To Eva Chu

From Jason Olson
CAMBRIA

Re: Balaam Brothers
WORK Plan

510 337 9335

CAMBRIA

POST-REMEDIATION EXCAVATION-FLOOR SAMPLING WORKPLAN

Balaam Brothers Property
1350 Powell Street
Emeryville, California
Cambria Project No. 502-1795

February 11, 2003

Prepared for:

David Diamond
Balaam Brothers Partnership
1115 Hillview Road
Berkeley, California 94708

Prepared by:

Cambria Environmental Technology, Inc.
1144 65th Street, Suite B
Oakland, California 94608

Jason D. Olson, EIT
Project Manager

Robert Clark-Riddell, P.E.
Principal Engineer

POST-REMEDIATION EXCAVATION-FLOOR SAMPLING WORKPLAN

Balaam Brothers Property
1350 Powell Street
Emeryville, California

INTRODUCTION

Cambria Environmental Technology, Inc. (Cambria) is submitting this Post-Remediation Excavation-Floor Sampling Workplan for the above-referenced site (the Site) on behalf of the Balaam Brothers Partnership. Site remediation activities were performed in accordance with Cambria's July 3, 2002 Corrective Action Plan (CAP), as approved by the Alameda County Department of Environmental Health (ACDEH). Implementation of the CAP was designed to remediate petroleum hydrocarbons to facilitate issuance of a no further action (NFA) letter. The Site cleanup goals were agreed to by the ACDEH and the San Francisco Bay Regional Water Quality Control Board (RWQCB) in a June 21, 2002 letter. Upon receipt of an NFA letter from the local regulatory agencies, Pulte Homes plans to purchase the Site property and the adjacent property at 1300 Powell Street for redevelopment as high-density housing.

Remediation of the site by excavation and disposal of impacted soil was completed in November 2002. Upon review of draft tables and maps of confirmation sample results, ACDEH approved backfilling of the remedial excavation, which was conducted in a stepwise fashion from early December 2002 through late January, 2003. The final Corrective Action Completion Report was submitted to ACDEH on December 13, 2002. Subsequently, ACDEH conducted an additional review of the confirmation sample results and on February 10, 2003 requested that this Workplan be prepared to provide for additional sampling of residual hydrocarbons in native soil at the base of the backfilled excavation. Described below are the Site background, cleanup goals and agency requirements, soil and groundwater remediation, proposed work, and proposed schedule.

SITE BACKGROUND

The Site is located on the northeast corner of the intersection of Powell Street and Hollis Street, in a mixed industrial/commercial area within Emeryville, California (see Figure 1). The Site background is more completely described in Cambria's Corrective Action Completion Report. In summary, the Site has been impacted by petroleum hydrocarbons from two former underground

storage tanks (USTs) and four former aboveground storage tanks (ASTs) which were placed in service during the 1930s or 1940s, and operated during approximately that period by Cook's Oil Company and Standard Oil Company. The ASTs were removed sometime prior to the late 1950s, prior to acquisition of the property by Balaam Brothers. The USTs were removed by Balaam Brothers in 1987.

CLEANUP GOALS AND AGENCY REQUIREMENTS

The following cleanup goals were approved by the ACDEH and RWQCB in their June 21, 2002 letter, and were used as guidelines during Site excavation:

- Remediation of the upper 10 feet of soil to less than 1,000 parts per million (ppm) total petroleum hydrocarbons (combined TPHg, TPHd and TPHmo).
- Removal of floating product from the groundwater.
- Reduction of dissolved hydrocarbons to less than 20 ppm (milligrams/liter) total petroleum hydrocarbons (combined TPHg, TPHd and TPHmo).
- Clean imported soil shall comprise the upper 2 feet of all landscaped areas, planting boxes, etc.
- Vapor barriers (membranes) shall underlie the entirety of all inhabited structures; no utilities shall penetrate vapor barriers.
- Final Site development plans will be submitted prior to Site development.
- A post-remediation groundwater monitoring program shall be conducted to confirm residual groundwater contaminants at the Site.
- Deed notifications/restrictions shall be filed in accordance with agency requirements

SOIL AND GROUNDWATER REMEDIATION

Remedial Activities

To remediate Site soil and groundwater, Cambria implemented the ACDEH-approved *Corrective Action Plan (CAP)*. The CAP consisted of soil excavation and groundwater extraction during excavation. In summary, Site remediation and restoration consisted of the following activities:

- Excavating most of the Site to 10 feet below grade surface (bgs) during July through November 2002, with some excavation extending to 16 feet bgs to target impacted soil and reduce potential impact to groundwater. A total of 16,338 tons was transported and disposed offsite.

- Using soil analytical results of excavation sidewall and floor samples to help guide excavation boundaries.

