



Hexavalent Chromium Monitoring in Barrio Logan Update #2

Sampling Results and Analysis For the Sampling Period of March 11- April 5, 2002

The San Diego Air Pollution Control District (SDAPCD) and California Air Resources Board (ARB) are continuing to conduct intensive monitoring for hexavalent chromium at selected sites in Barrio Logan near Master Plating and Carlson & Beauloye Machine Shop. The information contained in this fact sheet summarizes the results obtained during the period of March 11- April 5, 2002 for the ambient (outside) monitoring and indoor monitoring of the air at Master Plating. This fact sheet also contains analyses of meteorological data and additional metals and soils data that has been collected.

SAMPLING RESULTS AND ANALYSIS

On March 11, the ARB and SDAPCD began a new phase of monitoring near the two chrome plating facilities. The new phase focused outside monitoring efforts on the two locations where the most frequent occurrences of hexavalent chromium have been detected and where the highest concentrations were recorded in December. These sites are located at the residence between the facilities (Location 1) and in the alley behind the plating facilities (Location 5). Samples were collected on a 24-hour and 12-hour schedule to most closely match operating hours of the plating facilities. On March 25, the owner of Master Plating voluntarily agreed during court proceedings to cease all chrome plating operations until further legal notice. Monitoring has continued since the halt of chrome plating at Master Plating.

The table below summarizes the 24-hour concentrations collected in this new phase of monitoring from March 11 – April 5. The table shows the concentrations collected prior to the March 25th shutdown of chrome plating at Master Plating, and concentrations of samples collected since that time. The samples collected after March 25th are separated into weekly intervals. A total of 52 (24-hour) samples were analyzed for the latest sampling period. Of those, 33 samples (63%) had values below the level of detection (LOD) and 19 samples (37%) had readings above the LOD.

Summary of Ambient Air Monitoring Results (24-Hour Samplers)

Sampling Location	March 11 – April 5, 2002		
	No. of samples	Hexavalent Chromium (ng/m ³) ¹	
		Average ²	Highest
March 11 – March 24			
Location 1 (between plating facilities)	14	0.70	3.1
Location 5 (alley)	14	0.12	0.3
Week 1: March 25 – 31			
Location 1 (between plating facilities)	7	0.76	2.1
Location 5 (alley)	7	0.10	0.1
Week 2: April 1-5			
Location 1 (between plating facilities)	5	0.14	0.2
Location 5 (alley)	5	0.16	0.4

¹ Nanograms per cubic meter

² In calculating the average concentrations, it is standard practice to assume that any sample detected below the level of detection (LOD) is half that value. Therefore, in this case, all samples below LOD are assumed to be 0.1 ng/m³.

During the first week after the shutdown of plating operations (Week 1) there was active 'spring cleaning' and painting taking place at Master Plating, including on the weekend. During that time there were higher than expected indoor levels measured inside Master Plating indicating an additional source of hexavalent chromium inside the building other than chrome plating. There was a corresponding elevated concentration recorded at Location 1 at the same time.

In the second week (Week 2), business activities returned to normal (no spring cleaning/painting) according to the owner of Master Plating. The indoor concentrations returned to expected low levels during the second week, i.e. those previously seen on non-plating days throughout the study, after the heavy cleaning subsided. The ambient concentrations at all sites during the last week of this sampling period were consistently less, with samples at or below detection.

Indoor Air Sampling Results at Master Plating

During the time of March 11 – April 5, 2002 there was continued indoor air monitoring at Master Plating. All samples had readings above the LOD. A summary of the indoor testing results is shown below. Results are categorized by the shutdown of chrome plating at Master Plating on March 25. Again, note that during Week 1, active 'spring cleaning' was taking place inside of Master Plating, while during Week 2 there were more normal business practices.

Summary of Indoor Sampling Results at Master Plating

	12-Hour Samples	24-Hour Samples
March 11- March 24		
Number of Samples	12	9
Lowest Concentration (ng/m ³)	3.5	3.1
Highest Concentration (ng/m ³)	845	383
Average Concentration (ng/m ³)	174.7	74.6
Week 1 (March 25 – 31)		
Number of Samples	6	4
Lowest Concentration (ng/m ³)	11	12
Highest Concentration (ng/m ³)	127	28
Average Concentration (ng/m ³)	42.2	18
Week 2 (April 1 - 5)		
Number of Samples	4	4
Lowest Concentration (ng/m ³)	4.5	3.4
Highest Concentration (ng/m ³)	10	6.5
Average Concentration (ng/m ³)	4.9	8.2

There appears to be a consistent relationship, both from indoor readings on non-plating days and from notes of technicians on site, that Master Plating can generate indoor levels of hexavalent chromium without active chrome plating occurring. Elevated outside levels are observed on days the building is reopened after a weekend of no activity, or, as shown in recent data, when other indoor actions occur such as disrupting dust or other activities take place within Master Plating.

