM Sediment and Pore Water Sampling. The methods for collecting, containerizing, preserving, and handling the pore water samples should be provided in the FSP, as these procedures are not included in the project Quality Assurance Project Plan (QAPP; Tetra Tech EM, Inc., June 2, 2010).

5. Section 3.3.2 – WTA Potholing Investigation.
   a. This section does not describe the soil sampling that is planned at each pothole location as described in Section 3.2.2 – *DQOs for the Pothole Investigations in the WTA* under Step 7. The sampling proposed at each pothole location from the surface (0 to 0.5 feet bgs) and from 1.5 to 2 feet bgs should be described in this section in addition to the soil sampling based on staining, odors, etc.
   b. The first paragraph on page 16 states that contact with groundwater is not anticipated and will be avoided. It also states that the anticipated depth of water intrusion during low tide events is 4 to 8 feet bgs. Please clarify why groundwater intrusion is not anticipated since the depths of the excavations may be as deep as 10 feet bgs.

c. The first full paragraph at the top of page 17 states that under certain conditions, a licensed professional engineer will be consulted. Please include and identify the licensed professional engineer that will be in responsible charge in Section 4.0 – *Project Roles and Responsibilities*.

6. Section 3.3.3 – Analytical Methods and Quality Control.
   a. The containers types, preservation methods, and holding times for each analytical method and matrix should be provided, as this information is not provided in the QAPP.
   b. At least 10 percent of the pore water samples should be collected as duplicates as per the QAPP.
   c. Daily field equipment blanks for reusable sampling equipment (i.e., shovels, stainless-steel spoons, stainless-steel mixing bowls, etc.) should be collected and analyzed for constituents of concern as per the QAPP.
   d. Describe the level of data validation that will be performed on the analytical data from this investigation as per the QAPP.
   e. Remove *and soil gas* from the second to last paragraph on page 18.
   f. Please clarify the location of Brooks Rand, the analytical laboratory identified for methyl mercury analysis.

7. Tables.
   a. Include information for methyl mercury by EPA Method 1630 (modified) on Tables 1 and 2, as appropriate.
   b. Table 5 should list the number of surface soil samples and subsurface soil samples that are planned to be collected from the pothole locations according to Section 3.2.2 (under Step 7) which states that one surface soil sample (0 to 0.5 feet bgs) will be collected from each pothole location and one deeper sample (1.5 to 2 feet bgs) from about half of the pothole locations.
   c. Include a table that identifies the types and numbers of field quality control samples that will be collected for each media (soil, sediment, pore water).

If you have any questions, please contact Lynn Nakashima at lynn.nakashima@dtsc.ca.gov or (510) 540-3839.

Sincerely,

Lynn Nakashima

Lynn Nakashima, Project Manager
Senior Hazardous Substances Scientist
Brownfields and Environmental
Restoration Program
Berkeley Office - Cleanup Operations

Michelle Dalrymple

Michelle Dalrymple, P.G.
Engineering Geologist
Brownfields and Environmental
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Enclosures

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MEMORANDUM

TO: Lynn Nakashima
Senior Hazardous Substances Scientist
Brownfields and Environmental Restoration Program
Department of Toxic Substances Control
700 Heinz Avenue, Suite 200
Berkeley, CA 94710

FROM: J. Michael Eichelberger, Ph.D. J Michael Eichelberger
Staff Toxicologist
Ecological Risk Assessment Section (ERAS)
Human and Ecological Risk Office (HERO)
Department of Toxic Substances Control
8800 Cal Center Drive
Sacramento, CA 95826

DATE: August 24, 2016

SUBJECT: PHASE V FIELD SAMPLING PLAN UNIVERSITY OF CALIFORNIA, BERKELEY, BERKELEY GLOBAL CAMPUS AT RICHMOND BAY, FORMER RICHMOND FIELD STATION SITE, RICHMOND, CALIFORNIA

PCA: 11018 Site Code: DTSC201605-00

Background

At the request of the DTSC project manager, ERAS is providing review and comment on the aforementioned report in the subject line above. The Phase V sampling plan is intended to address additional sampling to characterize the distribution and concentrations of Chemicals of Potential Concern that may pose a risk to human health and ecological receptors by media within the Bulb Area, portions of the Western Transition Area, and the un-remediated portion of West Stege Marsh. ERAS has reviewed the report only in terms of sampling needs to support analysis of potential risk to ecological receptors, Dr. Kimiko Klein will provide a similar review in the context of potential risk to human health.