- Regrading/excavating the remainder of the Site to approximately 5 feet bgs for geotechnical purposes. The regraded/excavated area encompassed essentially the entire Site, and extended beyond the hydrocarbon-impacted excavation area.

- Removing all groundwater encountered during excavation.

- Backfilling the Site to approximately original Site grade with clean, import material.

- Post-remediation sampling of confined groundwater beneath the remedial excavation.

Sampling Results

Soil and groundwater sampling conducted both prior to, and during remediation indicated that long-chain hydrocarbons, primarily in the range of diesel, were present throughout much of the property. In addition, shorter-chain hydrocarbons in the range of gasoline, and volatile hydrocarbon constituents (benzene, toluene, ethylbenzene and xylenes [BTEX]) were present in the southernmost part of the Site (near sample EX-A-B-10 on Figure 2), apparently associated with a gasoline release from the former USTs near that location. BTEX constituents were present in this area at concentrations exceeding RWQCB Risk Based Screening Levels (RBSLs).

As specified in the CAP, post-remediation confirmation soil samples were collected from excavation sidewalls, and from the excavation floor when the excavation was shallower than 10 ft bgs. Sidewall samples were collected from the most highly impacted zones, as determined from field observations. Analytical results from confirmation sampling show that all impacted soil in excess of 1,000 mg/kg total TPH has been removed to a total depth of 10 feet bgs from the property. Only two soil samples, from excavation sidewall samples located at the western edge of the property, contained concentrations in excess of 1,000 mg/kg total TPH. Residual concentrations of BTEX constituents detected in confirmation samples were either non-detect, or less than RBSLs, with the exception of benzene and/or xylenes detected in three samples [EX-A-

S-3 (10-2-02); EX-A-S-9 (7-24-02); and EX-A-B-10 (7-24-02)]. Current BTEX concentrations are expected to be lower than the concentrations measured in these samples as the result of volatilization resulting from extensive post-remediation grading and the long period of axposure of the excavation floor and sidewalls prior to backfilling.

Highly impacted groundwater and free product was encountered in the shallow wells screened within the excavation boundaries prior to soil and groundwater removal. During excavation, it was determined that this groundwater and free product was present under confined conditions within laterally discontinuous permeable zones surrounded by low permeability clay. Both the impacted groundwater and the generally coincident impacted soils were removed during excavation. Post-remediation wells were drilled through the floor of the excavation and also encountered primarily low permeability clay and apparently discontinuous more permeable saturated zones at depths ranging from 16 to 29 feet. These zones were demonstrably confined and had been hydraulically isolated from the previously removed impacted shallow groundwater, and so contained only low to non-detect levels of site COCs.

PROPOSED WORK

As documented in the *Corrective Action Completion Report*, the remedial excavation has achieved the cleanup goals described above. However, in their February 11, 2003 letter, ACDEH requested that further sampling be conducted to document the residual concentrations of petroleum hydrocarbons and volatile hydrocarbon constituents (BTEX) remaining at depths between 10 and 16 feet below ground surface (ft bgs) at the floor of the remedial excavation, and at one sample location along the southern property boundary. ACDEH has indicated that the purpose of sampling for the northern portion of the site is to provide general information pertaining to residual contamination of diesel-range long-chain hydrocarbons in subsurface soil at the excavation floor, which is approximately 10 ft bgs or deeper. The objective of sampling along the southernmost portion of the site is to provide information pertaining to diesel range hydrocarbons and BTEX, and whether residual concentrations represent a risk to human health.

The proposed work is as follows:

1. A soil sample will be collected from the native soil sidewall of the excavation area at a depth of 3.5 ft bgs and at the location A shown on Figure 2. This boring will be hand augured to a depth of 3 ft bgs. A slide hammer sampler will then be used to retrieve a soil core through the bottom of the boring. The site geologist will log cuttings or core in this interval, and a soil sample will then be collected from each core. All samples will be analyzed for total petroleum hydrocarbons in the ranges of gasoline, diesel, motor oil, and bunker oil, and for individual BTEX constituents.
2. Soil samples will be collected from immediately beneath the excavation backfill at locations B through G shown on Figure 2. Soil borings will be drilled at each sample location using a hollow-stem auger rig or direct-push rig. Each boring will be drilled to within approximately 1-foot of encountering the excavation floor. A split-spoon sampler or coring barrel will then be used to retrieve a soil core through the excavation floor. The site geologist will log cuttings or core in this interval, and a soil sample will then be collected from each core. Each sample will be collected from a few inches below the interface backfill and native soil. If groundwater enters the borehole, a grab groundwater sample will be collected. Samples from the southern portion of the site (locations B, C, D, and E) will be analyzed for total petroleum hydrocarbons in the ranges of gasoline, diesel, motor oil, and bunker oil, and for individual BTEX constituents. Samples from the northern portion of the site (locations F and G) will be analyzed for total petroleum hydrocarbons in the ranges of gasoline, diesel, motor oil, and bunker oil.

