SUMMARY REPORT: 2020 AMBIENT AIR MONITORING FOR ASBESTOS, METALS AND RESPIRABLE DUSTS
BAY AREA RAPID TRANSIT
M-LINE, OAKLAND AND SAN FRANCISCO, CA

PREPARED FOR:

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SYSTEM SAFETY DEPARTMENT
300 LAKESIDE DRIVE, 18TH FLOOR
OAKLAND, CA 94612

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SCA PROJECT NO.: B-13259

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Abstract

This report summarizes the observations and results of ambient air testing for asbestos, metals and total respirable dust conducted at the various Bay Area Rapid Transit (BART) stations with asbestos-containing fireproofing and/or vinyl asbestos floor tiles and mastics. The monitoring was conducted from August 25 - 27, 2020. The purpose of monitoring the stations with asbestos-containing fireproofing and/or vinyl asbestos floor tiles and mastic was to determine the level of airborne asbestos in the stations and to assess the potential hazards to occupants.

The sample results revealed airborne asbestos fiber levels were all <0.001 fibers/cc based on Phase Contrast Microscopy (PCM) analyses. These results indicate that the airborne asbestos concentration at all sites tested is statistically comparable to background levels, and is not affected by the presence of asbestos-containing construction materials, such as asbestos-containing fireproofing found throughout the structural members.

The downtown San Francisco stations experience black settled dust from the Muni-Metro system sharing a similar tunnel and ventilation system and from rail grinding activities. Airborne sampling was conducted for total respirable dust. In summary, total respirable dust concentrations were found to be as follows:

- Total respirable dust levels at the Embarcadero Center Northeast Station's Booth adjacent to the Clipper Service Station on the Concourse Level had a concentration ranging from 0.018 to 0.105 mg/m^3 with an average concentration of 0.043 mg/m^3, or well under the OSHA Permissible Exposure Limit of 5.0 mg/m^3.
- Total respirable dust levels at the Embarcadero Center Station's Southwest Station Agent's Booth on the Concourse Level had a concentration ranging from 0.012 to 0.086 mg/m^3 with an average concentration of 0.034 mg/m^3, or well under the OSHA Permissible Exposure Limit of 5.0 mg/m^3.
- Total respirable dust levels at the Montgomery Station's Fan Room 107 on the Concourse Level had a concentration ranging from 0.013 to 0.365 mg/m^3 with an average concentration of 0.075 mg/m^3, or well under the OSHA Permissible Exposure Limit of 5.0 mg/m^3.
- Total respirable dust levels at the Montgomery Station's South Station Agent's Booth on the Concourse Level had a concentration ranging from 0.012 to 0.610 mg/m^3 with an average concentration of 0.068 mg/m^3, or well under the OSHA Permissible Exposure Limit of 5.0 mg/m^3.

Finally, settled dust samples from the Montgomery, Powell and Civic Center Station trackside Fan Rooms were analyzed for metal content with the following results (see Table 1):

- The Montgomery Street trackside settled dust sample has an elevated concentration (4,800 mg/kg) of zinc near the TTLC concentration of 5,000 mg/kg; defining this material as a hazardous waste. STLC testing of cadmium, chromium, copper, lead and zinc are needed to determine the leachability of these metals, since the results were above 10% of the TTLC standard.
- The Powell Street trackside settled dust sample has an elevated concentration (8,500 mg/kg) of zinc above the TTLC concentration of 5,000 mg/kg; defining this material as a hazardous waste. STLC testing of cadmium, chromium, copper, lead and zinc are needed to determine the leachability of these metals, since the results were above 10% of the TTLC standard.
- The Civic Center trackside settled dust sample has concentrations under the Title 22 TTLC for each (see Table 7). STLC testing of chromium, copper, lead and zinc are needed to determine the leachability of these metals, since the results were above 10% of the TTLC standard.

Table 1: CAM-17 Settled Dust Analyses

Metal	Montgomery Settled dust TTLC (mg/kg)	Powell Station Settled dust TTLC (mg/kg)	Civic Center Settled dust TTLC (mg/kg)	Title 22 Hazardous Waste TTLC Standard (mg/kg)	Title 22 Hazardous Waste STLC Std. (mg/l)	Comments
Antimony	28	37	12	500	1.5	Below Title 22 TTLC Std.
Arsenic	8.4	8.3	4	500	5.0	Below Title 22 TTLC Std.
Barium	620	340	230	10000	100	Below Title 22 TTLC Std.
Beryllium	ND	ND	ND	75	0.75	Below Title 22 TTLC Std.
Cadmium	13	13	5.9	100(1)	1.0	Below Title 22 TTLC Std.
Chromium	120	100	79	500 (CrVI)	5	Below Title 22 TTLC Std.
Cobalt	12	16	37	8000	80	Below Title 22 TTLC Std.
Copper	570	1500	560	2,500	25	Below Title 22 TTLC Std.
Lead	560	180	110	1,000	5.0	Below Title 22 TTLC Std.
Mercury	0.91	0.15	0.11	20	0.2	Below Title 22 TTLC Std.
Molybdenum	20	19	8.5	3500	350	Below Title 22 TTLC Std.
Nickel	90	96	58	2000	20	Below Title 22 TTLC Std.
Selenium	ND	ND	ND	100	1.0	Below Title 22 TTLC Std.
Silver	1.4	4.1	0.63	500	5	Below Title 22 TTLC Std.
Thallium	ND	ND	ND	700	7.0	Below Title 22 TTLC Std.
Vanadium	45	62	62	5000	24	Below Title 22 TTLC Std.
Zinc	**4,800(1)**	**8,500(1)**	2,000	2400	250	**Above Title 22 TTLC Std. for Montgomery and Powell**

ND = None Detected
N/A = Not Applicable
(1) Requires STLC and TCLP analyses to fully characterize waste disposal requirement, but generally is considered a hazardous waste

Project Personnel

BAY AREA RAPID TRANSIT (BART)

District Industrial Hygienist.....James Lovelady

SCA ENVIRONMENTAL, INC. (SCA)

Certified Industrial Hygienist..... Dan Leung, CIH, CSP, CAC #07-4175
Site Surveillance Technician.....Junjie “Leo” Fang

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1.0 Introduction

This report summarizes the sampling results collected during the ambient air monitoring for asbestos conducted in the Bay Area Rapid Transit's system-wide stations with asbestos-containing fireproofing. The airborne asbestos sampling included the following stations:

- Powell Street Station, San Francisco, CA
- Montgomery Street Station, San Francisco, CA
- 12th Street Station, Oakland, CA
- 19th Street Station, Oakland, CA
- MacArthur Station, Oakland, CA
- Berkeley Main Station, Berkeley, CA
- Ashby Station, Berkeley, CA
- 16th Street Station, San Francisco, CA
- 24th Street Station, San Francisco, CA
- Rockridge Station, Oakland, CA
- Lafayette Station, Lafayette, CA

SCA Environmental, Inc. (SCA) conducted the monitoring from August 25 - 27, 2020 at the request of the Bay Area Rapid Transit District's System Safety Department.

Portions of the systems' structural steel are protected with fireproofing that contains 5 to 10% Chrysotile asbestos. In addition, several other construction materials contain asbestos (including various vinyl floor tiles and mastics in various Train Control Rooms throughout the legacy stations. Asbestos is regulated as a respiratory carcinogen. In order to verify that the operations and maintenance program implemented for this building are working properly, testing for the levels of airborne asbestos fibers is conducted periodically.

2.0 Methodology

Asbestos

Ambient air samples for asbestos were collected at the following stations and quantities:

San Francisco
- Powell Street Station (2)
- Montgomery Street Station (2)

Oakland
- 12th Street Station (1)
- 19th Street Station (1)
- MacArthur Station (1)
- Berkeley Main Station (1)
- Ashby Station (1)

M-Line
- 16th Street (1)
- 24th Street (1)

C-Line
- Rockridge (1)
- Lafayette (1)

All the asbestos samples were analyzed by Phase Contrast Microscopy (PCM), except for the project blanks, in accordance with the National Institute for Occupational Safety and Health (NIOSH) method 7400. PCM results are calculated in fibers per cubic centimeter (f/cc).

All air samples were collected for an approximately 24-hour period using Buck Libra low flow, AC-operated or similar air pumps to maintain even flow rates. Samples were collected on Zefon International Inc. Model Z008BA 25-millimeter, 0.8-micrometer pore size, mixed cellulose ester membrane filters in open-faced cassettes with conductive cowls. Pump flow rates were calibrated against a primary standard.

The contract laboratories that provided analytical asbestos services for the project are summarized below:

Laboratory	Analysis Type	Accreditation
Asbestos TEM Laboratories, Inc. Berkeley, CA	Phase Contrast Microscopy (PCM) Analysis	• National Voluntary Laboratory Accreditation Program (NVLAP # 101048-3). • California Environmental Laboratory Accreditation Program (ELAP #1620).
McCampbell Analytical, Inc. Pittsburg, CA	CAM-17 Metals Analysis	• AIHA Laboratory Accreditation Program (LAP# 232255). • California Environmental Laboratory Accreditation Program (ELAP #1644).

Respirable Dust

Ambient sampling for total respirable dust was conducted at two downtown San Francisco stations, which experience black settled dust deposits associated with the Muni-Metro system within the same tunnels and ventilation system and wheel grinding activities. Total respirable dust sampling was conducted at:

- Montgomery Street Station, San Francisco, CA
- Embarcadero Station, San Francisco, CA

Particulate readings were made utilizing a TSI Dust-Trak, which measures respirable dust or PM_{10} levels. Measurements are reported as mg/m^3.

Particulate matter (PM) is a complex mixture of tiny particles that consists of dry solid fragments, solid cores with liquid coatings, and small droplets of liquid. These particles vary greatly in size, shape and chemical composition, and can be made up of many different materials, such as metals, settled dust, soil, dust, mold and fungi. Particles 10 microns or less in diameter are defines as "respirable particulate matter" or PM_{10}. Fine particles are 2.5 microns or less in diameter ($PM_{2.5}$) and can contribute significantly to regional haze and reduction in visibility.

Spot Particulate Sampling.

In addition to the longer-term respirable dust sampling at the two BART stations noted above, SCA conducted spot sampling at agent booths, ticket machines and trackside to determine typical PM_{10} and $PM_{2.5}$ concentrations for BART passengers and employees. Stations sampled included 24th Street through Embarcadero in San Francisco.

Particulate readings were made utilizing a TSI Dust-Trak, which measures PM $_{2.5}$ and PM_{10} levels.

Settled Dust Sampling

CAM-17 metal analyses were completed for settled dust samples collected in the Montgomery, Powell and Civic Center track beds by EPA Method 6010B/7470A by McCampbell Analytical Inc.'s ELAP-accredited laboratory in Pittsburg, CA.

