South Coast
Air Quality Management District
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AIR MONITORING AT CARLTON FORGE WORKS
January 23, 2014

Background

Carlton Forge Works (CFW) manufactures forged high-temperature alloy rings for aerospace, gas turbine, and other industries, using principal alloy metals such as nickel, titanium, aluminum, cobalt, zirconium, niobium, and iron, as well as other high temperature metals with special properties. CFW operates a large grinding room with 25 grinding booths, each equipped with a handheld air grinder or a swing grinder and vented to one of three air pollution control equipment (baghouses). The facility is located in a mixed residential/industrial area of Paramount, CA and is surrounded by public areas and private residences.

Complaints of burning metallic odors reported by local community members led the South Coast Air Quality Management District (SCAQMD) to supplement ongoing complaint investigation, inspections and surveillance activities with preliminary air sampling in February, April and May of 2013. In August 2013, based on the preliminary air sampling results, SCAQMD began ambient field measurements near CFW to further investigate potential health impacts from exposure to gaseous and particulate pollutants emitted by CFW operations. Because the major activities at CFW are forging, abrasive blasting, coating, and grinding, particular attention was given to the monitoring of the metallic components of particle emissions to better characterize the emissions and determine ambient levels of potential exposure off-site and in the community.

Methods

Various collection methods were used to gather samples of air and materials. The sampling locations for all types of samples collected during this study are shown in Figure 1.

Air sampling

- Ambient air sampling
  Ambient air samples were collected east of CFW at three nearby locations on Vermont and California Avenue, using ambient particle samplers running on a typical 1-in-3 day schedule. These ambient concentration data provide the most relevant information in terms of potential off-site exposure to airborne toxic pollutants.

- Summa canister “grab” sampling
  Summa canisters provided by SCAQMD were used by a complainant to collect gaseous (i.e. Volatile Organic Compounds or VOCs) air samples immediately outside of the facility gate, downwind of the facility.

- Source testing
  A source test was performed according to California Air Resources Board (CARB) Method 436 (Determination of Multiple Metal Emissions from Stationary Sources) to determine the metal emissions at the three baghouse exhausts, and the concentrations of metals at a roof vent of the grinding area. The purpose of source test sample analysis is to determine the composition of

material emitted from the facility in order to compare it to samples taken in the community. Source test results, however, do not measure actual public exposure.

Material sampling

- Wipe sampling
  Wipe samples of dust and fines from metal grinding operations were taken from near the top of the exhaust stack venting the southernmost baghouse, the rooftop of the grinding room, the rooftop of the saw building located east of the grinding room, near the top of the exhaust stack venting the centermost baghouse, and near the top of the exhaust stack venting the northernmost baghouse.

- Glass plate deposition sampling
  Glass plate deposition samples were collected from the rooftop of the CFW facility and within the nearby community east (downwind) of CFW. Some of these samples were taken directly across the street, on Vermont Avenue, and also about 1000 feet east of CFW and close to Lincoln Elementary School. The sampling locations were selected to provide information about the possible distribution of pollutants in the community. Although deposition plate results cannot determine ambient concentrations or approximate human exposure, they provide a good indication of gradients and the extent of potential off-site impacts.

- Bulk sampling
  Bulk samples were taken from dust collected in each of CFW's three baghouses for analysis. All samples were analyzed for a variety of elements, including Arsenic (As), Cadmium (Cd), Chromium (Cr), Iron (Fe), Manganese (Mn), Molybdenum (Mo), Nickel (Ni), Lead (Pb), Titanium (Ti), Vanadium (V), and Zinc (Zn). The purpose of bulk sample analysis is to determine the composition of solid material collected inside the facility in order to compare it to samples taken in the community.

Results

The bulk samples collected from the three baghouses indicate that Ni, Cr, Fe, Ti and Zn are the most abundant metals produced from the grinding process (Table 1a). The wipe sample from the roof of the grinding room had the highest concentration of all measured metals (with the exception of Zn) (Table 1b). Source test results confirm that emissions from the grinding area were enriched in these trace elements (Table 2). The emission rates from the baghouse exhaust indicated relatively low emission rates of metals from these stacks. However, the testing performed at the open roof vent suggests a higher rate of uncontrolled fugitive emissions. The glass plate deposition samples revealed a distinct gradient for several metals; in particular, the highest average levels of Ni, Co, Cr, and Mo were measured closest to CFW and decreased gradually with increasing distance from the facility (Table 3).

The ambient concentrations of Ni, Cr, Mo, and Cd (and to a lesser degree Co) exceeded their corresponding average levels recorded in the South Coast Air Basin between 2004 and 2006 during the third Multiple Air Toxics Exposure Study (MATES III; SCAQMD 2008) (see Table 4a – 4h for details). While sample results are limited and still preliminary, these increased levels are probably associated with direct emissions from CFW coupled with

re-suspension of dust accumulated on or near the CFW facility. On one sampling day (August 20, 2013), the concentration averaged over 24-hr of Ni measured at one site (downwind of the CFW's grinding room) significantly exceeded the acute (1-hr average) and 8-hr average Reference Exposure Levels (RELs), and on three other sampling days (August 26, September 10 and October 31, 2013) it exceeded the 8-hr average REL. Longer term monitoring would be necessary to assess long-term chronic (multi-year) risk; however, the four month average Ni concentration at the southern site (33.7 ng/m^3) was above the Ni chronic REL (14 ng/m^3). The RELs are developed by the California Office of Environmental Health Hazard Assessment, and are designed so that exposure below the relevant REL is not expected to result in adverse non-cancer health effects. It should be noted that if a REL is exceeded that does not necessarily mean that health effects will occur, but that additional investigation of sources and potential exposures is warranted.

A summary of nickel health effects and development of the RELs can be found at the following link. http://www.oehha.ca.gov/air/chronic_rels/pdf/032312NiREL_Final.pdf. The RELs were based on laboratory animal studies that found immunologic effects and cellular injury in the lungs and respiratory system with exposures to high levels of nickel.

It should be noted that while the total Cr concentrations exceeded the average MATES III levels, the toxic fraction of Cr, Hexavalent Chromium (CrVI), was well below the chronic REL.

The measured concentrations of toxic VOCs were within the ambient ranges typically observed throughout the South Coast Air Basin. Acetone, ethane and propane were slightly above background, but these are not considered toxic VOCs and may be associated with natural gas usage from forging oven operations in the CFW facility (Table 5).

Follow-up

Recent actions taken by SCAQMD

On August 7, 2013, SCAQMD requested that CFW prepare a detailed air toxics inventory report to identify and report all calendar year 2012 air toxic emissions resulting from operation of various equipment at CFW. Based on the air toxics inventory report, CFW may be required to prepare a detailed health risk assessment to analyze and evaluate the health risk to the public due to the emissions from its operations.

On September 27, 2013, SCAQMD informed CFW that the facility is required to file applications with SCAQMD for permits to operate grinding and associated air pollution control equipment. Those permit applications have been submitted to the SCAQMD and are currently being evaluated.

SCAQMD is continuing to collect ambient air samples at two nearby locations and evaluate the results to have a better understanding of long term exposure levels in the community. More recent measurements have shown that ambient concentrations have declined since October 2013.

SCAQMD staff has initiated work to propose to its Governing Board a new rule to reduce fugitive emissions at metal forging, grinding and processing operations.

Recent Actions Taken by CFW

Based on SCAQMD's investigations and discussions with CFW and the facility's independent review of the operation of equipment in its grinding room, CFW has taken the following steps to improve the collection and control efficiency of their air pollution control equipment and to reduce fugitive emissions:

- Moved the grinding operations closer to the associated dust collection devices.
- Increased the air flow through its air pollution control equipment (baghouses).
- Closed the roof vents and isolated the grinding area by installing plastic strip curtains.
- Increasing the frequency and improved the effectiveness of housekeeping practices.
- CFW is also further evaluating structural changes in their grinding operations to improve fugitive dust collection and control, including putting their grinding operation under better negative pressure.
- CFW has hired a consultant and conducted their own source testing and ambient air monitoring to measure metal concentrations in the exhaust of the baghouse and in the surrounding areas.

SCAQMD has also shared a copy of this updated summary with the California Department of Toxics Substance Control, the Los Angeles County Department of Public Health Environmental & Safety and the U.S. Environmental Protection Agency.