Scope of the Review

The document was reviewed for scientific content related to potential implications to ecological risk. Grammatical or typographical errors that do not affect the interpretation of the text have not been noted. We assume that regional personnel have evaluated the sampling of environmental media, analytical chemistry data and quality assurance procedures, and have reviewed the adequacy of the site characterization.

General Comments

ERAS in general feels the sampling and analysis plan as presented is adequate for the specified scope of work. ERAS has a few minor comments concerning Table 3 as outlined below in the Specific Comments.

Specific Comments

1. Pdf page 39 of 165, Table 3: Aquatic Screening Criteria and Reporting Limits for Pore Water Phase V Field Sampling Plan University of California, Berkeley, Richmond Field Station Site. Note 2 specifies that the Marine Aquatic Toxicity Criteria includes a dilution factor of 5. The actual listed values in the table do not have a factor of 5 applied to them. The screening criteria should not have a dilution factor since the upland groundwater screening values were accounting for attenuation from the upland to Stege Marsh sediments. In the sediments themselves, no dilution factor should be allowed because this is the site of exposure to benthic organisms. The reference to a dilution factor in note 2 should be removed as should note 3 in its entirety.

2. Pdf page 39 of 165, Table 3: Aquatic Screening Criteria and Reporting Limits for Pore Water Phase V Field Sampling Plan University of California, Berkeley, Richmond Field Station Site, Note 2. Based on the hierarchy specified in Note 2, the Marine Aquatic Toxicity Criteria for cadmium should be 7.9 µg/L and for mercury it should be 0.94 µg/L. The table should be revised accordingly.

3. Pdf page 39 of 165, Table 3: Aquatic Screening Criteria and Reporting Limits for Pore Water Phase V Field Sampling Plan University of California, Berkeley, Richmond Field Station Site, Note 2. The selenium screening level of 5.0 µg/L is the fresh water criteria; the salt water criteria is 71 µg/L. This is the screening criteria for all three sources of screening levels presented in Note 2. Please explain why the fresh water criteria is selected for a marine environment.

Conclusions

ERAS generally agrees with the sampling approach presented in the report. Certain entries in Table 3 need to be corrected as noted above.

Reviewed by: Brian Faulkner, Ph.D.
Senior Toxicologist (HERO/ERAS)

Cc: James M. Polilsini, Ph.D.
Supervising Toxicologist

Department of Toxic Substances Control

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MEMORANDUM

TO: Lynn Nakashima
Senior Hazardous Substances Scientist
Brownfields and Environmental Restoration Program
700 Heinz Avenue, Suite 200
Berkeley, CA 94710-2721

FROM: Kimiko Klein, Ph.D.
Staff Toxicologist Emerita
Human and Ecological Risk Office (HERO)

DATE: August 19, 2016

SUBJECT: Phase V Field Sampling Plan
RICHMOND FIELD STATION SITE, UNIVERSITY OF CALIFORNIA, BERKELEY
PCA 11018 Site Code: 201605-00

Background

The University of California Richmond Field Station (UCRFS) is located on 96 acres of former industrial upland and 13 acres of transition habitat and tidal salt marsh. Industrial use of the uplands, including the manufacture of blasting caps containing mercury fulminate, and a briquette company, took place from the 1870's until 1950, when the University of California purchased the property for use as an engineering research facility. Several remedial measures have been implemented and include the treatment and transport to the adjacent Zeneca property of mercury contaminated soils, installation of a biologically active permeable barrier (PAPB), installation of a slurry wall between the Zeneca property and the UCRFS, excavation and removal of contaminated sediments from part of the Western Stege Marsh, and backfilling with clean fill to restore Ridgeway's rail habitat. Soils with elevated arsenic concentrations in limited areas of the site have also been removed. The University intends to develop this site as part of

a new major research facility, the Berkeley Global Campus at Richmond. The Human and Ecological Risk Office (HERO) has been requested to provide technical support for this site.