The higher concentrations of hexavalent chromium at Location 1 have a strong association with emissions from Master Plating. This is based on the relationship between the indoor activity and indoor air quality at Master Plating, and the indoor air quality and the ambient readings at Location 1. It also is supported by the unique composition of the air quality inside Master Plating and the appearance of that unique pattern of emissions, or “fingerprint”, on air quality readings on corresponding days at Location 1. The fingerprint of emissions is most evident when the hexavalent levels at Location 1 are high. Graphs to support these interpretations are available.

Additional Sampling for Other Metals

Analysis was also conducted for additional metals, including nickel, iron, magnesium, copper, zinc, and lead. Of all these metals, only nickel was significantly higher at Location 1 than the average concentrations at Barrio Logan-Memorial Academy, the San Diego region and statewide averages for similar time periods. Nickel is associated with decorative chrome plating activities, as well as other sources. The nickel levels inside Master Plating were high, suggesting that it was contributing, at least in part, to the high outdoor readings. None of the outdoor measurements of nickel posed a health risk.

Meteorological Analysis

A detailed analysis of the wind flow patterns was conducted for the monitoring period commencing February 5, 2002. Master Plating is situated to the west of Location 1; therefore, a westerly wind flow would blow directly from the facility towards that location. On days with a predominantly westerly wind flow (wind blowing from the west), there was a high correlation of elevated outdoor concentrations at Location 1 (between the platers) with indoor concentrations at Master Plating, when activity was taking place at Master Plating. Conversely, when similar wind patterns were observed and there was no plating activity within Master Plating, or the wind direction is predominantly from another direction, such as the south, noticeably lower concentrations were detected at Location 1. Wind patterns were similar for the study periods during chrome plating activity and after plating ceased at Master Plating.

Soil Samples

As a part of the intensive investigation into hexavalent chromium in Barrio Logan, soil samples were collected in March 2002 at selected locations in and near several industrial facilities including Master Plating and the Carlson & Beauloye Machine Shop, and at some nearby residences. These samples were only collected as a screening tool, to help provide information on possible sources. It is critical to note that the detection limit for analyzing the hexavalent chromium content in soils was much higher than the LOD used for air samples. The soil detection limit used is roughly a thousand times less sensitive on a mass basis than that for air. This means that a sample may show non-detectable levels of hexavalent chromium in the soil; however, hexavalent chromium could be present below those levels and its airborne dust could influence ambient concentrations that are measured by a much more sensitive method.

None of the residential soil samples contained detectable levels of hexavalent chromium or of total chromium above what would be expected in soil. In some cases, wipe samples were collected of dust on windowsills. A wipe sample from an indoor windowsill of one residence contained 2.8 micrograms of hexavalent chromium. Soil and wipe samples were also collected from the two plating facilities and contained measurable amounts of total chromium. Hexavalent chromium was also detected inside on a wall and on the roof of Carlson & Beauloye Machine Shop. None of the samples contained levels of hexavalent chromium above the Department of Toxic Substances Control (DTSC) soil cleanup level for hexavalent chromium of 17 ppm for a residential exposure scenario (which is more stringent than the commercial or industrial cleanup level). Due to the much lower toxicity of total chromium, DTSC does not have a soil cleanup level for total chromium.

FINDINGS

- Based on the information collected to date, including data since the halt of chrome plating operations at Master Plating, there is a high degree of confidence that the higher levels of hexavalent chromium measured at Location 1 are associated with activities at Master Plating. This finding is based on several analyses of correlations

between indoor concentrations, hexavalent chromium ratios, electricity usage, wind flow patterns, and outside measurements.

- Analysis of ambient metals data shows that concentrations for other measured metals were no higher than those seen for the wintertime at Barrio Logan-Memorial Academy, except for nickel that is associated with decorative chrome plating.
- The data from additional monitoring at downwind sites of other sources is being collected and evaluated to determine if sources other than Master Plating are contributing to elevated concentrations in the Barrio Logan community.

NEXT STEPS

The SDAPCD and ARB will continue to monitor ambient air quality levels and facility operations during the shutdown of Master Plating, and to further investigate for other potential sources of elevated hexavalent chromium ambient levels. Four additional monitoring sites are being located to determine if impacts further away from the plating facilities are being experienced by the community.

For more information, please contact:

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