Figure 1 Aerial map of the sampling area around Carlton Forge Works (CFW) in Paramount, CA

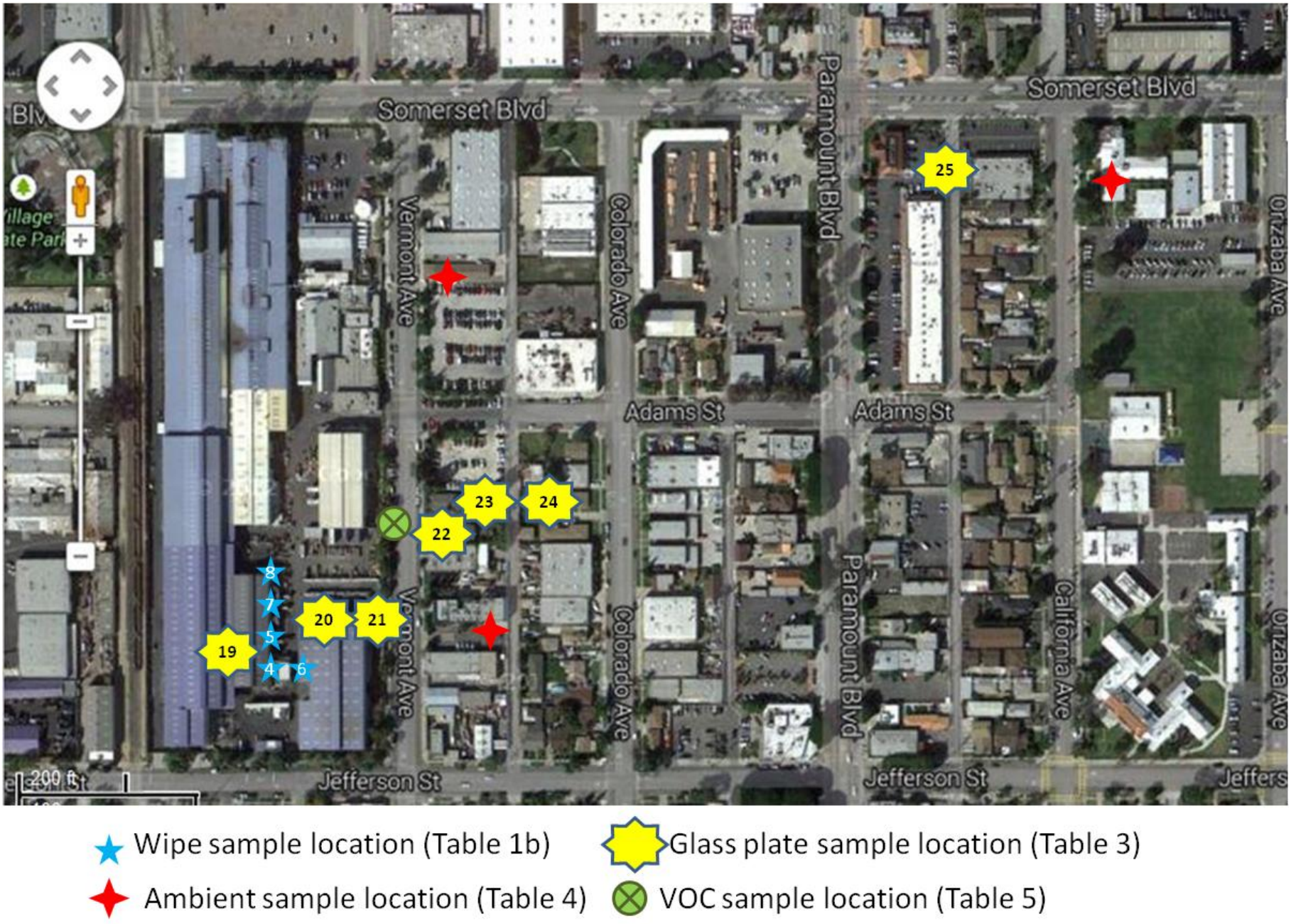

Table 1. Bulk and wipe sample analysis results (Table 1a and 1b, respectively). Bulk samples are either expressed in ppm or % (by weight). Wipe sample analysis results in µg/ft^2. All samples were collected on 2/5/2013.

a)

Sample ID	Sample Location	As (ppm)	Cd (ppm)	Cr (%)	Fe (%)	Mn (ppm)	Ni (%)	Pb (ppm)	Ti (%)	V (%)	Zn (ppm)
Sample #1	Central baghouse's collection barrel	16	<1	8.9	5.2	<1	19.5	<1	14.8	0.6	94
Sample #2	Northern baghouse's collection barrel	10	<1	5.7	4.0	850	11.5	<1	31.4	1.9	480
Sample #3	Southern baghouse's collection barrel	<1	<1	7.7	10.1	900	16.5	<1	17.3	0.9	1,340

b)

Sample ID	Sample Location	As	Cd	Cr	Fe	Mn	Ni	Pb	Ti	V	Zn
Sample #4	Top of south baghouse's exhaust stack	2	0.7	330	8,100	120	1,300	8.2	890	52	15,100
Sample #5	Roof of grinding room	6.4	1.3	800	25,900	190	3,000	68	2,400	210	970
Sample #6	Roof of "Saw" building east of grinding room	4.3	0.6	340	15,900	110	1,200	54	690	68	900
Sample #7	Central baghouse's exhaust stack	0.9	0.1	52	3,900	160	150	3.5	160	9.6	9,300
Sample #8	Top of northern baghouse's exhaust stack	1.6	0.3	250	7,100	75	800	6.6	740	44	7,000

Table 2. Results of source testing for metals collected from a roof vent of the grinding room and from each of the baghouse exhausts. Grinding equipment vented to the baghouse #3 is used to grind a 45-degree edge on metal cylinders prior to drop forging; grinding equipment vented to the baghouses #1 and #2 are used to finish metal parts after forging. Since measurement of flow rates from the roof vent were not possible, corresponding emission rates cannot be not calculated.

	Baghouse 1	Baghouse 2	Baghouse 3	Roof Vent
	Concentration			
	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$
Aluminum	71	51	32	51
Antimony	0.14	0.11	0.10	0.17
Arsenic	0.29	0.30	0.22	1.93
Barium	11.4	10.1	8.4	11.8
Cadmium	2.3	2.0	1.7	2.1
Chromium	2.2	1.6	1.3	3.1
Cobalt	6.3	5.1	4.3	7.1
Copper	10.6	9.0	6.5	9.8
Iron	59	47	39	63
Lead	150	55	46	71
Manganese	47	39	35	43
Nickel	5.9	2.3	1.7	9.4
Phosphorus	11.0	9.8	8.8	11.0
Selenium	0.15	0.09	0.06	0.36
Silver	0.15	0.05	0.06	0.05
Zinc	335	297	251	315
	Emission Rates			
	g/hr	g/hr	g/hr	g/hr
Aluminum	6.3	4.6	2.8	N/A
Antimony	0.01	0.01	0.01	N/A
Arsenic	0.03	0.03	0.02	N/A
Barium	1.02	0.09	0.73	N/A
Cadmium	0.21	0.19	0.15	N/A
Chromium	0.20	0.15	0.11	N/A
Cobalt	0.56	0.46	0.37	N/A
Copper	0.95	0.82	0.57	N/A
Iron	5.28	4.27	3.37	N/A
Lead	13.4	5.0	4.1	N/A
Manganese	4.2	3.6	3.0	N/A
Nickel	0.53	0.21	0.15	N/A
Phosphorus	0.99	0.89	0.77	N/A
Selenium	0.01	0.01	0.01	N/A
Silver	0.01	0.01	0.01	N/A
Zinc	30	27	22	N/A

Table 3. Concentrations of metals at seven monitoring locations around the Carlton Forge Works facility. The metal levels were collected on the glass plate deposition samples. Metals that are shaded indicate levels higher than typical Western U.S. soil and/or levels showing a gradient, decreasing with increased distance from CFW.