3.0 Applicable Standards

Asbestos

A summary of airborne asbestos standards applicable to this project is tabulated in Table 2 as follows:

Table 2: Summary of Asbestos Standards

Source	Level	Nature	Comments
Cal/OSHA[1]	0.1 f/cc 1.0 f/cc	Occupational & mandatory	8-hour Time Weighted Average (TWA) Permissible Exposure Level (PEL) (triggers OSHA required training, medical examinations, etc.) Excursion Limit (EL) for 30 minutes sampling duration
NIOSH[2]	0.1 f/cc	Recommended	Occupational PEL
ACGIH[3]	0.2 f/cc	Recommended	Occupational Threshold Limit Value (TLV) Notice of Intended Changes
Calif. Prop 65[4]	vague	Mandatory	Standard and monitoring method are unclear, but generally interpreted as comparable to outside ambient air
Bay Area Rapid Transit	0.01 f/cc (PCM) 70 str/mm^2 (TEM)	Contractual & mandatory Contractual & mandatory	Ambient air action level for occupied areas via PCM. Originating from AHERA[5] regulations and adopted by Bay Area Rapid Transit. Ambient air action level for occupied areas via TEM. Originating from AHERA[5] regulations and adopted by Bay Area Rapid Transit.

1 California Department of Industrial Relations, Division of Occupational Safety and Health, 8 CCR 1529.
2 National Institute of Occupational Safety and Health
3 American Conference of Governmental Industrial Hygienists, 2004
4 California Proposition 65
5 Asbestos Hazard Emergency Response Act (AHERA); 40 CFR Part 763

Respirable Dust

Extensive research indicates that exposure to PM_{10} and $PM_{2.5}$ levels exceeding current air quality standards is associated with increased risk of hospitalization for lung and heart-related respiratory illness, including emergency room visits for asthma. PM exposure is also associated with increased risk of premature deaths, especially in the elderly and people with pre-existing cardiopulmonary disease. In children, studies have shown associations between PM exposure and reduced lung function and increased respiratory symptoms and illnesses.

Table 3 below summarizes the applicable published Cal/OSHA and ACGIH permissible exposure limits for respirable dust as well as the California Air Resources Board's standards. Note that some of the addressed standards cover office environments and are not occupational exposure standards for BART station employees. In addition, many of these standards are arithmetic mean levels over a 24-hour or annual period; therefore, exposure within the BART system needs to be time-weighed against other daily or annual exposures outside the BART system.

Table 3: Summary of Respirable Dust Standards

Contaminant	Source	Level	Nature	Comments
Particulate	N/A	ambient	N/A	Compare against outdoor readings to indicate effectiveness of filter units in air handling system
	Cal/OSHA[1]	5 mg/m^3	Mandatory/ Occupational	8-hour TWA PEL for respirable dust
		10 mg/m^3		8-hour TWA PEL for total dust
	ACGIH[2]	10 mg/m^3	Recommended/ Occupational	8-hour TWA TLV resulting in lung disorders
	EPA[3]	0.05 mg/m^3	Recommended/ Indoor Occupancy (Offices)	National Ambient Air Quality Standard
Respirable Particles (PM_{10})	ASHRAE[4]	0.05 mg/m^3	Recommended Indoor Occupancy (Offices)	Based on protecting office environments against respiratory morbidity in the general population and avoiding exacerbation of asthma with no carcinogens. Indoor concentrations are normally lower. Guideline level may lead to unacceptable deposition of "dust."
	CARB[5]	0.05 mg/m^3	Recommended by CARB	24 hour California Air Resources Board Maximum Indoor Level
		0.02 mg/m^3		Annual arithmetic mean level
	EPA[3]	0.15 mg/m^3	Recommended by LEED Program (for Offices)	National Ambient Air Quality Standard
	LEED[6]	0.05 mg/m^3	Recommended by LEED Program (for Offices)[6]	8-hour TWA PEL for respirable dust for office environments using a TSI Sidepak Aerosol Monitor or PEM Sampler with PM_{10} lab analyses
Respirable Particles ($PM_{2.5}$)	CARB[5]	0.02 mg/m^3	Recommended by CARB	Annual arithmetic mean level
	EPA[3]	0.035 mg/m^3	Recommended by EPA	24-hr arithmetic mean level

Table 1 Footnotes:

1. California Department of Industrial Relations, Division of Occupational Safety and Health, Title 8 General Safety Orders §5155.
2. American Conference of Governmental Industrial Hygienists, 2016, Threshold Limit Values for Chemical Substances and Physical Agents
3. U.S. Environmental Protection Agency, National Ambient Air Quality Standard.
4. ASHRAE Standards 62-1989R, Appendix C-1, August 1996, and 62.1-2004, Appendix B.
5. California Air Resources Board, June 2005, "Draft for Public Review – Report to the California Legislature Indoor Air Pollution in California," Table 4.1.
6. U.S. Green Building Council (USGBC) Leadership in Energy and Environmental Design (LEED), Indoor Air Quality testing, credit 3.2, November 2008.

CAM-17 Metals

Total Threshold Limit Concentrations (TTLC), Soluble Threshold Limit Concentrations (STLC), and Toxicity Characteristic Leaching Procedure (TCLP) limits are published under Title 22 of the California Code of Regulations §662261.24 for classifying hazardous waste. Applicable standards for the CAM-17 metals are included in Tables 1, 7 and 8 herein.

4.0 Results and Discussion

Asbestos

Sampling was conducted as part of the BART's Ambient Air Quality Monitoring Program, since the listed stations have asbestos-containing fireproofing. Sampling was conducted for an approximately 24-hour period from August 25 to August 26, 2020 in the San Francisco stations and August 26 to August 27, 2020 in the East Bay Stations.

At the request of Mr. James Lovelady within BART's System Safety Department, SCA Environmental, Inc. (SCA) conducted visual inspections and ambient air testing. SCA's Environmental Scientist, Mr. Junjie "Leo" Fang (Site Surveillance Technician), conducted work under the direct supervision of Mr. Dan Leung, CIH, CSP of SCA. Mr. Leung is a Cal/OSHA registered Certified Asbestos Consultant (CAC #07-4175) and a Certified Industrial Hygienist (CIH).

The ambient air sampling results for the Stations are summarized in Table 4 below. The laboratory reports and field data sheets are included as Attachment 1. All observed asbestos-containing fireproofing was noted to be in "good" condition. No notable areas of imminent danger were observed within the representative areas viewed by SCA's Surveyor. Asbestos fireproofing on the Concourse Level of the Powell Street Station was significantly abated since the prior ambient air sampling in May 2011.

Background airborne fiber concentrations by PCM were as follows:

Table 4: Summary of Airborne Asbestos Results

Station	Location	Sample I.D.	Results (fibers/cc)	Comments
Lafayette	Train Control Room 103	LAF-TC103	<0.001	Well below the EPA's PCM Reoccupancy Air Standard of 0.01 f/cc
Rockridge	Janitor's Room 203	ROCK-203	<0.001	Well below the EPA's PCM Reoccupancy Air Standard of 0.01 f/cc
MacArthur	Break Room 102	MAC-102	<0.001	Well below the EPA's PCM Reoccupancy Air Standard of 0.01 f/cc
Berkeley	Break Room 108	BERK-108	<0.001	Well below the EPA's PCM Reoccupancy Air Standard of 0.01 f/cc
Ashby	Elevator Room 204	ASH-204	<0.001	Well below the EPA's PCM Reoccupancy Air Standard of 0.01 f/cc
19th St. Oakland	Mech. Room 108A	19-108A	<0.001	Well below the EPA's PCM Reoccupancy Air Standard of 0.01 f/cc
12th St. Oakland	Electrical Room 107C	12-107C	<0.001	Well below the EPA's PCM Reoccupancy Air Standard of 0.01 f/cc
Montgomery	Coffee Shop Storage/Elect Room 110.	MONT-110	<0.001	Well below the EPA's PCM Reoccupancy Air Standard of 0.01 f/cc
Montgomery	Storage Room 111	MONT-111	<0.001	Well below the EPA's PCM Reoccupancy Air Standard of 0.01 f/cc
Powell	Police Break Room	POW-POL-BK	<0.001	Well below the EPA's PCM Reoccupancy Air Standard of 0.01 f/cc
Powell	Electrical Room 110	POW-110	<0.001	Well below the EPA's PCM Reoccupancy Air Standard of 0.01 f/cc
16th St. Mission	Mech. Room 101A	16-101A	<0.001	Well below the EPA's PCM Reoccupancy Air Standard of 0.01 f/cc
24th St. Mission	Mech. Room 101A	24-101A	<0.001	Well below the EPA's PCM Reoccupancy Air Standard of 0.01 f/cc

All ambient station air samples were below BART's Perimeter Action Level of 0.01 fibers per cubic centimeter (fibers/cc). The results were generally found to be comparable to the previous sampling rounds completed by SCA.

Respirable Dust (PM_{10})

SCA sampled for respirable dust at two San Francisco Stations to determine typical airborne dust concentrations. Sampling occurred during typical daytime and nighttime operations with the fans on as well as overnight. The purpose of this sampling was to determine the concentrations of black carbon settled dust arising from the Muni-Metro system, which shares a common ventilation system.

Total respirable dust concentrations were found to be as follows:

Table 5: Respirable Dust Concentrations

Location	Start Date	Sampling Time	Respirable Dust Concentration			Permissible Exposure Limit (mg/m^3)	Comments
			Max. Level (mg/m^3)	Min. Level (mg/m^3)	Average Level (mg/m3)		
Embarcadero Concourse Level Northeast Station Agent's Booth	8/26/20	24:03 hrs.	0.105	0.018	0.043	5.0	Well Below 8-hr. PEL
Embarcadero Concourse Level Southwest Station Agent's Booth	8/26/20	24:03 hrs.	0.086	0.012	0.034	5.0	Well Below 8-hr. PEL
Montgomery Platform Level Station Fan Room 107	8/25/20	24:00 hrs.	0.365	0.013	0.075	5.0	Well Below 8-hr. PEL
Montgomery Concourse Level South Station Agent's Booth	8/25/20	24:00 hrs.	0.610	0.012	0.068	5.0	Well Below 8-hr. PEL

All sample results were found to be well under Cal/OSHA's occupational exposure standard of 5.0 mg/m^3.

Spot PM_{10} and $PM_{2.5}$ Reading

The results of spot PM_{10} and $PM_{2.5}$ readings for various San Francisco Line stations are presented in Table 6.