Document Reviewed

The HERO reviewed "Phase V Field Sampling Plan", dated July 15, 2016, and prepared by Tetra Tech, Inc., for the University of California, Berkeley. The HERO downloaded this document from Envirostor on August 5, 2016.

General Comments

Phases I through IV of previous field sampling efforts investigated site-wide groundwater and upland area soils. In addition, Phase IV sampling included the investigation of magnetic anomalies in the Western Transition Area (WTA), the area between the upland area and the marsh. Phase V field sampling will analyze for contaminants in sediments and pore water in the area of the Western Stege Marsh (WSM) that has not been remediated. Phase V will also further investigate the WTA in order to identify the contents of the fill material used to create that area. The eastern transition area is not included in this work plan, since it is entirely composed of clean fill material.

The HERO reviewed the field sampling work plan for Phase V, focusing on the adequacy of the proposed data to support a potential human health risk evaluation. The Ecological Risk Assessment Section (ERAS) will submit a separate review of this work plan for its adequacy to support a potential ecological health risk evaluation.

The HERO has the following specific comments on the work plan..

Specific Comments

1. Page 9, Section 3.2.1 Data Quality Objectives (DQOs) for Sediment and Pore Water in Western Stege Marsh – Step 1: State the Problem. No screening levels have been proposed for chemicals in sediment that may bioaccumulate in humans who ingest fish caught from Meeker Slough. In addition, sediment in Meeker Slough is not to be sampled in this field sampling event. Therefore, please explain why the problem statement of humans ingesting fish caught from Meeker Slough is included in this section, or revise the problem statement to cover the sampling proposed in Phase V.

2. Page 10, Section 3.2.1 DQOs for Sediment and Pore Water in Western Stege Marsh – Step 4: Define the Boundaries of the Study. Provide the technical/scientific criteria for proposing the sampling of sediment from near-surface and two feet below

surface for polychlorinated biphenyl (PCB) Aroclor analysis. Provide the criteria for choosing the locations of sediments to be analyzed for methylmercury.

3. Page 10, Section 3.2.1 DQOs for Sediment and Pore Water in Western Stege Marsh – Step 5: Develop the Decision Rules. The effects range-low (ER-L) and effects range-medium (ER-M) concentrations are listed in Table 2, not Table 1, as stated in this section. Please correct the text.

4. Page 12, Section 3.2.2 DQOs for the Pothole Investigations in the Western Transition Area (WTA) – Step 1: State the Problem. Please include the depth to groundwater in the WTA in the text to provide the necessary information on the potential for contaminants to leach into groundwater in the WTA.

5. Page 14, Section 3.2.2 DQOs for the Pothole Investigations in the WTA – Step 7: Optimize Design for Obtaining Data. Although samples will be taken at all locations from 0 to 0.5 feet below ground surface (bgs), provide the rationale for choosing locations for the deeper samples (1.5 to 2 feet bgs) to be collected at 50 percent of the samples. Provide the reasons for not taking any samples between two and 10 feet bgs. The HERO recommends that samples at deeper depths be collected should the shallower samples indicate that contamination may exist at depths greater than two feet bgs.

6. Page 15, Section 3.3.2 WTA Potholing Investigation. Describe the methods or provide the reference for potholing and sampling from a pothole, since those methods are not described in the Quality Assurance Project Plan (QAPP).

7. Page 16, Section 3.3.2 WTA Potholing Investigation – Excavation Procedures. Please clarify if the criteria for sampling soil based on odor and/or staining would be related to historical information on past activities.

8. Figure 3 Phase V Investigation Areas. The owner or responsible party of the area east of Meeker Slough and between the WTA and WSM should be identified either in this figure or in the text.

Conclusions

This sampling plan is similar to previous plans submitted to the DTSC and reviewed by the HERO; therefore, most major human health risk assessment issues have already been addressed. The HERO has identified a few deficiencies as described in the specific comments above that must be addressed before the HERO can support its acceptance by the DTSC.

If you have any further questions, please contact Kimiko Klein at (510) 540-3762 or via electronic mail at kimi.klein @dtsc.ca.gov.

Reviewed by: Thomas F Booze, Ph.D.
Staff Toxicologist
Human and Ecological Risk Office

Concur: Claudio Sorrentino, Ph.D.
Senior Toxicologist
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cc: J. Michael Eichelberger, Ph.D.
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