		Sample #19	Sample #20	Sample #21	Sample #22	Sample #23	Sample #24	Sample #25	Mean Conc.	Range of Conc.		
		Plate #45-96	Plate #50-96	Plate #A98	Plate #28-95	Plate #79-96	Plate #55-08	Plate #93-96	of Soil in	of Soil in	Gradient	Exceeds
Element	Unit	1320410-01	1320410-02	1320410-03	1320410-04	1320410-05	1320410-06	1320410-07	Western U.S. [1]	Western U.S. [2]	observed	soil range
Aluminum	%	3.83	2.88	2.36	2.61	2.12	2.03	1.55	5.8	0.5 - >10		
Antimony	ppm	9.61	9.18	10.7	15.3	10.6	5.83	14	0.47	<1 - 2.6	NO	X
Arsenic	ppm	ND (<0.01 ppm)	ND (<0.01 ppm)	ND (<0.01 ppm)	ND (<0.01 ppm)	ND (<0.01 ppm)	ND (<0.01 ppm)	ND (<0.01 ppm)	5.5	0.10 - 97		
Barium	ppm	356	424	392	621	500	390	491	580	70 - 5000		
Beryllium	ppm	ND (<0.01 ppm)	ND (<0.01 ppm)	ND (<0.01 ppm)	ND (<0.01 ppm)	ND (<0.01 ppm)	ND (<0.01 ppm)	ND (<0.01 ppm)	1	<1 - 15		
Cadmium	ppm	ND (<0.01 ppm)	ND (<0.01 ppm)	ND (<0.01 ppm)	ND (<0.01 ppm)	ND (<0.01 ppm)	ND (<0.01 ppm)	ND (<0.01 ppm)	<0.01	<0.01		
Calcium	%	1.55	1.75	1.7	2.09	1.87	1.55	2.04	1.8	0.06 - 32		
Cerium	ppm	36.6	37.5	31.2	49.7	42.9	51.4	41.5	65	<150 - 300		
Cesium	ppm	ND (<0.01 ppm)	ND (<0.01 ppm)	ND (<0.01 ppm)	ND (<0.01 ppm)	ND (<0.01 ppm)	ND (<0.01 ppm)	ND (<0.01 ppm)	unavailable	unavailable		
Chromium	ppm	622	681	494	385	257	122	90.3	41	3 - 2,000	X	NO
Cobalt	ppm	545	594	582	384	231	73.7	46.2	7	<3 - 50	X	NO
Copper	ppm	2,450	1,820	1,210	1,850	1,740	702	388	21	2 - 300	X	X
Gallium	ppm	19.6	21.3	19.9	29.1	23.8	20.7	22.8	16	<5 - 70		
Germanium	ppm	ND (<0.01 ppm)	ND (<0.01 ppm)	ND (<0.01 ppm)	ND (<0.01 ppm)	ND (<0.01 ppm)	ND (<0.01 ppm)	ND (<0.01 ppm)	1.2	0.58 - 2.5		
Iron	%	3.43	3.23	2.88	3.79	3.02	3.34	2.69	2.1	0.1 - >10		
Lanthanum	ppm	22	22.3	19.9	30.9	25.7	27.9	26.8	30.0	<30 - 200		
Lead	ppm	103	115	123	166	179	194	131	17	<10 - 700		
Magnesium	%	0.68	0.74	0.67	0.95	0.85	1.16	0.79	0.74	0.03 - >10		
Manganese	ppm	465	457	403	535	438	611	456	380	30 - 5000		
Molybdenum	ppm	327	317	244	165	109	40.8	25.1	1	<3 - 7	X	X
Nickel	ppm	3,230	3,300	2,420	1,310	800	310	12.6	15	<5 - 500	X	X
Potassium	%	0.386	0.427	0.419	0.556	0.524	0.833	0.574	1.8	0.19 - 6.3		
Rubidium	ppm	21.2	24.8	24.9	38.9	33	46.2	33.1	69	<20 - 210		
Selenium	ppm	ND (<0.01 ppm)	ND (<0.01 ppm)	ND (<0.01 ppm)	ND (<0.01 ppm)	ND (<0.01 ppm)	ND (<0.01 ppm)	ND (<0.01 ppm)	0.23	<0.1 - 4.3		
Silicon	%	1.82	2.42	2.27	3.61	2.95	1.98	2.26	30.0	15 - 44		
Silver	ppm	39.2	8.99	ND (<0.01 ppm)	ND (<0.01 ppm)	ND (<0.01 ppm)	ND (<0.01 ppm)	ND (<0.01 ppm)	unavailable	unavailable		
Sodium	%	0.62	0.905	0.809	0.823	0.952	0.466	0.524	0.97	0.05 - >10		
Strontium	ppm	152	180	161	192	159	137	170	100	10 - 3,000		
Thallium	ppm	ND (<0.01 ppm)	ND (<0.01 ppm)	ND (<0.01 ppm)	ND (<0.01 ppm)	ND (<0.01 ppm)	ND (<0.01 ppm)	ND (<0.01 ppm)	unavailable	unavailable		
Tin	ppm	28.8	32.9	31	33.2	16.6	17.3	17.5	0.9	<0.1 - 0.74	X	X
Titanium	%	0.68	0.9	0.55	0.44	0.32	0.25	0.14	0.22	0.05 - 2.0	X	NO
Tungsten	ppm	82.6	86.4	56.4	70.1	50.1	17.1	12.1	unavailable	unavailable	X	N/A
Uranium	ppm	ND (<0.01 ppm)	ND (<0.01 ppm)	ND (<0.01 ppm)	ND (<0.01 ppm)	ND (<0.01 ppm)	ND (<0.01 ppm)	ND (<0.01 ppm)	2.5	0.68 - 7.9		
Vanadium	ppm	400	490	301	227	159	86	54	70	7 - 500	X	NO
Yttrium	ppm	ND (<0.01 ppm)	ND (<0.01 ppm)	ND (<0.01 ppm)	ND (<0.01 ppm)	ND (<0.01 ppm)	ND (<0.01 ppm)	ND (<0.01 ppm)	22	<10 - 150		
Zinc	ppm	1,230	1,340	1,600	1,990	1,810	998	1,710	55	10 - 2,100		
Zirconium	ppm	183	173	92.6	82.4	58	22	22.8	160	<20 - 1,500	X	NO

[1] : Arithmetic mean reported by U.S. Geological Service

[2] : Concentration range reported by U.S. Geological Service

Table 4. Concentrations of metals at one of the ambient air monitoring location in August (a), September (b), October (c), November (d) and December (e); and at the second ambient monitoring location in August (f), September and October (g), east and downwind of the Carlton Forge Works facility (this location was no longer available to SCAQMD for sampling as of October 4, 2013, and was replaced with a new site east of CFW as of October 31, 2013); and at the third ambient monitoring location east of the previous two in October, November and December (h). Available overall average concentrations and standard deviations and Multiple Air Toxics Exposure Study (MATES III) averages and standard deviations are also provided along with acute, 8-hr average, and chronic Reference Exposure Levels (RELs) when available.

a)

Site		Southern site								August	MATES III	Reference Exposure Level		
Sample Date		8/8/2013	8/11/2013	8/14/2013	8/17/2013	8/20/2013	8/23/2013	8/26/2013	8/29/2013	Average	Average ± SD	Acute	8-Hour	Chronic
Mg	ng/m^3	309	239	297	284	588	380	500	430	378	1679.9 ± 1020.4			
Si	ng/m^3	1877	1606	2208	2015	5815	2412	3600	2950	2810	6565.3 ± 3811.4			
P	ng/m^3	37.8	62.3	77.4	85.0	87.6	51.8	57.1	60.6	64.9	53.3 ± 40.42			
S	ng/m^3	574	1153	1347	1367	1081	710	730	610	946	N/A			
Cl	ng/m^3	1826	406	300	496	935	1538	2100	980	1073	N/A			
Al	ng/m^3	838	571	819	735	2296	879	1350	1200	1086	4099.9 ± 2744.0			
K	ng/m^3	298	306	356	360	787	417	540	450	439	577.1 ± 616.1			
Ca	ng/m^3	823	588	846	818	2161	1105	1450	1250	1130	1946.0 ± 1927.8			
Ti	ng/m^3	893	80	224	124	1164	200	380	340	426	195.5 ± 124.6			
V	ng/m^3	60.8	2.9	13.8	2.8	62.6	8.2	16.6	16.9	23.1	10.6 ± 10.45			
Cr	ng/m^3	40.3	5.7	59.8	30.4	198.2	32.0	73.3	37.7	59.7	4.54 ± 5.20			
CrVI	ng/m^3	0.65	0.23	0.16	0.17	0.32	0.10	0.31	0.84	0.35	0.20 ± 0.23			200
Mn	ng/m^3	17.3	11.4	18.0	20.0	60.0	21.3	30.7	27.8	25.8	31.0 ± 25.4			
Co	ng/m^3	10.4	2.1	3.5	3.8	46.5	7.5	19.2	9.3	12.8	3.96 ± 2.88			
Ni	ng/m^3	59.6	3.8	19.3	11.7	293.8	36.8	98.5	45.9	71.2	5.82 ± 4.52	200	60	14
Cu	ng/m^3	22.2	11.6	16.9	23.5	40.2	25.9	27.6	31.0	24.9	48.05 ± 51.27	100000		
Zn	ng/m^3	41.4	24.6	33.9	40.4	168.1	66.5	82.6	75.0	66.6	78.19 ± 51.38			
Ga	ng/m^3	0.8	0.8	3.5	ND	1.3	1.2	ND	ND	1.5	N/A			
Fe	ng/m^3	989	832	1392	1232	3621	1348	1950	1600	1620	2152.1 ± 1317.4			
Ge	ng/m^3	ND	ND	0.3	ND	ND	ND	ND	ND	0.3	1.31 ± 0.58			
As	ng/m^3	0.4	ND	ND	ND	0.6	ND	ND	ND	0.5	0.76 ± 0.86	200	15	15
Mo	ng/m^3	15.5	2.3	28.3	84.3	77.5	20.7	33.5	25.7	36.0	3.94 ± 3.93			
Sr	ng/m^3	10.2	8.6	13.8	14.2	33.7	14.4	17.5	16.2	16.1	15.69 ± 15.97			
Se	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	N/A			20000
Br	ng/m^3	15.1	21.3	21.4	16.2	16.6	15.9	18.5	15.8	17.6	N/A			
Rb	ng/m^3	0.2	0.8	ND	ND	4.4	1.5	ND	ND	1.7	1.55 ± 1.65			
Y	ng/m^3	1.2	0.8	2.1	0.7	5.3	1.5	ND	ND	1.9	0.57 ± 0.50			
Nb	ng/m^3	7.1	0.8	4.1	2.8	34.5	2.9	ND	ND	8.7	1.10 ± 0.29			
Pd	ng/m^3	5.2	3.2	2.8	5.2	2.9	3.5	ND	ND	3.8	1.65 ± 0.43			
Ag	ng/m^3	2.5	2.5	3.5	0.7	0.2	1.2	ND	ND	1.7	1.80 ± 2.79			
Cd	ng/m^3	2.9	5.1	8.3	7.6	3.0	3.3	ND	ND	5.0	1.56 ± 1.22			20
In	ng/m^3	4.6	5.3	7.9	5.2	6.1	3.5	ND	ND	5.4	1.83 ± 1.14			
Sn	ng/m^3	10.0	7.4	13.8	11.7	16.0	7.9	ND	13.1	11.4	4.29 ± 8.96			
Sb	ng/m^3	14.4	11.0	15.5	12.1	15.6	13.4	ND	ND	13.7	2.51 ± 3.24			
Cs	ng/m^3	11.1	21.5	56.7	72.2	25.9	14.8	ND	30.1	33.2	N/A			
Ba	ng/m^3	46.4	30.8	48.7	63.2	106.3	51.6	65.1	68.8	60.1	69.95 ± 64.54			
La	ng/m^3	11.3	ND	6.6	26.9	ND	ND	ND	ND	14.9	25.01 ± 0.26			
Pt	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.05 ± 0.25			
Au	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	3.12 ± 0.54			
Pb	ng/m^3	5.6	4.4	6.6	9.0	15.8	8.2	7.2	ND	8.1	12.38 ± 11.15			
Bi	ng/m^3	0.6	ND	ND	ND	0.6	ND	ND	5.3	2.2	2.19 ± 2.30			
U	ng/m^3	1.0	0.6	2.8	4.5	0.4	0.6	ND	ND	1.6	N/A			
Sm	ng/m^3	34.1	28.6	85.7	65.0	32.6	32.0	ND	ND	46.3	N/A			
Tl	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	N/A			
Te	ng/m^3	4.2	5.0	21.1	21.1	8.8	4.4	ND	ND	10.7	N/A			
Ce	ng/m^3	9.0	15.6	46.6	5.5	11.4	10.2	ND	ND	16.4	N/A			
Gd	ng/m^3	35.1	25.7	45.9	121.6	63.6	12.8	ND	ND	50.8	N/A			
Zr	ng/m^3	21.1	8.2	18.3	12.8	78.8	24.2	53.9	19.2	29.6	N/A			