Table 6: Spot PM_{10} and $PM_{2.5}$ Readings

				PM_{10} Concentrations (mg/m^3)			$PM_{2.5}$ Concentrations (mg/m^3)		
Station	**Date**	**Time**	**Location**	**Max**	**Avg.**	**Min.**	**Max**	**Avg.**	**Min**
CAAQS Std.[1]					0.05			0.035	
Cal/OSHA 8-hr. PEL Respirable Dust[2]					5			---	
19th St.	8/27/2020	4:22 p.m.	Northeast Ticket Machines	0.021	0.020	0.019	0.024	0.021	0.020
19th St.	8/27/2020	4:31 p.m.	Central Agent Booth	0.016	0.015	0.014	0.018	0.017	0.016
19th St.	8/27/2020	4:38 p.m.	Lower Platform Trackside	0.016	0.015	0.014	0.017	0.016	0.017
12th St.	8/27/2020	3:58 p.m.	Central Agent Booth	0.022	0.021	0.020	0.020	0.019	0.019
12th St.	8/27/2020	4:06 p.m.	North Ticket Machines	0.022	0.020	0.019	0.021	0.019	0.018
12th St.	8/27/2020	4:13 p.m.	Upper Platform Trackside	0.027	0.025	0.023	0.026	0.024	0.021
Montgomery	8/27/2020	3:05 p.m.	North Agent Booth	0.017	0.017	0.017	0.020	0.019	0.019
Montgomery	8/27/2020	3:12 p.m.	North Ticket Machines	0.019	0.017	0.016	0.021	0.020	0.019
Montgomery	8/27/2020	3:19 p.m.	Trackside	0.055	0.049	0.045	0.053	0.048	0.044
Powell	8/27/2020	2:35 p.m.	Police Squad Room	0.024	0.023	0.022	0.026	0.025	0.024
Powell	8/27/2020	2:42 p.m.	South Agent Booth	0.022	0.020	0.017	0.023	0.020	0.019
Powell	8/27/2020	2:51 p.m.	North Ticket Machines	0.032	0.030	0.027	0.032	0.031	0.029
16th St.	8/27/2020	1:40 p.m.	Agent Booth	0.050	0.047	0.044	0.048	0.045	0.043
16th St.	8/27/2020	1:47 p.m.	Ticket Machines	0.101	0.056	0.017	0.099	0.053	0.017
16th St.	8/27/2020	1:55 p.m.	Trackside	0.125	0.084	0.053	0.118	0.083	0.053
24th St.	8/27/2020	1:14 p.m.	Agent Booth	0.083	0.062	0.045	0.079	0.063	0.049
24th St.	8/27/2020	1:21 p.m.	Ticket Machines	0.049	0.033	0.013	0.045	0.029	0.013
24th St.	8/27/2020	1:28 p.m.	Trackside	0.104	0.087	0.075	0.086	0.076	0.068
Civic Center	8/27/2020	2:06 p.m.	North Agent Booth	0.029	0.027	0.026	0.030	0.027	0.025
Civic Center	8/27/2020	2:13 p.m.	North Ticket Machines	0.028	0.020	0.016	0.028	0.020	0.017
Civic Center	8/27/2020	2:21 p.m.	Trackside	0.135	0.115	0.089	0.129	0.108	0.088
Embarcadero	8/27/2020	12:18 p.m.	Southwest Agent Booth	0.069	0.048	0.040	0.043	0.038	0.034
Embarcadero	8/27/2020	12:28 p.m.	Southwest Ticket Machines	0.049	0.041	0.025	0.043	0.034	0.022
Embarcadero	8/27/2020	12:53 p.m.	Trackside	0.110	0.087	0.064	0.082	0.072	0.057
			Maximum	0.135	0.115	0.089	0.129	0.108	0.088
			Minimum	0.016	0.015	0.013	0.017	0.016	0.013

				PM_{10} Concentrations (mg/m^3)			$PM_{2.5}$ Concentrations (mg/m^3)		
Station	**Date**	**Time**	**Location**	**Max**	**Avg.**	**Min.**	**Max**	**Avg.**	**Min**
CAAQS Std.(1)					0.05			0.035	
Cal/OSHA 8-hr. PEL Respirable Dust(2)					5			---	
			Average	0.051	0.041	0.032	0.047	0.039	0.031

Source: (1) California Environmental Protection Agency Air Resources Board, April 25, 2005
http://www.arb.ca.gov/research/aaqs/caaqs/pm/pm.htm
(2) Table AC-1 Permissible Exposure Limits for Chemical Contaminants
https://www.dir.ca.gov/title8/5155table_ac1.html

None of the spot measurements found PM_{10} levels exceeding Cal/OSHA's 8-hr. Permissible Exposure Limit of 5.0 mg/m^3; Cal/OSHA has no established occupational standard for $PM_{2.5}$. While the short-term $PM_{2.5}$ exposures exceed the EPA/CARB level of 0.035 mg/m^3, the EPA/CARB standard is an annual average concentration. Passengers and employees need to weigh their exposures outside of the station with the time-weighted exposures indoors. Note that the airborne levels within the BART system largely contain carbon, cellulose, silica and iron as contaminants, based on previous bulk sample analyses.

Cleanup of the stations with HEPA-filtered vacuums would help reduce the airborne dust concentrations. Use of power washing would require proper filtering and disposal of the waste water because of its metal content.

Settled Dust

Settled dust samples were collected within the trackside fan rooms at three San Francisco Stations to determine their metal content. Analyses were completed by McCampbell Analytical Inc.'s ELAP-accredited laboratory. The results of the CAM-17 analyses are as follows:

Table 7: Settled Dust CAM-17 TTLC Metal Analyses

CAM-17 Metal	Sample MONT-305		Sample POWELL-304		Sample CIVIC-301A/B		Title 22 Hazardous Waste TTLC/ STLC Standard*
	TTLC (ppm)	STLC/ TCLP (mg/l)	TTLC (ppm)	STLC/ TCLP (mg/l)	TTLC (ppm)	STLC/ TCLP (mg/l)	
Antimony	28	N/A	37	N/A	12	N/A	500 / 15
Arsenic	8.4	N/A	8.3	N/A	4	N/A	500 /5.0
Barium	620	N/A	340	N/A	230	N/A	10000 / 100
Beryllium	ND	N/A	ND	N/A	ND	N/A	75 / 0.75
Cadmium	13	TBD	13	TBD	5.9	N/A	100 / 1.0
Chromium	120	TBD	100	TBD	79	TBD	500 (CrVI) / 5
Cobalt	12	N/A	16	N/A	37	N/A	8000 / 80
Copper	570	TBD	1500	TBD	560	TBD	2500 / 25
Lead	560	TBD	180	TBD	110	TBD	1,000 / 5.0
Mercury	0.91	N/A	0.15	N/A	0.11	N/A	20 / 0.2
Molybdenum	20	N/A	19	N/A	8.5	N/A	3500 / 350
Nickel	90	N/A	96	N/A	58	N/A	2000 /20
Selenium	ND	N/A	ND	N/A	ND	N/A	100 / 1.0
Silver	1.4	N/A	4.1	N/A	0.63	N/A	500 / 5
Thallium	ND	N/A	ND	N/A	ND	N/A	700 / 7.0
Vanadium	45	N/A	62	N/A	62	N/A	2400/ 24
Zinc	**4,800**	TBD	**8,500**	TBD	2,000	TBD	5000 / 250

ND = None Detected
N/A = TTLC results under 10% of standard, so extraction testing is not required
TBD = To Be Determined
TTLC = Total Threshold Limit Concentration in ppm or mg/kg
STLC = Soluble Threshold Limit Concentrations in mg/liter
TCLP = Toxicity Characteristic Leaching Procedure in mg/liter

The results of the CAM-17 analyses are as follows:

- The Montgomery Street trackside settled dust sample has an elevated concentration (4,800 mg/kg) of zinc near the TTLC concentration of 5,000 mg/kg; defining this material as a hazardous waste. STLC testing of cadmium, chromium, copper, lead and zinc are needed to determine the leachability of these metals, since the results were above 10% of the TTLC standard.
- The Powell Street trackside settled dust sample has an elevated concentration (8,500 mg/kg) of zinc above the TTLC concentration of 5,000 mg/kg; defining this material as a hazardous waste. STLC testing of cadmium, chromium, copper, lead and zinc are needed to determine the leachability of these metals, since the results were above 10% of the TTLC standard.
- The Civic Center trackside settled dust sample has concentrations under the Title 22 TTLC for each (see Table 7). STLC testing of chromium, copper, lead and zinc are needed to determine the leachability of these metals, since the results were above 10% of the TTLC standard.

No suspect materials were collected for Polarized Light Microscopy (PLM) analysis.

For informational purposes the metal concentrations in May 2011 for the Powell, Montgomery and Embarcadero Stations were as follows:

- Airborne lead concentrations during the sampling periods were all below 0.014 µg/m^3, or less than the analytical detection limit. All perimeter airborne lead concentrations were well below Cal/OSHA's Action

Level or Permissible Exposure Level (PEL) of 30 µg/m^3 and 50 µg/m^3, respectively, as well as the National Ambient Air Quality Standard (NAAQS) of 1.5 µg/m^3.

- Airborne iron concentrations during the sampling period ranged from <4.6 to 80 µg/m^3. All airborne iron concentrations were well below Cal/OSHA's Permissible Exposure Level (PEL) of 5,000 µg/m^3.

- Airborne copper concentrations during the sampling period ranged from <0.11 to 1.1 µg/m^3, or well below Cal/OSHA's Permissible Exposure Level (PEL) of 100 µg/m^3 for copper fume.

- Airborne zinc concentrations during the sampling period were all below 1.4 µg/m^3, or less than the analytical detection limit, or well below Cal/OSHA's Permissible Exposure Level (PEL) of 5,000 µg/m^3 for zinc fumes.

- Airborne nickel concentrations during the sampling period ranged from <0.11 to 0.39 µg/m^3, or well below Cal/OSHA's Permissible Exposure Level (PEL) of 1,000 µg/m^3.

- Airborne chromium concentrations during the sampling period all ranged from 0.12 to 0.21 µg/m^3, or well below Cal/OSHA's Permissible Exposure Level (PEL) of 500 µg/m^3.

Please feel free to contact me directly if you have any questions.

Sincerely,
SCA ENVIRONMENTAL, INC.