The rationale for the proposed sampling locations is as follows:

A. Located at property boundary where shallow soil benzene and xylene concentrations exceeding RBSLs were previously detected.
B. Located at deepest part of excavation close to former USTs and at west edge of area where BTEX constituents in excavated soils exceeded RBSLs.
C. Located near former fuel pumps where boring EB-12 previously contained free product and benzene exceeding RBSL was previously detected at base of excavation.
D. Located in vicinity of former boring 8 (Hicks) and pothole sample PH-3-9 contained elevated TPH concentrations (2,800 and 6,784 mg/kg respectively).
E. Located immediately at north end of former AST tank pit and east of former boring 4A (prior location of free product in groundwater).
F. Located in area where surrounding sample locations previously contained from 3,200 to 10,000 mg/kg TPH.
G. Located near northernmost former AST in area where surrounding samples contained 4,200 to 7,000 mg/kg TPH.

Additional soil boring and sampling details and Cambria's *Standard Field Procedures for Soil Borings and Monitoring Wells* are included in Appendix A.

CONTINGENCIES

In the event that BTEX constituents are detected at concentrations exceeding RBSLs, factors bearing on actual site-specific risks versus the risks suggested by the RBSL comparison will be considered in assessment of the sampling data. Assumptions inherent in the development of the RBSLs will be reviewed to assess whether they match site-specific parameters. If site-specific parameters are such that RBSLs result in overestimates of risk, then site-specific risk estimates will be calculated. In calculating risks, consideration will be given to the effectiveness of proposed institutional and engineering controls in mitigating exposures or rendering exposure pathways incomplete. If needed, additional information from the site (e.g. soil parameters, soil gas samples) may be collected to further refine risk assessments.

PROPOSED SCHEDULE

Due to the need to expedite closure of the Site, it is anticipated that sampling will be conducted on Thursday or Friday, February 12, 2003. Samples will be submitted to the laboratory on an expedited turnaround basis.

FIGURES, TABLES, AND ATTACHMENTS

Figure 1 – Post-Remediation Conditions in Soil and Excavation Extent

Appendix A – Cambria's *Standard Field Procedures for Soil Borings and Monitoring Wells*

EXPLANATION

Depth	TPHg	TPHd	TPHmo	Total*

Concentrations in soil are in parts per million (ppm, mg/kg)
Concentrations exceeding 1,000 ppm total TPH are shown in **bold**

- Approximate location of excavation sidewall soil sample (Cambria, 2002)
- Approximate location of excavation floor soil sample (Cambria, 2002)
- Approximate location of deeper soil boring (Lowney Associates, 2002)
- Approximate location of shallow soil boring (Lowney Associates, 2002)
- Approximate location of exploratory boring (R.T. Hicks, 2001)
- (A) - Proposed soil boring location