b)

Site		Southern site								September	MATES III	Reference Exposure Level		
Sample Date		9/1/2013	9/4/2013	9/10/2013	9/13/2013	9/19/2013	9/22/2013	9/25/2013	9/28/2013	Average	Average ± SD	Acute	8-Hour	Chronic
Mg	ng/m^3	160	500	460	370	440	340	470	410	394	1679.9 ± 1020.4			
Si	ng/m^3	930	3250	4350	2650	3200	1750	3300	3650	2885	6565.3 ± 3811.4			
P	ng/m^3	29.3	57.3	82.3	59.4	68.4	38.8	45.5	61.3	55.3	53.3 ± 40.42			
S	ng/m^3	430	720	1100	740	1000	530	670	390	697	N/A			
Cl	ng/m^3	140	2150	560	460	300	2250	3350	400	1201	N/A			
Al	ng/m^3	340	1200	1550	970	1200	650	1100	1350	1045	4099.9 ± 2744.0			
K	ng/m^3	180	490	620	440	530	360	498	660	472	577.1 ± 616.1			
Ca	ng/m^3	360	1200	1700	1150	1250	840	950	1450	1113	1946.0 ± 1927.8			
Ti	ng/m^3	58	250	400	300	180	83	220	170	208	195.5 ± 124.6			
V	ng/m^3	ND	13.7	14.7	12.8	5.3	ND	8.6	ND	11.0	10.6 ± 10.45			
Cr	ng/m^3	9.4	39.2	94.5	27.2	16.0	3.2	14.0	8.6	26.5	4.54 ± 5.20			
CrVI	ng/m^3	0.04	0.24	0.83	0.12	0.16	0.11	0.37	0.08	0.24	0.20 ± 0.23			200
Mn	ng/m^3	5.8	25.7	42.3	26.1	29.0	16.0	22.7	46.0	26.7	31.0 ± 25.4			
Co	ng/m^3	ND	8.2	26.1	7.6	6.5	1.7	3.8	4.4	8.3	3.96 ± 2.88			
Ni	ng/m^3	15.5	37.9	130.0	26.9	13.0	2.3	15.4	6.5	30.9	5.82 ± 4.52	200	60	14
Cu	ng/m^3	5.2	26.1	27.8	30.1	18.0	12.0	13.1	38.3	21.3	48.05 ± 51.27	100000		
Zn	ng/m^3	16.7	88.4	130.1	67.2	60.0	33.0	37.7	60.0	61.6	78.19 ± 51.38			
Ga	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	N/A			
Fe	ng/m^3	450	1600	2500	1550	1650	890	1244	2050	1492	2152.1 ± 1317.4			
Ge	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.31 ± 0.58			
As	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.76 ± 0.86	200	15	15
Mo	ng/m^3	ND	16.6	31.3	13.5	3.2	ND	ND	3.4	13.6	3.94 ± 3.93			
Sr	ng/m^3	5.0	17.1	21.3	13.9	16.0	9.3	15.8	18.1	14.6	15.69 ± 15.97			
Se	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	N/A			20000
Br	ng/m^3	5.9	39.8	14.1	15.0	16.0	16.0	23.6	20.8	18.9	N/A			
Rb	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.55 ± 1.65			
Y	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.57 ± 0.50			
Nb	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.10 ± 0.29			
Pd	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.65 ± 0.43			
Ag	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.80 ± 2.79			
Cd	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.56 ± 1.22			20
In	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.83 ± 1.14			
Sn	ng/m^3	ND	ND	11.4	ND	ND	ND	ND	ND	ND	4.29 ± 8.96			
Sb	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.51 ± 3.24			
Cs	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	N/A			
Ba	ng/m^3	ND	65.5	74.1	68.2	70.0	41.0	30.1	88.4	62.5	69.95 ± 64.54			
La	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	25.01 ± 0.26			
Pt	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.05 ± 0.25			
Au	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	3.12 ± 0.54			
Pb	ng/m^3	ND	ND	9.0	ND	ND	ND	ND	ND	9.0	12.38 ± 11.15			
Bi	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.19 ± 2.30			
U	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	N/A			
Sm	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	N/A			
Tl	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	N/A			
Te	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	N/A			
Ce	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	N/A			
Gd	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	N/A			
Zr	ng/m^3	ND	18.0	37.7	18.1	17.0	ND	32.2	17.9	23.5	N/A			

c)