Dan Leung, CIH, CSP, CAC #07-4175, CDPH #7329
Vice-President, Industrial Hygiene
(415) 867-9544
dleung@sca-enviro.com

Attachment 1

Laboratory Results – Airborne Asbestos

p poo. 9

FIELD DATA SHEET

	Tel	Fax
650 Delancey St, #222, SF, CA 94107	415-8821675	415-9620736
1 Lakeside Drive, Suite 215, Oakland, CA 94612	510-6456200	415-9620736

PROJECT NAME	**BART Ambient Air Sam**	**SCA PRJ #**	**B-12658**
Zone	**Activities**	**DATE**	**8/25 - 8/26**
Asbestos-containing Stations	**Ambient Air Sampling**		

Inspected & Sampled By: **LF** **Reviewed By:** **DL**

COMMENTS: Ambient air sampling.

Media: 25mm 0.8mic MCEF
Method Ref: 7400 PCM
Sampling Type: Ambient

BLANKS	BLANK			Rotom ID:	5141	Report #:	370390	
	24th St. Mech Rm	16th St. Mech Rm	Powell Electrical	Powell Police	Montgomery Storage	Montgomery Coffee Shop Storage	12th St. Electrical	19th St. Mech Rm
SAMPLE LOC	101A	101A	Rm 110	Break Rm	Rm 111	Rm/Electric Rm 110	Rm 107C	108A
START (LPM)	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
STOP (LPM)	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
HEIGHT (ft)	5	5	5	5	5	5	5	5
SAMPLE I.D.	24-101A	16-101A	POW-110	POW-POL-BK	MONT-111	MONT-110	12-107C	19-108A
PUMP I.D.	SCA1028	SCA1069	10076	SCA1483	SCA1037	10077	SCA1030	SCA1028
AVG. FLOW RATE (LPM)	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
TIME ON (hh:mm)	10:34	10:17	09:22	09:08	08:25	08:43	09:43	10:09
TIME OFF	07:55	08:07	08:28	08:23	08:42	08:50	08:06	11:00
SAMPLED TIME (MIN.)	1281	1310	1386	1395	1457	1447	1343	1491
SAMPLE VOL. (L.)	2434	2489	2633	2651	2768	2749	2552	2833
microgram / M^3 lead	NA	NA	NA	NA	NA	NA	NA	NA
p p b lead	NA	NA	NA	NA	NA	NA	NA	NA
[PCM] Total Fibers/ cc	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
[TEM] structures/ cc	NA	NA	NA	NA	NA	NA	NA	NA

	Ashby Elevator Rm	Berkeley Break Rm	MacArthur Break	Rockridge Janitor's	Lafayette Train
SAMPLE LOC	204	108	Rm 102	Rm 203	Control Rm 103
START (LPM)	1.9	1.9	1.9	1.9	1.9
STOP (LPM)	1.9	1.9	1.9	1.9	1.9
HEIGHT (ft)	5	5	5	5	5
SAMPLE I.D.	ASH-204	BERK-108	MAC-102	ROCK-203	LAF-TC103
PUMP I.D.	SCA1069	SCA1037	10076	SCA1030	SCA1028
AVG. FLOW RATE (LPM)	1.9	1.9	1.9	1.9	1.9
TIME ON (hh:mm)	10:50	11:05	10:34	12:25	12:06
TIME OFF	08:43	09:20	08:17	10:27	10:00
SAMPLED TIME (MIN.)	1313	1335	1303	1322	1314
SAMPLE VOL. (L.)	2495	2537	2476	2512	2497
microgram / M^3 lead	NA	NA	NA	NA	NA
p p b lead	NA	NA	NA	NA	NA
[PCM] Total Fibers/ cc	<0.001	<0.001	<0.001	<0.001	<0.001
[TEM] structures/ cc	NA	NA	NA	NA	NA

Sampling Location Diagram work zone * sample location

PHASE CONTRAST MICROSCOPY
ANALYTICAL REPORT
NIOSH 7400 Method

Contact: Dan Leung

Address: SCA Environmental, Inc. - San
320 Justin Drive
San Francisco, CA 94112

Samples Submitted: 14

Samples Analyzed: 13

Job Site / No. Bart M-Line
B13259-DL

Report No.: **370390**
Date Reported: Sep-02-20
Date Submitted: 082820

SAMPLE ID	FIBERS per CC	95% UCL	FIBERS per FIELDS	FIBERS per FILTER	LOCATION / DESCRIPTION
24-101A Lab ID # 532-06390-001	< **0.0011**	**0.0024**	< **5.5/100**	< **2697**	Volume(L) Run Time(Min) Flow Rate(LPM) 2434
16-101A Lab ID # 532-06390-002	< **0.0011**	**0.0022**	< **5.5/100**	< **2697**	Volume(L) Run Time(Min) Flow Rate(LPM) 2489
POW-110 Lab ID # 532-06390-003	< **0.0010**	**0.0023**	< **5.5/100**	< **2697**	Volume(L) Run Time(Min) Flow Rate(LPM) 2633
POW-POL-BK Lab ID # 532-06390-004	< **0.0010**	**0.0022**	< **5.5/100**	< **2697**	Volume(L) Run Time(Min) Flow Rate(LPM) 2651
MONT-111 Lab ID # 532-06390-005	< **0.0010**	**0.0018**	< **5.5/100**	< **2697**	Volume(L) Run Time(Min) Flow Rate(LPM) 2768
MONT-110 Lab ID # 532-06390-006	< **0.0010**	**0.0022**	< **5.5/100**	< **2697**	Volume(L) Run Time(Min) Flow Rate(LPM) 2749
12-107C Lab ID # 532-06390-007	< **0.0011**	**0.0028**	< **5.5/100**	< **2697**	Volume(L) Run Time(Min) Flow Rate(LPM) 2552
19-108A Lab ID # 532-06390-008	< **0.0010**	**0.0021**	< **5.5/100**	< **2697**	Volume(L) Run Time(Min) Flow Rate(LPM) 2833
ASH-204 Lab ID # 532-06390-009	< **0.0011**	**0.0024**	< **5.5/100**	< **2697**	Volume(L) Run Time(Min) Flow Rate(LPM) 2495
BERK-108 Lab ID # 532-06390-010	< **0.0011**	**0.0023**	< **5.5/100**	< **2697**	Volume(L) Run Time(Min) Flow Rate(LPM) 2537

Detection Limit = 7 Fibers/MM2

Analyst Jie Zhang

ASBESTOS TEM LABORATORIES, INC.
www.asbestostemlabs.com

600 BANCROFT WAY, STE. A, BERKELEY, CA 94710 (510) 704-8930
With Offices in Reno, NV (775) 359-3377

PHASE CONTRAST MICROSCOPY
ANALYTICAL REPORT
NIOSH 7400 Method

Contact: Dan Leung

Address: SCA Environmental, Inc. - San
320 Justin Drive
San Francisco, CA 94112

Samples Submitted: 14

Samples Analyzed: 13

Job Site / No. Bart M-Line
B13259-DL

Report No.: **370390**
Date Reported: Sep-02-20
Date Submitted: 082820

SAMPLE ID	FIBERS per CC	95% UCL	FIBERS per FIELDS	FIBERS per FILTER	LOCATION / DESCRIPTION
MAC-102 Lab ID # 532-06390-011	< **0.0011**	**0.0022**	< **5.5/100**	< **2697**	Volume(L) Run Time(Min) Flow Rate(LPM) 2476
ROCK-203 Lab ID # 532-06390-012	< **0.0011**	**0.0022**	< **5.5/100**	< **2697**	Volume(L) Run Time(Min) Flow Rate(LPM) 2512
LAF-TC103 Lab ID # 532-06390-013	< **0.0011**	**0.0022**	< **5.5/100**	< **2697**	Volume(L) Run Time(Min) Flow Rate(LPM) 2497
BLANK Lab ID # 532-06390-014	**NA**	**NA**	**NA/100**	**NA**	HOLD Volume(L) Run Time(Min) Flow Rate(LPM)
Lab ID #					Volume(L) Run Time(Min) Flow Rate(LPM)
Lab ID #					Volume(L) Run Time(Min) Flow Rate(LPM)
Lab ID #					Volume(L) Run Time(Min) Flow Rate(LPM)
Lab ID #					Volume(L) Run Time(Min) Flow Rate(LPM)
Lab ID #					Volume(L) Run Time(Min) Flow Rate(LPM)
Lab ID #					Volume(L) Run Time(Min) Flow Rate(LPM)

Detection Limit = 7 Fibers/MM2

Analyst Jie Zhang

ASBESTOS TEM LABORATORIES, INC.
www.asbestostemlabs.com

600 BANCROFT WAY, STE. A, BERKELEY, CA 94710 (510) 704-8930
With Offices in Reno, NV (775) 359-3377

CHAIN OF CUSTODY FORM

Bill to: SCA Environmental

Email report/COC/Invoice to:
dleung@sca-enviro.com (PROJ MGR)
lfang@scaehs.com (TECH)
labreports99@gmail.com (ACCT)

EMAIL HEADING: BART M-LINE AMBIENT AIR — (Project #) - (Project Manager Initials) - (Site Name/Address) - (Date MMDD)

B13259	DL	BART [redacted] M-line	8/28

LAB: ATEM

COURIER

LAB REP NOTIFIED:		Notification DATE/TIME:	
COURIER (UPS, SPC T,...)		LAST 5 OF TRACKING NUMBER:	
EST ARRIVAL DATE:		EST. ARRIVAL TIME:	

Method Reference: (7400 PCM) AHERA TEM ≤0.005 s/cc AnaSen) CARB-AHERA TEM 0.001 s/cc Ana Sensitivity

PLM (asbestos) Flame AA (Lead) ICP (Lead)

Sample Media: (25) 37 mm 0.45 (0.8 micron) MCEF Bulk Water Wipe

RESULTS DUE: 3 days TAT AM / PM

CHAIN OF CUSTODY DATA:

Sending Info: 14 samples submitted by LF on 8/28 at ~~4:00~~ 4:00P

Received by Lab: 14 samples received by MTZ on 8/31 at 1030

Received by Analyst: _____ samples received by _____ on _____ at _____

SAMPLE ID	LITERS	Description	Ins/Blanks/Outs
24-101A	2434		
16-101A	2489		
POW-110	2633		
POW-POL-Bk	2651		
MONT-111	2768		
MONT-110	2749		
12-107C	2552		
19-108A	2833		
ASH-204	2495		
BERK-108	2537		
MAC-102	2476		
ROCK-203	2512		
LAF-TC103	2497		
BLANK	0 LITERS	HOLD	BLANK
	0 LITERS		BLANK
	0 LITERS		BLANK

INSTRUCTIONS TO LAB (delete items not applicable AND circle items applicable):