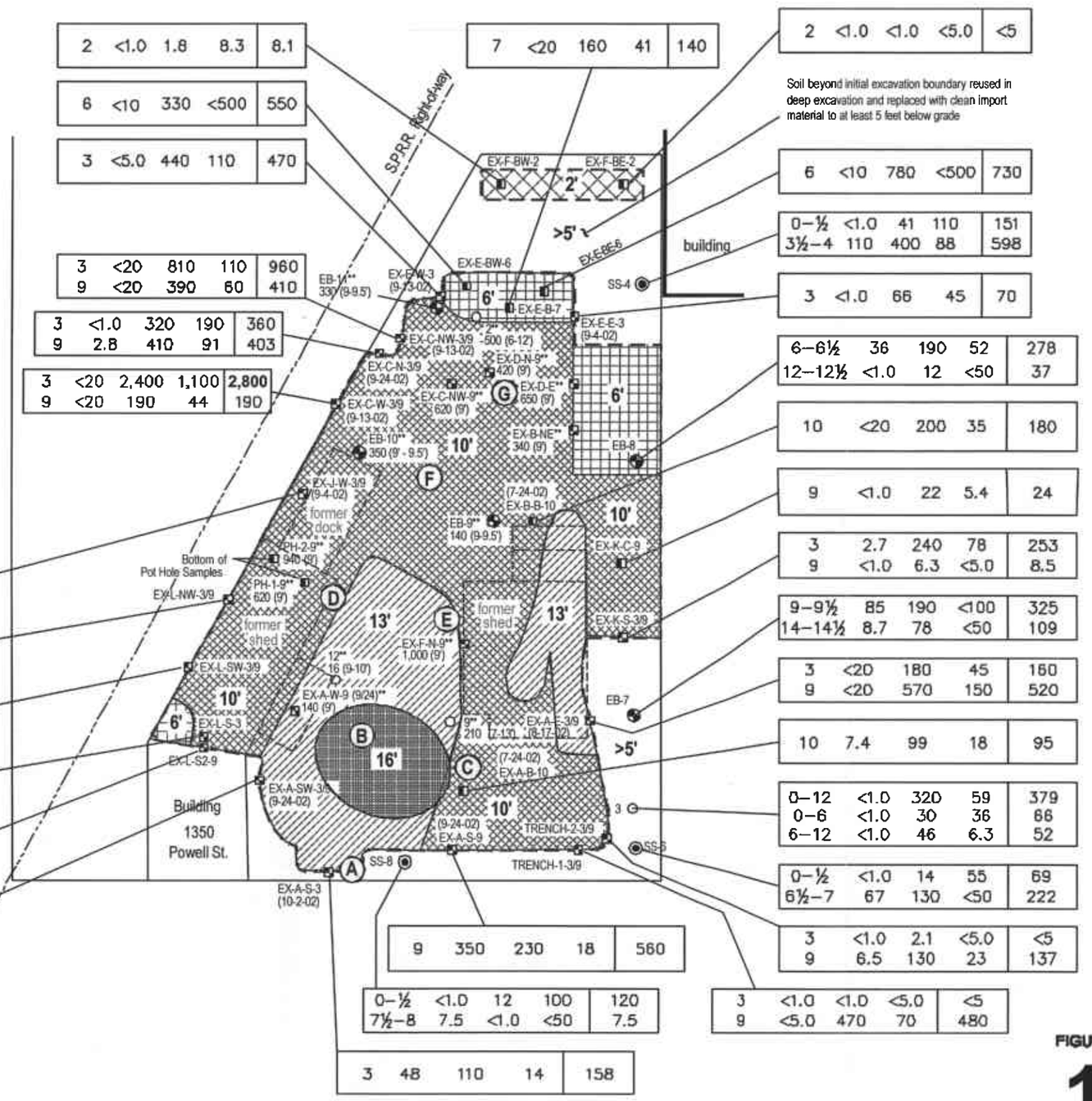
Excavation boundary

2' depth range | 10' depth range | 16' depth range

6' depth range | 13' depth range

* - Total TPH does not equal cumulative result of TPHg + TPHd + TPHmo for excavation confirmation samples. To avoid quantification of overlapping results, Total TPH = TPHg (C6-C9) + TPHbo (C10+) for soil and sidewall samples during excavation in 2002 (TPHbo = TPH bunker oil).

** - Soil sample at excavated location



2	<1.0	1.8	8.3	8.1
6	<10	330	<500	550
3	<5.0	440	110	470
3	<20	810	110	960
9	<20	390	60	410
3	<1.0	320	190	360
9	2.8	410	91	403
3	<20	2,400	1,100	**2,800**
9	<20	190	44	190
3	<2.0	46	18	44
9	<20	220	66	230
3	<1.0	<1.0	<5.0	<5
9	67	3,000	650	**2,867**
3	<1.0	<1.0	<5.0	<5
9	<1.0	<1.0	<5.0	<5
3	<1.0	1.0	<5.0	<5
9	<1.0	41	13	42
3	<1.0	<1.0	<5.0	<5
9	<10	240	25	240
9	350	230	18	560
0–½	<1.0	12	100	120
7½–8	7.5	<1.0	<50	7.5
3	48	110	14	158
7	<20	160	41	140

2	<1.0	<1.0	<5.0	<5
6	<10	780	<500	730
0–½	<1.0	41	110	151
3½–4	110	400	88	598
3	<1.0	66	45	70
6–6½	36	190	52	278
12–12½	<1.0	12	<50	37
10	<20	200	35	180
9	<1.0	22	5.4	24
3	2.7	240	78	253
9	<1.0	6.3	<5.0	8.5
9–9½	85	190	<100	325
14–14½	8.7	78	<50	109
3	<20	180	45	160
9	<20	570	150	520
10	7.4	99	18	95
0–12	<1.0	320	59	379
0–6	<1.0	30	36	66
6–12	<1.0	46	6.3	52
0–½	<1.0	14	55	69
6½–7	67	130	<50	222
3	<1.0	2.1	<5.0	<5
9	6.5	130	23	137
3	<1.0	<1.0	<5.0	<5
9	<5.0	470	70	480

Soil beyond initial excavation boundary reused in deep excavation and replaced with clean import material to at least 5 feet below grade

Post-Remediation Conditions in Soil at or near Excavation Bottom and Excavation Extent, and Proposed Boring Locations

CAMBRIA

Balaam Property
1350 Powell Street
Emeryville, California

FIGURE
1

I:\BALAAM\BROTHERS\FIGURES\CAMBRIA\SAMPLES-101002_02-11.DWG