Site		Southern site												October	MATES III	Reference Exposure Level		
Sample Date		10/1/2013	10/4/2013	10/7/2013	10/10/2013	10/13/2013	10/16/2013	10/17/2013	10/19/2013	10/22/2013	10/25/2013	10/28/2013	10/31/2013	Average	Average ± SD	Acute	8-Hour	Chronic
Mg	ng/m^3	420	1200	610	510	670	510	510	450	370	400	420	540	551	1679.9 ± 1020.4			
Si	ng/m^3	2950	8400	3800	1700	2950	3900	3900	3000	2100	2650	800	4050	3350	6565.3 ± 3811.4			
P	ng/m^3	50.1	330.0	190.0	140.0	220.0	190.0	190.0	180.0	160.0	190.0	92.5	180.0	176.1	53.3 ± 40.42			
S	ng/m^3	740	1000	860	980	1300	870	870	1100	1750	1650	620	600	1028	N/A			
Cl	ng/m^3	1600	720	1400	4150	3200	400	400	810	1150	1100	4550	670	1679	N/A			
Al	ng/m^3	1100	3400	1700	790	1250	1600	1600	1200	960	1100	600	1650	1413	4099.9 ± 2744.0			
K	ng/m^3	530	1350	670	360	620	600	600	570	370	430	200	600	575	577.1 ± 616.1			
Ca	ng/m^3	1150	3650	1650	880	1100	2000	2000	1500	910	1200	490	1950	1540	1946.0 ± 1927.8			
Ti	ng/m^3	210	430	650	110	160	350	350	170	220	160	80	340	269	195.5 ± 124.6			
V	ng/m^3	5.3	5.3	33.6	1.7	1.0	11.3	11.3	2.1	8.9	ND	4.8	6.7	8.4	10.6 ± 10.45			
Cr	ng/m^3	33.5	18.1	31.7	19.6	6.7	35.8	35.8	10.4	39.8	28.6	35.8	56.0	29.3	4.54 ± 5.20			
CrVI	ng/m^3	0.07	0.24	0.10	0.10	0.07	0.36	0.36	0.06	0.06	0.06	0.85	0.25	0.22	0.20 ± 0.23			200
Mn	ng/m^3	30.0	91.6	45.6	18.1	33.3	75.1	75.1	34.3	28.8	31.8	13.3	68.7	45.5	31.0 ± 25.4			
Co	ng/m^3	7.0	11.2	9.0	ND	5.3	8.2	8.2	4.0	3.0	5.9	3.6	12.6	7.1	3.96 ± 2.88			
Ni	ng/m^3	47.6	15.8	34.8	17.9	8.6	26.3	26.3	7.5	20.9	30.3	28.9	64.2	27.4	5.82 ± 4.52	200	60	14
Cu	ng/m^3	24.9	37.3	47.5	23.8	11.0	59.8	59.8	51.6	31.2	29.9	12.6	52.9	36.9	48.05 ± 51.27	100000		
Zn	ng/m^3	66.5	86.3	85.6	54.3	40.9	120.0	120.0	82.8	46.5	65.7	37.3	122.6	77.4	78.19 ± 51.38			
Ga	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	N/A			
Fe	ng/m^3	1700	4400	2400	1150	1650	2700	2700	1990	1350	1650	600	2800	2091	2152.1 ± 1317.4			
Ge	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.31 ± 0.58			
As	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.76 ± 0.86	200	15	15
Mo	ng/m^3	6.7	4.0	17.4	11.2	ND	30.1	30.1	4.0	50.7	33.3	13.7	14.1	19.6	3.94 ± 3.93			
Sr	ng/m^3	15.8	44.6	23.5	13.1	16.4	22.4	22.4	18.0	13.1	14.1	7.0	24.9	19.6	15.69 ± 15.97			
Se	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	N/A			20000
Br	ng/m^3	20.6	9.0	10.5	12.0	10.3	8.0	8.1	16.3	13.7	16.8	15.8	10.5	12.6	N/A			
Rb	ng/m^3	ND	7.8	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	7.8	1.55 ± 1.65			
Y	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.57 ± 0.50			
Nb	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.10 ± 0.29			
Pd	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.65 ± 0.43			
Ag	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.80 ± 2.79			
Cd	ng/m^3	ND	ND	ND	ND	ND	9.6	9.6	ND	ND	ND	11.4	ND	10.2	1.56 ± 1.22			20
In	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.83 ± 1.14			
Sn	ng/m^3	11.4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	11.4	4.29 ± 8.96			
Sb	ng/m^3	ND	ND	ND	ND	ND	18.4	18.4	28.6	ND	ND	ND	20.0	21.3	2.51 ± 3.24			
Cs	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	N/A			
Ba	ng/m^3	68.0	130.0	100.0	53.3	53.1	120.0	120.0	102.4	55.4	69.9	27.4	110.0	84.1	69.95 ± 64.54			
La	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	25.01 ± 0.26			
Pt	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.05 ± 0.25			
Au	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	3.12 ± 0.54			
Pb	ng/m^3	ND	12.0	9.2	6.3	11.8	12.8	12.8	10.4	8.8	6.9	ND	12.9	10.4	12.38 ± 11.15			
Bi	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.19 ± 2.30			
U	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	N/A			
Sm	ng/m^3	ND	69.9	ND	61.7	62.6	66.3	66.3	ND	ND	ND	80.7	ND	67.9	N/A			
Tl	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	N/A			
Te	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	N/A			
Ce	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	N/A			
Gd	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	N/A			
Zr	ng/m^3	29.9	ND	ND	ND	ND	ND	ND	ND	ND	32.0	ND	ND	30.9	N/A			

d)

Site		Southern site										November	MATES III	Reference Exposure Level		
Sample Date		11/3/2013	11/6/2013	11/9/2013	11/12/2013	11/15/2013	11/18/2013	11/21/2013	11/24/2013	11/27/2013	11/30/2013	Average	Average ± SD	Acute	8-Hour	Chronic
Mg	ng/m^3	310	450	280	670	640	420	91	120	150	470	360	1679.9 ± 1020.4			
Si	ng/m^3	1050	3700	1850	5150	2400	1750	440	1000	1450	2100	2089	6565.3 ± 3811.4			
P	ng/m^3	92.1	149.5	100.0	260.0	160.0	120.0	41.7	64.1	62.6	140.0	119.0	53.3 ± 40.42			
S	ng/m^3	800	420	720	1000	1100	870	290	190	210	680	628	N/A			
Cl	ng/m^3	2150	380	450	1050	5350	2400	780	120	98	3850	1663	N/A			
Al	ng/m^3	460	1450	740	2150	1050	800	320	390	590	880	883	4099.9 ± 2744.0			
K	ng/m^3	250	530	340	830	500	370	89	230	230	410	378	577.1 ± 616.1			
Ca	ng/m^3	500	1650	830	2750	1100	850	280	500	710	1000	1017	1946.0 ± 1927.8			
Ti	ng/m^3	55	230	110	540	170	120	88	430	120	150	201	195.5 ± 124.6			
V	ng/m^3	ND	ND	ND	17.3	ND	ND	ND	ND	ND	ND	17.3	10.6 ± 10.45			
Cr	ng/m^3	ND	28.3	5.6	54.5	32.3	34.9	16.4	ND	29.9	11.7	26.7	4.54 ± 5.20			
CrVI	ng/m^3	0.02	0.41	0.07	0.56	0.04	0.56	0.56	0.06	0.14	0.27	0.27	0.20 ± 0.23			200
Mn	ng/m^3	8.8	58.3	21.2	88.1	27.7	21.1	6.7	10.6	22.3	65.1	33.0	31.0 ± 25.4			
Co	ng/m^3	ND	5.0	ND	13.2	5.7	3.1	ND	ND	12.9	4.2	7.4	3.96 ± 2.88			
Ni	ng/m^3	2.5	20.1	5.4	39.5	35.2	13.6	12.2	ND	58.4	11.7	22.1	5.82 ± 4.52	200	60	14
Cu	ng/m^3	15.0	59.3	28.9	120.0	21.4	36.1	15.5	26.2	34.0	56.0	41.2	48.05 ± 51.27	100000		
Zn	ng/m^3	23.0	99.2	50.2	219.8	63.5	48.0	33.8	42.9	48.9	83.5	71.3	78.19 ± 51.38			
Ga	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	N/A			
Fe	ng/m^3	540	2450	1150	4100	1500	1300	450	770	1150	1800	1521	2152.1 ± 1317.4			
Ge	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.31 ± 0.58			
As	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.76 ± 0.86	200	15	15
Mo	ng/m^3	ND	22.2	ND	34.2	ND	47.2	8.8	ND	ND	9.0	24.3	3.94 ± 3.93			
Sr	ng/m^3	7.5	18.4	9.8	32.4	19.5	13.4	5.2	7.7	7.9	17.1	13.9	15.69 ± 15.97			
Se	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	N/A			20000
Br	ng/m^3	9.8	7.3	10.6	18.6	20.8	14.8	4.8	5.0	ND	17.7	12.2	N/A			
Rb	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.55 ± 1.65			
Y	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.57 ± 0.50			
Nb	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.10 ± 0.29			
Pd	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.65 ± 0.43			
Ag	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.80 ± 2.79			
Cd	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.56 ± 1.22			20
In	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.83 ± 1.14			
Sn	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	4.29 ± 8.96			
Sb	ng/m^3	ND	22.2	ND	25.5	ND	ND	ND	ND	ND	20.4	22.7	2.51 ± 3.24			
Cs	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	N/A			
Ba	ng/m^3	ND	110.0	52.9	192.9	68.5	67.8	ND	43.7	83.9	86.1	88.2	69.95 ± 64.54			
La	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	25.01 ± 0.26			
Pt	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.05 ± 0.25			
Au	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	3.12 ± 0.54			
Pb	ng/m^3	ND	12.8	ND	24.6	6.9	ND	ND	ND	ND	8.5	13.2	12.38 ± 11.15			
Bi	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.19 ± 2.30			
U	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	N/A			
Sm	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	N/A			
Tl	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	N/A			
Te	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	N/A			
Ce	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	N/A			
Gd	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	N/A			
Zr	ng/m^3	ND	36.3	15.4	59.3	28.9	15.5	15.1	13.5	17.9	30.4	25.8	N/A			

e)