1. Pickup requested:
   Contact: _____
   Time of Call: _____
2. Call contact to acknowledge receipt of samples.
3. Analyze samples by PCM only.
4. Analyze inside samples by PCM first; if any sample >0.01 f/cc, contact project manager.
5. If all samples are <0.01 f/cc, proceed with items 6, 7 or 8, as noted.
6. Analyze inside samples only; stop if Avg >70 str/mm^2, contact PM before analyzing outsides or blanks.
7. Analyze all samples, including outside samples and blanks.
8. Do NOT analyze outside or blank samples.
9. Analyze by TEM only the inside air sample with the highest PCM result.
10. Serial analysis; stop at first positive (>1%); first trace (<0.1%);except sheetrock and plaster samples.
11. Analyze all bulk samples, unless otherwise indicated.
12. PCB: <0.05mg/kg detection limit required. Authorized to perform cleanup to meet the detection limit.
13. _____

Report Number: 370390

Invoice Number:

INSTRUCTIONS TO LAB: call 858-999-4462 if questions

Supplies /Equipment	Qty
Hi-Vol Pumps (3040)	
Lo-Vol Pumps (3020)	13
TEM / Pb cassettes (3520)	
PCM cassettes (3500)	14
Bulk sampling supply (3710)	
Lead Wipes (3266)	
Legionella Bottles (3742)	
Water Bottles (Pb/other) (3743)	
Mold Cassettes (3522)	
Smoke Tubes (3540)	
Matched Weight Cassette (3521)	

ver 2015

Attachment 2

Respirable Dust (PM_{10}) Sampling Results – Embarcadero & Montgomery Street Stations

Location	Level	Start Date	DustTrak ID	Test Length (D:H:M)	Max Level(mg/m3)	Min Level	Avg Level	TWA
Embarcadero Northeast Station Agent's Booth(near Clipper Service Station)	Concourse	8/26/2020	8017	1:03:00	0.105	0..018	0.043	0.05
Embarcadero Southwest Station Agent's Booth	Concourse	8/26/2020	8016	1:03:00	0.086	0.012	0.034	0.044
Montgomery Station Fan Room 107	Concourse	8/25/2020	8017	1:00:40	0.365	0.013	0.075	0.157
Montgomery South Station Agent's Booth	Concourse	8/25/2020	8016	1:00:30	0.61	0.012	0.068	0.124

Instrumen	DustTrak II
Model Nur	8530
Serial Num	8.53E+09
Firmware V	3.9
Calibration	3/3/2020
Test Name	EMBAR NE AGE_778
Test Start T	########
Test Start I	########
Test Lengtl	1:03:00
Test Interv	10:00
Mass Aver	0.043
Mass Mini	0.018
Mass Maxi	0.105
Mass TWA	0.05
Photometr	1
Flow User	0
Errors	
Number of	162

Elapsed Tir	Mass [mg/	Alarms	Errors
600	0.058		
1200	0.083		
1800	0.079		
2400	0.066		
3000	0.058		
3600	0.048		
4200	0.043		
4800	0.043		
5400	0.041		
6000	0.042		
6600	0.044		
7200	0.05		
7800	0.054		
8400	0.057		
9000	0.06		
9600	0.06		
10200	0.056		
10800	0.049		
11400	0.047		
12000	0.051		
12600	0.051		
13200	0.05		
13800	0.055		
14400	0.052		
15000	0.05		
15600	0.05		
16200	0.047		

16800	0.043
17400	0.047
18000	0.046
18600	0.041
19200	0.038
19800	0.044
20400	0.08
21000	0.058
21600	0.04
22200	0.035
22800	0.036
23400	0.032
24000	0.041
24600	0.051
25200	0.042
25800	0.044
26400	0.045
27000	0.045
27600	0.052
28200	0.047
28800	0.048
29400	0.038
30000	0.034
30600	0.033
31200	0.043
31800	0.037
32400	0.034
33000	0.035
33600	0.032
34200	0.029
34800	0.032
35400	0.042
36000	0.042
36600	0.043
37200	0.037
37800	0.034
38400	0.033
39000	0.03
39600	0.031
40200	0.034
40800	0.04
41400	0.038
42000	0.047
42600	0.048
43200	0.045
43800	0.044
44400	0.065

45000	0.052
45600	0.045
46200	0.047
46800	0.053
47400	0.051
48000	0.048
48600	0.049
49200	0.045
49800	0.04
50400	0.036
51000	0.032
51600	0.032
52200	0.031
52800	0.031
53400	0.03
54000	0.029
54600	0.029
55200	0.029
55800	0.033
56400	0.031
57000	0.031
57600	0.032
58200	0.031
58800	0.03
59400	0.029
60000	0.028
60600	0.027
61200	0.026
61800	0.028
62400	0.025
63000	0.025
63600	0.024
64200	0.023
64800	0.023
65400	0.023
66000	0.022
66600	0.022
67200	0.022
67800	0.021
68400	0.02
69000	0.019
69600	0.019
70200	0.018
70800	0.018
71400	0.02
72000	0.02
72600	0.023

73200	0.028
73800	0.053
74400	0.105
75000	0.064
75600	0.049
76200	0.046
76800	0.045
77400	0.039
78000	0.042
78600	0.049
79200	0.05
79800	0.06
80400	0.058
81000	0.055
81600	0.054
82200	0.055
82800	0.054
83400	0.051
84000	0.051
84600	0.052
85200	0.049
85800	0.048
86400	0.045
87000	0.046
87600	0.049
88200	0.045
88800	0.044
89400	0.048
90000	0.048
90600	0.047
91200	0.048
91800	0.049
92400	0.054
93000	0.05
93600	0.048
94200	0.045
94800	0.067
95400	0.057
96000	0.063
96600	0.063
97200	0.047

Instrumen	DustTrak II
Model Nur	8530
Serial Num	8.53E+09
Firmware \	3.9
Calibration	########
Test Name	EMBAR S AGEN_081
Test Start	########
Test Start I	########
Test Lengtl	1:03:00
Test Interv	10:00
Mass Aver	0.034
Mass Mini	0.012
Mass Maxi	0.086
Mass TWA	0.044
Photometr	1
Flow User	0
Errors	
Number of	162

Elapsed Tir	Mass [mg/	Alarms	Errors
600	0.048		
1200	0.044		
1800	0.051		
2400	0.038		
3000	0.05		
3600	0.057		
4200	0.053		
4800	0.051		
5400	0.049		
6000	0.05		
6600	0.049		
7200	0.043		
7800	0.036		
8400	0.035		
9000	0.039		
9600	0.042		
10200	0.052		
10800	0.043		
11400	0.042		
12000	0.058		
12600	0.052		
13200	0.086		
13800	0.074		
14400	0.068		
15000	0.054		
15600	0.046		
16200	0.041		

16800	0.038
17400	0.038
18000	0.04
18600	0.033
19200	0.032
19800	0.03
20400	0.041
21000	0.034
21600	0.028
22200	0.026
22800	0.027
23400	0.025
24000	0.023
24600	0.024
25200	0.047
25800	0.052
26400	0.062
27000	0.053
27600	0.052
28200	0.044
28800	0.035
29400	0.03
30000	0.028
30600	0.033
31200	0.041
31800	0.04
32400	0.033
33000	0.031
33600	0.027
34200	0.024
34800	0.026
35400	0.03
36000	0.042
36600	0.039
37200	0.037
37800	0.031
38400	0.029
39000	0.027
39600	0.031
40200	0.036
40800	0.033
41400	0.04
42000	0.038
42600	0.04
43200	0.038
43800	0.039
44400	0.034

45000	0.029
45600	0.031
46200	0.026
46800	0.024
47400	0.023
48000	0.036
48600	0.035
49200	0.027
49800	0.023
50400	0.021
51000	0.02
51600	0.019
52200	0.018
52800	0.017
53400	0.017
54000	0.017
54600	0.016
55200	0.016
55800	0.016
56400	0.016
57000	0.017
57600	0.018
58200	0.017
58800	0.016
59400	0.015
60000	0.015
60600	0.014
61200	0.014
61800	0.013
62400	0.013
63000	0.013
63600	0.013
64200	0.013
64800	0.013
65400	0.012
66000	0.012
66600	0.012
67200	0.012
67800	0.013
68400	0.016
69000	0.014
69600	0.013
70200	0.013
70800	0.013
71400	0.014
72000	0.014
72600	0.016

73200	0.015
73800	0.014
74400	0.045
75000	0.045
75600	0.039
76200	0.03
76800	0.029
77400	0.027
78000	0.026
78600	0.032
79200	0.034
79800	0.045
80400	0.05
81000	0.055
81600	0.068
82200	0.051
82800	0.044
83400	0.035
84000	0.034
84600	0.037
85200	0.043
85800	0.035
86400	0.031
87000	0.031
87600	0.03
88200	0.031
88800	0.032
89400	0.034
90000	0.036
90600	0.043
91200	0.04
91800	0.056
92400	0.041
93000	0.04
93600	0.033
94200	0.043
94800	0.061
95400	0.051
96000	0.052
96600	0.072
97200	0.045

Instrumen	DustTrak II
Model Nur	8530
Serial Num	8.53E+09
Firmware \	3.9
Calibration	3/3/2020
Test Name	MONT FAN 107_777
Test Start	########
Test Start I	########
Test Lengtl	1:00:40
Test Interv	10:00
Mass Aver	0.075
Mass Mini	0.013
Mass Maxi	0.365
Mass TWA	0.157
Photometr	1
Flow User	0
Errors	
Number of	148

Elapsed Tir	Mass [mg/	Alarms	Errors
600	0.114		
1200	0.125		
1800	0.14		
2400	0.163		
3000	0.165		
3600	0.162		
4200	0.197		
4800	0.189		
5400	0.174		
6000	0.182		
6600	0.185		
7200	0.241		
7800	0.293		
8400	0.365		
9000	0.354		
9600	0.287		
10200	0.247		
10800	0.231		
11400	0.224		
12000	0.224		
12600	0.231		
13200	0.231		
13800	0.228		
14400	0.251		
15000	0.284		
15600	0.278		
16200	0.225		

16800	0.171
17400	0.186
18000	0.178
18600	0.194
19200	0.208
19800	0.193
20400	0.099
21000	0.064
21600	0.058
22200	0.032
22800	0.021
23400	0.021
24000	0.017
24600	0.016
25200	0.014
25800	0.013
26400	0.014
27000	0.015
27600	0.016
28200	0.018
28800	0.019
29400	0.018
30000	0.019
30600	0.021
31200	0.022
31800	0.024
32400	0.033
33000	0.043
33600	0.032
34200	0.034
34800	0.036
35400	0.038
36000	0.04
36600	0.047
37200	0.046
37800	0.045
38400	0.043
39000	0.044
39600	0.042
40200	0.045
40800	0.048
41400	0.049
42000	0.049
42600	0.04
43200	0.042
43800	0.042
44400	0.04