Site		Southern site										December	MATES III	Reference Exposure Level		
Sample Date		12/3/2013	12/6/2013	12/9/2013	12/12/2013	12/15/2013	12/18/2013	12/21/2013	12/24/2013	12/27/2013	12/30/2013	Average	Average ± SD	Acute	8-Hour	Chronic
Mg	ng/m^3	150	370	1000	330	330	N/A	N/A	N/A	N/A	N/A	436	1679.9 ± 1020.4			
Si	ng/m^3	1100	2150	7550	2700	2800	N/A	N/A	N/A	N/A	N/A	3260	6565.3 ± 3811.4			
P	ng/m^3	79.1	110.0	400.0	130.0	130.0	N/A	N/A	N/A	N/A	N/A	169.8	53.3 ± 40.42			
S	ng/m^3	350	490	510	410	340	N/A	N/A	N/A	N/A	N/A	420	N/A			
Cl	ng/m^3	340	1830	910	280	280	N/A	N/A	N/A	N/A	N/A	728	N/A			
Al	ng/m^3	470	890	3100	1080	1080	N/A	N/A	N/A	N/A	N/A	1324	4099.9 ± 2744.0			
K	ng/m^3	270	400	1250	440	500	N/A	N/A	N/A	N/A	N/A	572	577.1 ± 616.1			
Ca	ng/m^3	530	960	3250	1250	1140	N/A	N/A	N/A	N/A	N/A	1426	1946.0 ± 1927.8			
Ti	ng/m^3	85	160	430	190	160	N/A	N/A	N/A	N/A	N/A	205	195.5 ± 124.6			
V	ng/m^3	ND	ND	8.3	ND	ND	N/A	N/A	N/A	N/A	N/A	8.3	10.6 ± 10.45			
Cr	ng/m^3	17.1	14.0	25.2	17.8	5.4	N/A	N/A	N/A	N/A	N/A	15.9	4.54 ± 5.20			
CrVI	ng/m^3	0.12	INV	0.22	0.23	0.09	N/A	N/A	N/A	N/A	N/A	0.16	0.20 ± 0.23			200
Mn	ng/m^3	14.4	26.1	90.3	34.7	42.5	N/A	N/A	N/A	N/A	N/A	41.6	31.0 ± 25.4			
Co	ng/m^3	3.1	3.6	7.5	4.6	5.6	N/A	N/A	N/A	N/A	N/A	4.9	3.96 ± 2.88			
Ni	ng/m^3	22.1	15.4	11.9	11.9	7.9	N/A	N/A	N/A	N/A	N/A	13.8	5.82 ± 4.52	200	60	14
Cu	ng/m^3	34.5	48.9	53.7	67.0	66.6	N/A	N/A	N/A	N/A	N/A	54.1	48.05 ± 51.27	100000		
Zn	ng/m^3	49.7	100.0	109.9	97.1	93.0	N/A	N/A	N/A	N/A	N/A	89.9	78.19 ± 51.38			
Ga	ng/m^3	ND	ND	ND	ND	ND	N/A	N/A	N/A	N/A	N/A	ND	N/A			
Fe	ng/m^3	910	1500	4550	1900	1950	N/A	N/A	N/A	N/A	N/A	2162	2152.1 ± 1317.4			
Ge	ng/m^3	ND	ND	ND	ND	ND	N/A	N/A	N/A	N/A	N/A	ND	1.31 ± 0.58			
As	ng/m^3	ND	ND	ND	ND	ND	N/A	N/A	N/A	N/A	N/A	ND	0.76 ± 0.86	200	15	15
Mo	ng/m^3	ND	ND	9.8	10.9	ND	N/A	N/A	N/A	N/A	N/A	10.4	3.94 ± 3.93			
Sr	ng/m^3	10.2	15.7	43.1	15.9	17.3	N/A	N/A	N/A	N/A	N/A	20.5	15.69 ± 15.97			
Se	ng/m^3	ND	ND	ND	ND	ND	N/A	N/A	N/A	N/A	N/A	ND	N/A			20000
Br	ng/m^3	8.8	12.7	10.0	10.0	6.4	N/A	N/A	N/A	N/A	N/A	9.6	N/A			
Rb	ng/m^3	ND	ND	6.9	ND	ND	N/A	N/A	N/A	N/A	N/A	6.9	1.55 ± 1.65			
Y	ng/m^3	ND	ND	ND	ND	ND	N/A	N/A	N/A	N/A	N/A	ND	0.57 ± 0.50			
Nb	ng/m^3	ND	ND	ND	ND	ND	N/A	N/A	N/A	N/A	N/A	ND	1.10 ± 0.29			
Pd	ng/m^3	ND	ND	ND	ND	ND	N/A	N/A	N/A	N/A	N/A	ND	1.65 ± 0.43			
Ag	ng/m^3	ND	ND	ND	ND	ND	N/A	N/A	N/A	N/A	N/A	ND	1.80 ± 2.79			
Cd	ng/m^3	ND	ND	ND	ND	ND	N/A	N/A	N/A	N/A	N/A	ND	1.56 ± 1.22			20
In	ng/m^3	ND	ND	ND	ND	ND	N/A	N/A	N/A	N/A	N/A	ND	1.83 ± 1.14			
Sn	ng/m^3	ND	ND	ND	ND	ND	N/A	N/A	N/A	N/A	N/A	ND	4.29 ± 8.96			
Sb	ng/m^3	ND	25.3	ND	18.2	21.7	N/A	N/A	N/A	N/A	N/A	21.8	2.51 ± 3.24			
Cs	ng/m^3	ND	ND	ND	ND	ND	N/A	N/A	N/A	N/A	N/A	ND	N/A			
Ba	ng/m^3	70.4	75.4	200.0	170.0	120.0	N/A	N/A	N/A	N/A	N/A	127.2	69.95 ± 64.54			
La	ng/m^3	ND	ND	ND	ND	ND	N/A	N/A	N/A	N/A	N/A	ND	25.01 ± 0.26			
Pt	ng/m^3	ND	ND	ND	ND	ND	N/A	N/A	N/A	N/A	N/A	ND	2.05 ± 0.25			
Au	ng/m^3	ND	ND	ND	ND	ND	N/A	N/A	N/A	N/A	N/A	ND	3.12 ± 0.54			
Pb	ng/m^3	ND	6.1	14.0	8.6	6.9	N/A	N/A	N/A	N/A	N/A	8.9	12.38 ± 11.15			
Bi	ng/m^3	ND	ND	ND	ND	ND	N/A	N/A	N/A	N/A	N/A	ND	2.19 ± 2.30			
U	ng/m^3	ND	ND	ND	ND	ND	N/A	N/A	N/A	N/A	N/A	ND	N/A			
Sm	ng/m^3	ND	ND	ND	ND	ND	N/A	N/A	N/A	N/A	N/A	ND	N/A			
Tl	ng/m^3	ND	ND	ND	ND	ND	N/A	N/A	N/A	N/A	N/A	ND	N/A			
Te	ng/m^3	ND	ND	ND	ND	ND	N/A	N/A	N/A	N/A	N/A	ND	N/A			
Ce	ng/m^3	ND	ND	ND	ND	ND	N/A	N/A	N/A	N/A	N/A	ND	N/A			
Gd	ng/m^3	ND	ND	ND	ND	ND	N/A	N/A	N/A	N/A	N/A	ND	N/A			
Zr	ng/m^3	14.2	28.4	32.7	24.9	27.3	N/A	N/A	N/A	N/A	N/A	25.5	N/A			

f)