45000	0.04
45600	0.039
46200	0.039
46800	0.037
47400	0.038
48000	0.04
48600	0.042
49200	0.043
49800	0.043
50400	0.044
51000	0.045
51600	0.044
52200	0.046
52800	0.042
53400	0.046
54000	0.05
54600	0.051
55200	0.053
55800	0.055
56400	0.061
57000	0.062
57600	0.056
58200	0.055
58800	0.07
59400	0.062
60000	0.048
60600	0.043
61200	0.038
61800	0.036
62400	0.035
63000	0.031
63600	0.03
64200	0.028
64800	0.024
65400	0.023
66000	0.023
66600	0.028
67200	0.026
67800	0.024
68400	0.021
69000	0.02
69600	0.022
70200	0.025
70800	0.024
71400	0.025
72000	0.027
72600	0.027

73200	0.027
73800	0.024
74400	0.021
75000	0.021
75600	0.022
76200	0.024
76800	0.022
77400	0.028
78000	0.029
78600	0.03
79200	0.028
79800	0.029
80400	0.032
81000	0.033
81600	0.035
82200	0.036
82800	0.038
83400	0.038
84000	0.038
84600	0.035
85200	0.031
85800	0.028
86400	0.026
87000	0.025
87600	0.019
88200	0.016
88800	0.017

Instrumen	DustTrak II
Model Nur	8530
Serial Num	8.53E+09
Firmware \	3.9
Calibration	########
Test Name	MONT S AGENT_080
Test Start T	########
Test Start I	########
Test Lengtl	1:00:30
Test Interv	10:00
Mass Aver	0.068
Mass Mini	0.012
Mass Maxi	0.61
Mass TWA	0.124
Photometr	1
Flow User	0
Errors	
Number of	147

Elapsed Tir	Mass [mg/	Alarms	Errors
600	0.104		
1200	0.094		
1800	0.093		
2400	0.097		
3000	0.122		
3600	0.119		
4200	0.118		
4800	0.119		
5400	0.12		
6000	0.123		
6600	0.157		
7200	0.255		
7800	0.355		
8400	0.262		
9000	0.192		
9600	0.152		
10200	0.124		
10800	0.123		
11400	0.181		
12000	0.179		
12600	0.206		
13200	0.196		
13800	0.209		
14400	0.25		
15000	0.209		
15600	0.199		
16200	0.163		

16800	0.148
17400	0.156
18000	0.177
18600	0.184
19200	0.198
19800	0.095
20400	0.092
21000	0.103
21600	0.043
22200	0.03
22800	0.022
23400	0.018
24000	0.016
24600	0.013
25200	0.012
25800	0.012
26400	0.014
27000	0.015
27600	0.022
28200	0.021
28800	0.021
29400	0.019
30000	0.019
30600	0.019
31200	0.026
31800	0.028
32400	0.036
33000	0.027
33600	0.61
34200	0.25
34800	0.046
35400	0.041
36000	0.04
36600	0.04
37200	0.04
37800	0.04
38400	0.041
39000	0.04
39600	0.04
40200	0.04
40800	0.043
41400	0.038
42000	0.037
42600	0.035
43200	0.04
43800	0.048
44400	0.044

45000	0.037
45600	0.036
46200	0.033
46800	0.034
47400	0.035
48000	0.034
48600	0.034
49200	0.035
49800	0.038
50400	0.037
51000	0.056
51600	0.037
52200	0.034
52800	0.033
53400	0.032
54000	0.031
54600	0.032
55200	0.033
55800	0.034
56400	0.035
57000	0.037
57600	0.037
58200	0.037
58800	0.036
59400	0.036
60000	0.034
60600	0.032
61200	0.031
61800	0.029
62400	0.028
63000	0.026
63600	0.025
64200	0.023
64800	0.02
65400	0.019
66000	0.018
66600	0.018
67200	0.018
67800	0.017
68400	0.016
69000	0.015
69600	0.015
70200	0.015
70800	0.017
71400	0.027
72000	0.026
72600	0.02

73200	0.019
73800	0.023
74400	0.02
75000	0.019
75600	0.027
76200	0.022
76800	0.022
77400	0.025
78000	0.027
78600	0.025
79200	0.025
79800	0.028
80400	0.032
81000	0.047
81600	0.054
82200	0.09
82800	0.043
83400	0.052
84000	0.045
84600	0.035
85200	0.03
85800	0.051
86400	0.049
87000	0.035
87600	0.029
88200	0.021

Attachment 3

San Francisco Line Spot Sampling Results for PM_{10} and $PM_{2.5}$

				PM10 Concentrations (mg/m3)			PM2.5 Concentrations (mg/m3)		
Station	Location	Date	Time	Max	Avg	Min	Max	Avg	Min
Embarcadero	Southwest Agent Booth	8/27/2020	12:18	0.069	0.048	0.040	0.043	0.038	0.034
Embarcadero	Southwest Ticket Machines	8/27/2020	12:28	0.049	0.041	0.025	0.043	0.034	0.022
Embarcadero	Trackside	8/27/2020	12:53	0.110	0.087	0.064	0.082	0.072	0.057
24th St. Mission	Agent Booth	8/27/2020	13:14	0.083	0.062	0.045	0.079	0.063	0.049
24th St. Mission	Ticket Machines	8/27/2020	13:21	0.049	0.033	0.013	0.045	0.029	0.013
24th St. Mission	Trackside	8/27/2020	13:28	0.104	0.087	0.075	0.086	0.076	0.068
16th St. Mission	Agent Booth	8/27/2020	13:40	0.050	0.047	0.044	0.048	0.045	0.043
16th St. Mission	Ticket Machines	8/27/2020	13:47	0.101	0.056	0.017	0.099	0.053	0.017
16th St. Mission	Trackside	8/27/2020	13:55	0.125	0.084	0.053	0.118	0.083	0.053
Civic Center	North Agent Booth	8/27/2020	14:06	0.029	0.027	0.026	0.030	0.027	0.025
Civic Center	North Ticket Machines	8/27/2020	14:13	0.028	0.020	0.016	0.028	0.020	0.017
Civic Center	Trackside	8/27/2020	14:21	0.135	0.115	0.089	0.129	0.108	0.088
Powell	Police Squad Room	8/27/2020	14:35	0.024	0.023	0.022	0.026	0.025	0.024
Powell	South Agent Booth	8/27/2020	14:42	0.022	0.020	0.017	0.023	0.020	0.019
Powell	North Ticket Machines	8/27/2020	14:51	0.032	0.030	0.027	0.032	0.031	0.029
Montgomery	North Agent Booth	8/27/2020	15:05	0.017	0.017	0.017	0.020	0.019	0.019
Montgomery	North Ticket Machines	8/27/2020	15:12	0.019	0.017	0.016	0.021	0.020	0.019
Montgomery	Trackside	8/27/2020	15:19	0.055	0.049	0.045	0.053	0.048	0.044
12th St. Oakland	Central Agent Booth	8/27/2020	15:58	0.022	0.021	0.020	0.020	0.019	0.019
12th St. Oakland	North Ticket Machines	8/27/2020	16:06	0.022	0.020	0.019	0.021	0.019	0.018
12th St. Oakland	Upper Platform Trackside	8/27/2020	16:13	0.027	0.025	0.023	0.026	0.024	0.021
19th St. Oakland	Northeast Ticket Machines	8/27/2020	16:22	0.021	0.020	0.019	0.024	0.021	0.020
19th St. Oakland	Central Agent Booth	8/27/2020	16:31	0.016	0.015	0.014	0.018	0.017	0.016
19th St. Oakland	Lower Platform Trackside	8/27/2020	16:38	0.016	0.015	0.014	0.017	0.016	0.017
			Max	0.135	0.115	0.089	0.129	0.108	0.088
			Min	0.016	0.015	0.013	0.017	0.016	0.013
			Avg	0.051	0.041	0.032	0.047	0.039	0.031

Attachment 4

CAM-17 Settled Dust Metals Analyses – Montgomery, Powell & Civic Center Stations

McCampbell Analytical, Inc.

"When Quality Counts"

Analytical Report

WorkOrder: 2008F29

Report Created for: SCA Environmental, Inc.

2939 Summit Street, #302
Oakland, CA 94609

Project Contact: Dan Leung
Project P.O.:
Project: B13259; BART M-Line

Project Received: 08/31/2020

Analytical Report reviewed & approved for release on 09/04/2020 by:

Jennifer Lagerbom
Project Manager

McCampbell Analytical, Inc.
"When Quality Counts"

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http://www.mccampbell.com / E-mail: main@mccampbell.com

Glossary of Terms & Qualifier Definitions

Client: SCA Environmental, Inc.
Project: B13259; BART M-Line
WorkOrder: 2008F29

Glossary Abbreviation

%D	Serial Dilution Percent Difference
95% Interval	95% Confident Interval
CPT	Consumer Product Testing not NELAP Accredited
DF	Dilution Factor
DI WET	(DISTLC) Waste Extraction Test using DI water
DISS	Dissolved (direct analysis of 0.45 µm filtered and acidified water sample)
DLT	Dilution Test (Serial Dilution)
DUP	Duplicate
EDL	Estimated Detection Limit
ERS	External reference sample. Second source calibration verification.
ITEF	International Toxicity Equivalence Factor
LCS	Laboratory Control Sample
LQL	Lowest Quantitation Level
MB	Method Blank
MB % Rec	% Recovery of Surrogate in Method Blank, if applicable
MDL	Method Detection Limit
ML	Minimum Level of Quantitation
MS	Matrix Spike
MSD	Matrix Spike Duplicate
N/A	Not Applicable
ND	Not detected at or above the indicated MDL or RL
NR	Data Not Reported due to matrix interference or insufficient sample amount.
PDS	Post Digestion Spike
PDSD	Post Digestion Spike Duplicate
PF	Prep Factor
RD	Relative Difference
RL	Reporting Limit (The RL is the lowest calibration standard in a multipoint calibration.)
RPD	Relative Percent Deviation
RRT	Relative Retention Time
SPK Val	Spike Value
SPKRef Val	Spike Reference Value
SPLP	Synthetic Precipitation Leachate Procedure
ST	Sorbent Tube
TCLP	Toxicity Characteristic Leachate Procedure
TEQ	Toxicity Equivalents
TZA	TimeZone Net Adjustment for sample collected outside of MAI's UTC.
WET (STLC)	Waste Extraction Test (Soluble Threshold Limit Concentration)

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Glossary of Terms & Qualifier Definitions

Client: SCA Environmental, Inc.
Project: B13259; BART M-Line
WorkOrder: 2008F29

Analytical Qualifiers

a7	Reporting limit raised due to limited sample amount.