Site		Northern site										August	MATES III	Reference Exposure Level		
Sample Date		8/2/2013	8/6/2013	8/8/2013	8/11/2013	8/14/2013	8/17/2013	8/20/2013	8/23/2013	8/26/2013	8/29/2013	Average	Average ± SD	Acute	8-Hour	Chronic
Mg	ng/m^3	397	210	281	258	309	253	282	403	520	340	325	1679.9 ± 1020.4			
Si	ng/m^3	1885	1207	1503	1604	2473	1965	1750	2188	2300	2100	1898	6565.3 ± 3811.4			
P	ng/m^3	64.6	83.6	40.1	66.3	80.9	72.2	76.7	54.2	48.7	47.0	63.4	53.3 ± 40.42			
S	ng/m^3	1304	666	632	1378	1267	1206	1080	797	850	660	984	N/A			
Cl	ng/m^3	875	357	1920	392	354	499	707	1739	2550	1050	1044	N/A			
Al	ng/m^3	722	511	551	547	1006	726	654	838	900	780	724	4099.9 ± 2744.0			
K	ng/m^3	379	219	281	307	394	341	297	404	410	330	336	577.1 ± 616.1			
Ca	ng/m^3	825	521	656	532	1075	818	699	966	1100	910	810	1946.0 ± 1927.8			
Ti	ng/m^3	139	126	161	72	752	139	140	131	120	160	194	195.5 ± 124.6			
V	ng/m^3	3.8	7.3	12.8	2.8	43.3	3.6	9.0	7.6	ND	7.9	10.9	10.6 ± 10.45			
Cr	ng/m^3	12.1	24.9	113.0	5.2	25.2	14.1	117.8	37.7	30.4	28.0	40.8	4.54 ± 5.20			
CrVI	ng/m^3	0.04	0.48	0.90	0.08	0.34	0.59	1.43	0.23	0.34	0.29	0.47	0.20 ± 0.23			200
Mn	ng/m^3	14.9	9.7	20.0	15.5	24.0	17.1	14.2	21.1	21.8	25.6	18.4	31.0 ± 25.4			
Co	ng/m^3	3.1	5.2	5.2	2.4	5.9	6.1	7.9	6.2	ND	ND	5.3	3.96 ± 2.88			
Ni	ng/m^3	8.6	20.0	28.3	4.8	25.2	13.3	36.6	15.5	14.5	19.0	18.6	5.82 ± 4.52	200	60	14
Cu	ng/m^3	14.2	15.2	12.4	10.0	16.0	19.4	18.3	26.9	24.2	28.7	18.5	48.05 ± 51.27	100000		
Zn	ng/m^3	32.1	24.2	28.0	20.7	99.7	45.5	27.3	43.9	41.8	37.7	40.1	78.19 ± 51.38			
Ga	ng/m^3	ND	ND	1.7	2.8	ND	0.6	0.3	0.7	ND	ND	1.2	N/A			
Fe	ng/m^3	1041	639	1283	769	1363	1127	1418	1277	1180	1150	1125	2152.1 ± 1317.4			
Ge	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.31 ± 0.58			
As	ng/m^3	ND	ND	0.7	ND	ND	0.4	ND	ND	ND	ND	0.5	0.76 ± 0.86	200	15	15
Mo	ng/m^3	3.1	42.1	71.5	3.8	7.8	4.6	77.7	56.7	43.9	66.7	37.8	3.94 ± 3.93			
Sr	ng/m^3	10.4	4.5	9.3	7.6	13.3	9.9	11.1	11.4	10.7	13.5	10.2	15.69 ± 15.97			
Se	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	N/A			20000
Br	ng/m^3	25.6	11.7	15.2	21.8	21.7	16.2	15.5	22.5	19.3	13.5	18.3	N/A			
Rb	ng/m^3	ND	ND	ND	ND	1.1	1.0	0.7	0.3	ND	ND	0.8	1.55 ± 1.65			
Y	ng/m^3	0.3	1.4	0.0	1.4	1.3	1.3	0.7	1.7	ND	ND	1.0	0.57 ± 0.50			
Nb	ng/m^3	6.2	2.8	4.1	6.2	1.3	1.3	13.8	0.7	ND	ND	4.6	1.10 ± 0.29			
Pd	ng/m^3	2.4	4.5	3.5	3.8	1.0	2.1	4.1	6.9	ND	ND	3.5	1.65 ± 0.43			
Ag	ng/m^3	4.1	2.8	5.5	5.5	1.3	0.4	2.4	1.7	ND	ND	3.0	1.80 ± 2.79			
Cd	ng/m^3	8.6	5.9	7.9	9.7	4.0	4.4	12.4	9.0	ND	ND	7.7	1.56 ± 1.22			20
In	ng/m^3	9.3	10.4	0.3	6.9	7.1	6.3	13.1	10.0	ND	ND	7.9	1.83 ± 1.14			
Sn	ng/m^3	12.8	12.4	19.0	8.3	11.6	11.8	19.0	16.9	ND	ND	14.0	4.29 ± 8.96			
Sb	ng/m^3	9.3	9.3	ND	ND	10.1	10.1	18.7	19.3	ND	ND	12.8	2.51 ± 3.24			
Cs	ng/m^3	58.0	63.2	20.7	23.5	9.7	13.3	41.1	52.9	61.2	ND	38.2	N/A			
Ba	ng/m^3	59.4	39.7	68.8	38.3	50.7	54.5	42.8	72.9	80.2	52.5	56.0	69.95 ± 64.54			
La	ng/m^3	9.7	5.5	ND	7.9	13.5	ND	16.9	47.3	ND	ND	16.8	25.01 ± 0.26			
Pt	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.05 ± 0.25			
Au	ng/m^3	2.1	2.8	2.4	ND	ND	ND	7.9	4.5	ND	ND	3.9	3.12 ± 0.54			
Pb	ng/m^3	6.6	5.9	6.6	6.2	8.0	4.2	8.3	9.0	ND	ND	6.8	12.38 ± 11.15			
Bi	ng/m^3	ND	ND	1.4	ND	ND	0.6	ND	ND	ND	2.8	1.6	2.19 ± 2.30			
U	ng/m^3	3.1	1.4	1.7	2.1	0.8	0.8	1.0	2.4	ND	ND	1.7	N/A			
Sm	ng/m^3	44.2	67.4	3.8	63.2	33.9	20.9	97.4	39.7	ND	ND	46.3	N/A			
Tl	ng/m^3	ND	1.4	ND	ND	0.2	ND	ND	ND	ND	ND	0.8	N/A			
Te	ng/m^3	4.5	27.3	14.9	16.2	8.2	6.7	10.7	12.1	ND	ND	12.6	N/A			
Ce	ng/m^3	68.4	37.3	7.9	14.5	12.6	5.9	27.3	74.6	30.1	16.2	29.5	N/A			
Gd	ng/m^3	56.0	83.6	40.4	73.9	22.1	27.4	73.9	94.0	ND	ND	58.9	N/A			
Zr	ng/m^3	14.9	148.9	11.1	11.7	26.3	9.7	16.6	16.2	16.9	17.3	29.0	N/A			

g)

Site		Northern site												September	MATES III	Reference Exposure Level		
Sample Date		9/1/2013	9/4/2013	9/7/2013	9/10/2013	9/13/2013	9/16/2013	9/19/2013	9/22/2013	9/25/2013	9/28/2013	10/1/2013		Average	Average ± SD	Acute	8-Hour	Chronic
Mg	ng/m^3	180	560	590	320	460	380	490	360	510	460	440		431	1679.9 ± 1020.4			
Si	ng/m^3	900	3500	2750	1750	3100	1800	3150	1850	2900	4200	2050		2590	6565.3 ± 3811.4			
P	ng/m^3	29.7	67.0	75.0	63.6	70.5	62.0	74.0	36.0	42.1	60.8	45.3		58.1	53.3 ± 40.42			
S	ng/m^3	480	800	1050	1150	870	950	1150	590	740	460	820		824	N/A			
Cl	ng/m^3	420	2450	2050	510	700	290	240	2650	3700	540	1900		1355	N/A			
Al	ng/m^3	340	1270	1100	680	1100	660	1200	670	970	1550	780		954	4099.9 ± 2744.0			
K	ng/m^3	180	530	510	290	520	340	520	370	440	750	430		445	577.1 ± 616.1			
Ca	ng/m^3	340	1200	1200	730	1250	740	1100	770	790	1600	820		972	1946.0 ± 1927.8			
Ti	ng/m^3	44	180	140	120	220	130	170	90	180	190	100		146	195.5 ± 124.6			
V	ng/m^3	ND	9.7	ND	6.9	4.1	ND	ND	ND	ND	ND	ND		6.9	10.6 ± 10.45			
Cr	ng/m^3	ND	35.9	22.5	29.7	117.8	56.0	17.0	6.6	12.8	16.9	9.7		35.0	4.54 ± 5.20			
CrVI	ng/m^3	0.06	0.28	0.57	0.10	0.58	0.21	0.06	0.12	0.77	0.06	0.09		0.28	0.20 ± 0.23			200
Mn	ng/m^3	ND	29.4	29.7	22.5	34.5	23.0	23.0	28.0	21.8	48.4	22.1		28.9	31.0 ± 25.4			
Co	ng/m^3	ND	5.5	ND	7.9	ND	ND	5.5	ND	ND	7.6	ND		6.6	3.96 ± 2.88			
Ni	ng/m^3	ND	16.6	11.7	26.3	30.4	12.0	11.0	3.5	10.4	6.6	7.3		14.3	5.82 ± 4.52	200	60	14
Cu	ng/m^3	10.4	27.6	39.4	15.2	40.8	10.0	24.0	13.0	13.1	46.6	16.6		24.0	48.05 ± 51.27	100000		
Zn	ng/m^3	13.1	140.0	45.6	39.4	73.9	25.0	49.0	30.0	28.0	64.3	28.3		50.8	78.19 ± 51.38			
Ga	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		ND	N/A			
Fe	ng/m^3	410	1600	1400	1000	2250	1100	1450	1000	960	2300	990		1347	2152.1 ± 1317.4			
Ge	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		ND	1.31 ± 0.58			
As	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		ND	0.76 ± 0.86	200	15	15
Mo	ng/m^3	ND	48.7	25.9	58.4	49.8	16.0	13.0	ND	10.4	ND	ND		31.7	3.94 ± 3.93			
Sr	ng/m^3	ND	17.6	14.9	10.7	16.2	ND	15.0	13.0	ND	22.5	12.8		15.7	15.69 ± 15.97			
Se	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		ND	N/A			20000
Br	ng/m^3	10.7	78.4	25.9	13.1	17.6	13.0	16.0	19.0	22.1	23.1	19.3		23.9	N/A			
Rb	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		ND	1.55 ± 1.65			
Y	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		ND	0.57 ± 0.50			
Nb	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		ND	1.10 ± 0.29			
Pd	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		ND	1.65 ± 0.43			
Ag	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		ND	1.80 ± 2.79			
Cd	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		ND	1.56 ± 1.22			20
In	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		ND	1.83 ± 1.14			
Sn	ng/m^3	ND	19.7	ND	ND	19.7	ND	ND	ND	ND	27.3	ND		19.7	4.29 ± 8.96			
Sb	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		ND	2.51 ± 3.24			
Cs	ng/m^3	67.0	ND	52.5	54.6	69.8	70.0	51.0	ND	66.3	ND	51.8		61.6	N/A			
Ba	ng/m^3	ND	51.5	73.2	60.5	100.2	54.0	75.0	54.0	71.5	113.0	82.9		72.5	69.95 ± 64.54			
La	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		ND	25.01 ± 0.26			
Pt	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		ND	2.05 ± 0.25			
Au	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		ND	3.12 ± 0.54			
Pb	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		ND	12.38 ± 11.15			
Bi	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		ND	2.19 ± 2.30			
U	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		ND	N/A			
Sm	ng/m^3	116.1	ND	ND	ND	ND	100.0	ND	ND	ND	ND	ND		108.0	N/A			
Tl	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		ND	N/A			
Te	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		ND	N/A			
Ce	ng/m^3	37.3	40.4	18.0	30.7	32.8	ND	48.0	31.0	45.9	42.1	20.4		36.3	N/A			
Gd	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		ND	N/A			
Zr	ng/m^3	ND	22.8	15.2	25.2	28.0	18.0	14.0	ND	16.9	25.9	15.9		20.8	N/A			