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Analytical Report

Client:	SCA Environmental, Inc.	**WorkOrder:**	2008F29
Date Received:	08/31/2020 8:33	**Extraction Method:**	SW3050B
Date Prepared:	08/31/2020	**Analytical Method:**	SW6020
Project:	B13259; BART M-Line	**Unit:**	mg/Kg

CAM / CCR 17 Metals

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
MONT-305	**2008F29-001A**	**Soil**	**08/25/2020 09:00**	**ICP-MS5 261SMPL.d**	**204769**

Analytes	Result	RL	DF	Date Analyzed
Antimony	**28**	0.50	1	09/01/2020 17:47
Arsenic	**8.4**	0.50	1	09/01/2020 17:47
Barium	**620**	5.0	1	09/01/2020 17:47
Beryllium	ND	0.50	1	09/01/2020 17:47
Cadmium	**13**	0.50	1	09/01/2020 17:47
Chromium	**120**	0.50	1	09/01/2020 17:47
Cobalt	**12**	0.50	1	09/01/2020 17:47
Copper	**570**	2.5	5	09/01/2020 17:44
Lead	**560**	2.5	5	09/01/2020 17:44
Mercury	**0.91**	0.050	1	09/01/2020 17:47
Molybdenum	**20**	0.50	1	09/01/2020 17:47
Nickel	**90**	0.50	1	09/01/2020 17:47
Selenium	ND	0.50	1	09/01/2020 17:47
Silver	**1.4**	0.50	1	09/01/2020 17:47
Thallium	ND	0.50	1	09/01/2020 17:47
Vanadium	**45**	0.50	1	09/01/2020 17:47
Zinc	**4800**	25	5	09/01/2020 17:44

Surrogates	REC (%)	Limits	
Terbium	102	70-130	09/01/2020 17:47

Analyst(s): JAG

(Cont.)

CA ELAP 1644 • NELAP 4033ORELAP

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Analytical Report

Client:	SCA Environmental, Inc.	**WorkOrder:**	2008F29
Date Received:	08/31/2020 8:33	**Extraction Method:**	SW3050B
Date Prepared:	08/31/2020	**Analytical Method:**	SW6020
Project:	B13259; BART M-Line	**Unit:**	mg/Kg

CAM / CCR 17 Metals

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
POWELL-304	**2008F29-002A**	**Soil**	**08/25/2020 09:40**	**ICP-MS5 187SMPL.d**	**204769**

Analytes	Result	RL	DF	Date Analyzed
Antimony	**37**	0.88	1	09/01/2020 13:02
Arsenic	**8.3**	0.88	1	09/01/2020 13:02
Barium	**340**	8.8	1	09/01/2020 13:02
Beryllium	ND	0.88	1	09/01/2020 13:02
Cadmium	**13**	0.88	1	09/01/2020 13:02
Chromium	**100**	0.88	1	09/01/2020 13:02
Cobalt	**16**	0.88	1	09/01/2020 13:02
Copper	**1500**	8.8	10	09/01/2020 18:14
Lead	**180**	0.88	1	09/01/2020 13:02
Mercury	**0.15**	0.088	1	09/01/2020 13:02
Molybdenum	**19**	0.88	1	09/01/2020 13:02
Nickel	**96**	0.88	1	09/01/2020 13:02
Selenium	ND	0.88	1	09/01/2020 13:02
Silver	**4.1**	0.88	1	09/01/2020 13:02
Thallium	ND	0.88	1	09/01/2020 13:02
Vanadium	**62**	0.88	1	09/01/2020 13:02
Zinc	**8500**	88	10	09/01/2020 18:14

Surrogates	REC (%)	Limits	
Terbium	106	70-130	09/01/2020 13:02

Analyst(s): JAG Analytical Comments: a7

(Cont.)

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Analytical Report

Client:	SCA Environmental, Inc.	**WorkOrder:**	2008F29
Date Received:	08/31/2020 8:33	**Extraction Method:**	SW3050B
Date Prepared:	08/31/2020	**Analytical Method:**	SW6020
Project:	B13259; BART M-Line	**Unit:**	mg/Kg

CAM / CCR 17 Metals

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
CIVIC-301A/B	**2008F29-003A**	**Soil**	**08/25/2020 10:10**	**ICP-MS5 188SMPL.d**	**204769**

Analytes	Result	RL	DF	Date Analyzed
Antimony	**12**	0.50	1	09/01/2020 13:06
Arsenic	**4.0**	0.50	1	09/01/2020 13:06
Barium	**230**	5.0	1	09/01/2020 13:06
Beryllium	ND	0.50	1	09/01/2020 13:06
Cadmium	**5.9**	0.50	1	09/01/2020 13:06
Chromium	**79**	0.50	1	09/01/2020 13:06
Cobalt	**37**	0.50	1	09/01/2020 13:06
Copper	**560**	2.5	5	09/01/2020 18:17
Lead	**110**	0.50	1	09/01/2020 13:06
Mercury	**0.11**	0.050	1	09/01/2020 13:06
Molybdenum	**8.5**	0.50	1	09/01/2020 13:06
Nickel	**58**	0.50	1	09/01/2020 13:06
Selenium	ND	0.50	1	09/01/2020 13:06
Silver	**0.63**	0.50	1	09/01/2020 13:06
Thallium	ND	0.50	1	09/01/2020 13:06
Vanadium	**62**	0.50	1	09/01/2020 13:06
Zinc	**2000**	5.0	1	09/01/2020 13:06

Surrogates	REC (%)	Limits	
Terbium	105	70-130	09/01/2020 13:06

Analyst(s): JAG

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Quality Control Report

Client:	SCA Environmental, Inc.	**WorkOrder:**	2008F29
Date Prepared:	08/31/2020	**BatchID:**	204769
Date Analyzed:	09/01/2020	**Extraction Method:**	SW3050B
Instrument:	ICP-MS5	**Analytical Method:**	SW6020
Matrix:	Soil	**Unit:**	mg/kg
Project:	B13259; BART M-Line	**Sample ID:**	MB/LCS/LCSD-204769

QC Summary Report for Metals

Analyte	MB Result	MDL	RL	SPK Val	MB SS %REC	MB SS Limits
Antimony	ND	0.160	0.500	-	-	-
Arsenic	ND	0.150	0.500	-	-	-
Barium	ND	0.570	5.00	-	-	-
Beryllium	ND	0.0730	0.500	-	-	-
Cadmium	ND	0.0610	0.500	-	-	-
Chromium	ND	0.130	0.500	-	-	-
Cobalt	ND	0.0520	0.500	-	-	-
Copper	ND	0.180	0.500	-	-	-
Lead	ND	0.140	0.500	-	-	-
Mercury	ND	0.0320	0.0500	-	-	-
Molybdenum	ND	0.160	0.500	-	-	-
Nickel	ND	0.170	0.500	-	-	-
Selenium	ND	0.150	0.500	-	-	-
Silver	ND	0.120	0.500	-	-	-
Thallium	ND	0.0670	0.500	-	-	-
Vanadium	ND	0.130	0.500	-	-	-
Zinc	ND	3.00	5.00	-	-	-
Surrogate Recovery						
Terbium	528			500	106	70-130

(Cont.)

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Quality Control Report

Client:	SCA Environmental, Inc.	**WorkOrder:**	2008F29
Date Prepared:	08/31/2020	**BatchID:**	204769
Date Analyzed:	09/01/2020	**Extraction Method:**	SW3050B
Instrument:	ICP-MS5	**Analytical Method:**	SW6020
Matrix:	Soil	**Unit:**	mg/kg
Project:	B13259; BART M-Line	**Sample ID:**	MB/LCS/LCSD-204769

QC Summary Report for Metals

Analyte	LCS Result	LCSD Result	SPK Val	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Limit
Antimony	54.8	52.4	50	110	105	75-125	4.54	20
Arsenic	55.2	54.0	50	110	108	75-125	2.23	20
Barium	559	528	500	112	106	75-125	5.83	20
Beryllium	55.9	53.0	50	112	106	75-125	5.24	20
Cadmium	54.2	53.3	50	108	107	75-125	1.65	20
Chromium	54.6	53.3	50	109	107	75-125	2.37	20
Cobalt	55.1	53.1	50	110	106	75-125	3.75	20
Copper	55.3	54.0	50	111	108	75-125	2.22	20
Lead	53.5	54.2	50	107	108	75-125	1.18	20
Mercury	1.26	1.24	1.25	101	99	75-125	1.85	20
Molybdenum	53.2	50.6	50	106	101	75-125	5.13	20
Nickel	56.3	55.2	50	113	110	75-125	1.89	20
Selenium	55.1	54.3	50	110	109	75-125	1.57	20
Silver	53.6	51.4	50	107	103	75-125	4.12	20
Thallium	54.1	54.2	50	108	108	75-125	0.155	20
Vanadium	54.9	53.9	50	110	108	75-125	1.86	20
Zinc	554	543	500	111	109	75-125	1.87	20
Surrogate Recovery								
Terbium	554	532	500	111	106	70-130	4.04	20

McCampbell Analytical, Inc.
1534 Willow Pass Rd
Pittsburg, CA 94565-1701
(925) 252-9262

CHAIN-OF-CUSTODY RECORD

WorkOrder: 2008F29 **ClientCode: SCAO**

☐ WaterTrax ☐ WriteOn ☐ EDF ☐ Excel ▣ EQuIS ☑ Email ☐ HardCopy ☐ ThirdParty ☐ J-flag
▣ Detection Summary ▣ Dry-Weight

Report to:
Dan Leung
SCA Environmental, Inc.
2939 Summit Street, #302
Oakland, CA 94609
(510) 645-6200 FAX: (510) 839- 6200

Email: dleung@sca-enviro.com; labreports99@gm
cc/3rd Party:
PO:
Project: B13259; BART M-Line

Bill to:
Accounts Payable
SCA Environmental, Inc.
2939 Summit Street, #302
Oakland, CA 94609

Requested TAT: **5 days;**

Date Received: **08/31/2020**
Date Logged: **08/31/2020**

Lab ID	Client ID	Matrix	Collection Date	Hold	Requested Tests (See legend below)											
					1	2	3	4	5	6	7	8	9	10	11	12
2008F29-001	MONT-305	Soil	8/25/2020 09:00	☐	A	A										
2008F29-002	POWELL-304	Soil	8/25/2020 09:40	☐	A	A										
2008F29-003	CIVIC-301A/B	Soil	8/25/2020 10:10	☐	A	A										

Test Legend:

1	CAM17MS_TTLC_S	2	PRDisposal Fee	3		4	
5		6		7		8	
9		10		11		12	

Project Manager: Angela Rydelius **Prepared by: Valerie Alfaro**

Comments: address updated 8/1/19. MV

NOTE: Soil samples are discarded 60 days after results are reported unless other arrangements are made (Water samples are 30 days).
Hazardous samples will be returned to client or disposed of at client expense.

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"When Quality Counts"

1534 Willow Pass Road, Pittsburg, CA 94565-1701
Toll Free Telephone: (877) 252-9262 / Fax: (925) 252-9269
http://www.mccampbell.com / E-mail: main@mccampbell.com

WORK ORDER SUMMARY

Client Name: SCA ENVIRONMENTAL, INC.
Client Contact: Dan Leung
Contact's Email: dleung@sca-enviro.com; labreports99@gmail.com

Project: B13259; BART M-Line
Comments: address updated 8/1/19. MV

Work Order: 2008F29
QC Level: LEVEL 2
Date Logged: 8/31/2020

☐ WaterTrax ☐ WriteOn ☐ EDF ☐ Excel ☐ EQuIS ☑ Email ☐ HardCopy ☐ ThirdParty ☐ J-flag

Lab ID	Client ID	Matrix	Test Name	Containers /Composites	Bottle & Preservative	De-chlorinated	Collection Date & Time	TAT	Sediment Content	Hold	SubOut
2008F29-001A	MONT-305	Soil	SW6020 (CAM 17)	1	small round yellow container	☐	8/25/2020 9:00	5 days		☐	
2008F29-002A	POWELL-304	Soil	SW6020 (CAM 17)	1	small round yellow container	☐	8/25/2020 9:40	5 days		☐	
2008F29-003A	CIVIC-301A/B	Soil	SW6020 (CAM 17)	1	small round yellow container	☐	8/25/2020 10:10	5 days		☐	

NOTES: - STLC and TCLP extractions require 2 days to complete; therefore, all TATs begin after the extraction is completed (i.e., One-day TAT yields results in 3 days from sample submission).

- MAI assumes that all material present in the provided sampling container is considered part of the sample - MAI does not exclude any material from the sample prior to sample preparation unless requested in writing by the client.

2008F29

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1534 Willow Pass Rd. / Pittsburg, Ca. 94565-1701
www.mccampbell.com / main@mccampbell.com
Telephone: (877) 252-9262 / Fax: (925) 252-9269

CHAIN OF CUSTODY RECORD

TURN AROUND TIME: RUSH ☐ 1 DAY ☐ 2 DAY ☐ 3 DAY ☐ 5 DAY ☒

GeoTracker EDF ☐ PDF ☒ EDD ☐ Write On (DW) ☐ EQuIS ☐ 10 DAY ☐

Effluent Sample Requiring "J" flag ☐ UST Clean Up Fund Project ☐; Claim #_____

Report To: Dan Leung — Bill To: SCA Environmental, Inc.

Company: SCA Environmental, Inc.

2939 Summit St., #302 Oakland, CA 94609 labreports99@gmail.com

Tele: (415) 867-9544 — E-Mail: dleung@sca-enviro.com

Project #: B13259 — Project Name: BART M-Line

Project Location: BART M-Line — Purchase Order#

Sampler Signature: Dan Leung

SAMPLE ID	Location/ Field Point Name	SAMPLING Date	SAMPLING Time	# Containers	MATRIX: Ground Water	Waste Water	Drinking Water	Sea Water	Soil	Air	Sludge	Other	METHOD PRESERVED: HCL	HNO_3	Other
MONT-305	Montgomery	8/28/20	9:00	1								X			
POWELL-304	Powell	8/25/20	9:40	1								X			
CIVIC-301 A/B	Civic Center	8/25/20	10:10	1								X			

Analysis Request

BTEX & TPH as Gas (8021/ 8015) MTBE	TPH as Diesel (8015)	Total Petroleum Oil & Grease (1664 / 5520 E/B&F)	Total Petroleum Hydrocarbons (418.1)	EPA 505/ 608 / 8081 (Cl Pesticides)	EPA 608 / 8082 PCB's ; Aroclors only	EPA 507 / 8141 (NP Pesticides)	EPA 515 / 8151 (Acidic Cl Herbicides)	EPA 524.2 / 624 / 8260 (VOCs)	EPA 525.2 / 625 / 8270 (SVOCs)	EPA 8270 SIM / 8310 (PAHs / PNAs)	CAM 17 Metals (200.8 / 6020)***	LUFT 5 Metals (200.8 / 6020)***	Metals (200.8 / 6020)***	Lab to Filter sample for Dissolved metals analysis	PCB
											X	X			
											X				
											X				

**MAI clients MUST disclose any dangerous chemicals known to be present in their submitted samples in concentrations that may cause immediate harm or serious future health endangerment as a result of brief, gloved, open air, sample handling by MAI staff. Non-disclosure incurs an immediate $250 surcharge and the client is subject to full legal liability for harm suffered. Thank you for your understanding and for allowing us to work safely.

*** If metals are requested for water samples and the water type is not specified on the chain of custody, then MAI will default to metals by E200.8.

Relinquished By:	Date:	Time:	Received By:
Dan Leung	8/28/20	16:00	UPS
UPS	8/31/20	0833	

ICE/t° 24.2 °C NO ICE

GOOD CONDITION_____

HEAD SPACE ABSENT_____

DECHLORINATED IN LAB_____

APPROPRIATE CONTAINERS_____

PRESERVED IN LAB_____

PRESERVATION_____ VOAS O&G METALS OTHER HAZARDOUS: pH<2_____

COMMENTS:
PCBs: 1) Authorized to perform silica gel and GPC cleanups to meet the 50 ppb detection limit. 2) Please include case narrative if not able to attain lower reporting limit after cleanups.

1Z 8E4 999 22 1004 1729

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http://www.mccampbell.com / E-mail: main@mccampbell.com

Sample Receipt Checklist

Client Name:	**SCA Environmental, Inc.**	Date and Time Received:	**8/31/2020 08:33**
Project:	**B13259; BART M-Line**	Date Logged:	**8/31/2020**
		Received by:	Valerie Alfaro
WorkOrder №:	**2008F29** Matrix: Soil	Logged by:	Valerie Alfaro
Carrier:	UPS		

Chain of Custody (COC) Information

Chain of custody present?	Yes	☑	No	☐	
Chain of custody signed when relinquished and received?	Yes	☑	No	☐	
Chain of custody agrees with sample labels?	Yes	☑	No	☐	
Sample IDs noted by Client on COC?	Yes	☑	No	☐	
Date and Time of collection noted by Client on COC?	Yes	☑	No	☐	
Sampler's name noted on COC?	Yes	☑	No	☐	
COC agrees with Quote?	Yes	☐	No	☐	NA ☑

Sample Receipt Information

Custody seals intact on shipping container/cooler?	Yes	☑	No	☐	NA ☐
Shipping container/cooler in good condition?	Yes	☑	No	☐	
Samples in proper containers/bottles?	Yes	☑	No	☐	
Sample containers intact?	Yes	☑	No	☐	
Sufficient sample volume for indicated test?	Yes	☑	No	☐	

Sample Preservation and Hold Time (HT) Information

All samples received within holding time?	Yes	☑	No	☐	NA ☐
Samples Received on Ice?	Yes	☐	No	☑	
Sample/Temp Blank temperature	Temp: 24.2°C				NA ☐
Water - VOA vials have zero headspace / no bubbles?	Yes	☐	No	☐	NA ☑
Sample labels checked for correct preservation?	Yes	☑	No	☐	
pH acceptable upon receipt (Metal: <2; Nitrate 353.2/4500NO3: <2; 522: <4; 218.7: >8)?	Yes	☐	No	☐	NA ☑
UCMR Samples:					
pH tested and acceptable upon receipt (200.8: ≤2; 525.3: ≤4; 530: ≤7; 541: <3; 544: <6.5 & 7.5)?	Yes	☐	No	☐	NA ☑
Free Chlorine tested and acceptable upon receipt (<0.1mg/L)?	Yes	☐	No	☐	NA ☑

Comments:

Attachment 5

SCA's Personnel Certifications

ABIH®

american board of industrial hygiene®

organized to improve the practice of industrial hygiene
proclaims that

Daniel M.K. Leung

having met all requirements of
education, experience and examination,
is hereby certified in the

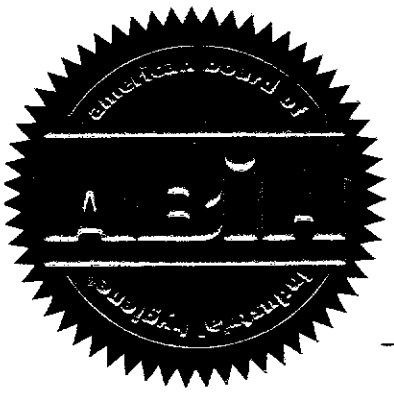
COMPREHENSIVE PRACTICE
of
INDUSTRIAL HYGIENE

and has the right to use the designations

CERTIFIED INDUSTRIAL HYGIENIST

CIH

Certificate Number	**10893 CP**
Awarded:	**November 21, 2015**
Expiration Date:	**June 1, 2021**



Chair, ABIH

Chief Executive Officer, ABIH

STATE OF CALIFORNIA — Gavin Newsom, Governor

DEPARTMENT OF INDUSTRIAL RELATIONS
Division of Occupational Safety and Health
Asbestos Certification & Training Unit
2424 Arden Way, Suite 495
Sacramento, CA 95825-2417
(916) 574-2993 Office http://www.dir.ca.gov/dosh/asbestos.html acru@dir.ca.gov

703094175C **301**

March 13, 2020

Daniel Leung
3615 Yacht Drive
Discovery Bay CA 94505

Dear Certified Asbestos Consultant or Technician:

Enclosed is your certification card. **To maintain your certification, you must abide by the rules printed on the back of the certification card.**

Your certification is valid for a period of one year. If you wish to renew your certification, you must apply for renewal at least 60 days before the expiration date shown on your card. [8 CCR 341.15(h)(1)].

Please hold and do not send copies of your required AHERA refresher renewal certificates to our office until you apply for renewal of your certification.

Certificates must be kept current if you are actively working as a CAC or CSST. The grace period is only for those who are not actively working as an asbestos consultant or site surveillance technician.

Please notify our office via U.S. Postal Service or other carrier of any changes in your mailing or work address within 15 days of the change.

Sincerely,

Jeff Ferrell
Senior Safety Engineer

Attachment: Certification Card

cc: File

Renewal – Card Attached 08/2019


State of California
Division of Occupational Safety and Health
Certified Asbestos Consultant

Daniel Leung
Name

Certification No. **07-4175**

Expires on **04/19/21**

This certification was issued by the Division of Occupational Safety and Health as authorized by Sections 7180 et seq. of the Business and Professions Code.