Sampler removed from the site

h)

Site		Eastern site											Study	MATES III	Reference Exposure Level		
Sample Date		10/31/2013	11/6/2013	11/12/2013	11/18/2013	11/24/2013	11/30/2013	12/6/2013	12/12/2013	12/18/2013	12/24/2013	12/30/2013	Average	Average ± SD	Acute	8-Hour	Chronic
Mg	ng/m^3	510	520	780	500	170	220	430	430	500	130	570	419	1679.9 ± 1020.4			
Si	ng/m^3	3250	3900	5750	2050	1350	1550	3150	2200	2650	930	4150	2665	6565.3 ± 3811.4			
P	ng/m^3	160.0	170.0	280.0	140.0	78.8	110.0	150.0	120.2	150.0	50.0	190.0	110.0	53.3 ± 40.42			
S	ng/m^3	610	460	1100	920	230	420	500	530	870	130	520	761	N/A			
Cl	ng/m^3	690	510	920	2200	120	460	270	1950	1250	180	750	1162	N/A			
Al	ng/m^3	1300	1600	2300	880	540	600	1250	870	1150	390	1700	1051	4099.9 ± 2744.0			
K	ng/m^3	640	600	940	430	290	350	530	440	460	260	720	468	577.1 ± 616.1			
Ca	ng/m^3	1700	1700	2850	960	590	660	1450	940	1350	430	1900	1164	1946.0 ± 1927.8			
Ti	ng/m^3	200	210	360	120	77	90	190	110	210	50	220	200	195.5 ± 124.6			
V	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	11.8	10.6 ± 10.45			
Cr	ng/m^3	14.2	12.4	21.4	12.8	ND	ND	11.7	ND	11.1	ND	5.5	27.9	4.54 ± 5.20			
CrVI	ng/m^3	0.68	0.25	1.01	0.18	0.04	0.11	0.08	0.09	0.13	0.08	0.04	0.31	0.20 ± 0.23			200
Mn	ng/m^3	130.0	78.8	120.0	32.1	22.5	16.9	44.9	20.4	29.0	15.5	47.0	38.8	31.0 ± 25.4			
Co	ng/m^3	7.6	ND	9.3	ND	ND	ND	6.9	ND	ND	ND	6.2	7.3	3.96 ± 2.88			
Ni	ng/m^3	9.7	5.5	10.7	6.9	ND	ND	6.9	ND	4.8	ND	4.5	19.2	5.82 ± 4.52	200	60	14
Cu	ng/m^3	59.7	67.7	130.0	42.8	34.9	46.3	83.6	50.8	52.2	20.7	80.2	40.1	48.05 ± 51.27	100000		
Zn	ng/m^3	180.0	120.2	270.0	62.9	53.6	60.8	120.0	75.7	110.0	31.8	110.0	78.3	78.19 ± 51.38			
Ga	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.4	N/A			
Fe	ng/m^3	3050	2900	4550	1550	1000	1200	2400	1500	1750	660	2700	1754	2152.1 ± 1317.4			
Ge	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.3	1.31 ± 0.58			
As	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.5	0.76 ± 0.86	200	15	15
Mo	ng/m^3	ND	ND	ND	16.9	ND	ND	ND	ND	ND	ND	ND	25.1	3.94 ± 3.93			
Sr	ng/m^3	21.9	19.7	36.6	15.5	10.4	11.7	20.4	16.2	19.0	10.0	27.3	16.1	15.69 ± 15.97			
Se	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	N/A			20000
Br	ng/m^3	9.7	8.3	18.0	13.5	ND	10.4	11.7	15.9	12.1	ND	8.3	15.9	N/A			
Rb	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.2	1.55 ± 1.65			
Y	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.5	0.57 ± 0.50			
Nb	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	6.6	1.10 ± 0.29			
Pd	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	3.7	1.65 ± 0.43			
Ag	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.4	1.80 ± 2.79			
Cd	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	7.2	1.56 ± 1.22			20
In	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	6.7	1.83 ± 1.14			
Sn	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	13.3	4.29 ± 8.96			
Sb	ng/m^3	ND	ND	39.4	ND	ND	ND	ND	ND	ND	ND	ND	23.7	2.51 ± 3.24			
Cs	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	40.9	N/A			
Ba	ng/m^3	140.0	170.0	250.0	90.9	70.8	78.4	160.0	110.0	113.0	78.4	180.7	93.4	69.95 ± 64.54			
La	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	15.9	25.01 ± 0.26			
Pt	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.05 ± 0.25			
Au	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	3.9	3.12 ± 0.54			
Pb	ng/m^3	ND	ND	27.6	ND	ND	ND	ND	ND	ND	ND	ND	14.8	12.38 ± 11.15			
Bi	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.9	2.19 ± 2.30			
U	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.6	N/A			
Sm	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	190.0	57.9	N/A			
Tl	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.8	N/A			
Te	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	11.7	N/A			
Ce	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	24.2	N/A			
Gd	ng/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	54.9	N/A			
Zr	ng/m^3	31.2	40.4	53.9	ND	ND	18.7	25.6	19.0	23.5	ND	25.9	27.6	N/A			

Table 5. Concentrations of volatile organic compounds at a location immediately west of the CFW facility.

Sample Date	2/7/2013	2/7/2013	4/26/2013	5/7/2013	**Typical Ambient Air**
Canister Number	54727	54640	54641	54024	
Sampling time	14:00	14:00	15:47	15:30	
Total NMOC, ppbc	276	640	154	119	100-700 ppbc
Compound	**Conc. (ppb)**	**Conc. (ppb)**	**Conc. (ppb)**	**Conc. (ppb)**	**Conc. (ppb)**
ethanol	3.0	3.2	3.82	2.95	
vinyl chloride	N.D.	N.D.	N.D.	N.D.	<0.1
1,3-butadiene	<0.1	<0.1	0.06	N.D.	<0.1-0.2
2-propenal (Acrolein)	0.2	0.3	0.46	0.41	0.1-0.4
acetone	13.4	64.5	9.37	9.11	3.7-13.7
methylene chloride	0.2	0.4	0.17	0.17	0.1-0.4
methyl tert butyl ether	N.D.	N.D.	N.D.	N.D.	<0.1
2-butanone (MEK)	0.4	1.0	0.48	0.76	0.3-0.8
chloroform	<0.1	<0.1	0.02	0.02	<0.1
1,2-dichloroethane	N.D.	N.D.	0.02	N.D.	<0.1
benzene	0.2	0.4	0.32	0.1	0.3-1.3
carbon tetrachloride	0.1	0.1	0.10	0.09	0.1
1,2-dichloropropane	<0.1	<0.1	N.D.	N.D.	<0.1
trichloroethylene	N.D.	N.D.	N.D.	N.D.	<0.1-0.1
toluene	0.4	0.8	0.39	0.25	0.8-4.1
1,2-dibromoethane	<0.1	0.1	N.D.	N.D.	
tetrachloroethylene	<0.1	<0.1	0.03	0.02	<0.1-0.1
ethylbenzene	<0.1	<0.1	0.05	0.03	0.1-0.5
m+p-xylenes	0.3	0.5	0.16	0.09	0.3-1.5
Styrene	0.2	0.2	N.D.	N.D.	<0.1-0.2
o-xylene	<0.1	0.1	0.03	0.02	0.1-0.6
1,4-dichlorobenzene	<0.1	<0.1	N.D.	N.D.	<0.1
1,2-dichlorobenzene	<0.1	<0.1	N.D.	N.D.	<0.1
isoprene	0.2	<0.1	0.14	0.09	
acetylene+ethylene	6.6	11.1	3.72	2.13	1.4-8.3
ethane	10.6	15.3	3.93	3.00	1.0-5.0
propylene	1.2	2.3	0.68	0.48	0.5-2.0
propane	27.8	66.4	16.11	6.66	1.3-16.0
isobutane	2.1	4.7	0.35	0.24	0.8-3.7
1-butene	0.2	0.2	N.D.	N.D.	0.1-0.3
n-butane	1.6	2.9	0.31	0.26	1.2-6.8
n-pentane	0.4	0.8	0.22	0.24	0.6-2.9
1-hexene	<0.1	<0.1	N.D.	N.D.	<0.1-0.1
n-hexane	0.2	0.3	0.05	0.05	0.2-1.0
n-heptane	<0.1	0.2	N.D.	N.D.	0.1-0.6
n-octane	<0.1	<0.1	N.D.	N.D.	<0.1-0.3
n-nonane	0.1	0.4	N.D.	N.D.	<0.1-0.1
n-decane	0.2	0.6	0.04	0.1	<0.1-0.1
n-undecane	<0.1	<0.1	0.03	N.D.	<0.1
n-dodecane	0.1	<0.1	N.D.	N.D.	<0.1