COUNTY OF LOS ANGELES
Public Health

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September 18, 2017

TO: Each Supervisor

FROM: Barbara Ferrer, Ph.D., M.P.H., M.Ed.
Director

SUBJECT: **UPDATE ON PROGRESS TO ABATE ELEVATED HEXAVALENT CHROMIUM LEVELS IN THE CITY OF PARAMOUNT**

On December 20, 2016, your Board instructed the Department of Public Health (DPH) to report back monthly on the progress to abate the endangerment posed by elevated hexavalent chromium ("Chromium-6") emissions in the City of Paramount. This ninth monthly progress report provides information on five key elements of the interagency response: air quality monitoring, soil assessment, enforcement, occupational health, and public communication. DPH is a part of the interagency team consisting of the South Coast Air Quality Management District (SCAQMD), Los Angeles County Fire Department, California Department of Toxics Substances Control (DTSC), California Environmental Protection Agency (CalEPA), California Air Resources Board (CARB), and the Long Beach Department of Health and Human Services.

## Air Quality Monitoring

SCAQMD continues air quality monitoring across the City of Paramount in order to identify and address sources of Chromium-6. Monitoring is focused on several geographic areas: compliance monitoring points previously established outside of Anaplex Corporation (Anaplex) and Aerocraft Heat Treating Company, Inc. (Aerocraft), the southern investigation area approximately a half-mile south of these facilities, and three area schools.

Anaplex and Aerocraft Facility Monitoring: When Chromium-6 emissions (measured over a 24-hour period) at the compliance monitoring points outside of Anaplex and Aerocraft exceed 1 nanogram per meter cubed ($ng/m^3$), the SCAQMD requires shut-down of all operations that contribute to Chromium-6 emissions. In the month of August, no shut-downs have been triggered. As shown in the table below, average Chromium-6 emissions in the original investigation area were lower in August 2017 than in the previous month.

**Hexavalent Chromium Monitoring Results (ng/m$^3$) – Aerocraft, Anaplex and Nearby Residential Areas**

| | Industrial | | Residential |
|---|---|---|---|
| **Month** | **Aerocraft** | **Anaplex** | **300 ft downwind** |
| October 2016 | 26 | | 4.7 |
| November 2016 | 12 | 11 | 2.0 |
| December 2017 | 3.0 | 2.5 | 0.7 |
| January 2017 | 1.0 | 2.1 | 0.5 |
| February 2017 | 1.1 | 0.5 | 0.6 |
| March 2017 | 1.1 | 0.8 | 0.7 |
| April 2017 | 0.6 | 0.4 | 0.3 |
| May 2017 | 0.7 | 0.6 | 0.4 |
| June 2017 | 0.5 | 0.5 | 0.8 |
| July 2017 | 0.3 | 1.9 | 1.6 |
| August 2017 | 0.4 | 0.2 | 0.3 |

Note: Grey shading indicates air monitoring was not conducted for this location during month listed.

Southern Investigation Area: Emissions in the southern investigation area (in and around Jackson Street, between Minnesota Avenue and Illinois Avenue) were lower than the previous month. In August, Chromium-6 concentrations in air ranged from 0.1 to 1.5 ng/m$^3$, with 10% of the samples in exceedance of 1 ng/m$^3$. SCAQMD's investigation into the source of Chromium-6 in the southern area continues, including facilities located in the City of Long Beach.

Area Schools: Monitoring by SCAQMD and CARB continues at three schools: Lincoln Elementary, Lynn Mokler Elementary, and Wesley Gaines Elementary. In August 2017, Chromium-6 levels at these schools ranged from 0.07 to 0.6 ng/m$^3$, which are lower than levels reported for the previous month. The average Chromium-6 concentration at Lincoln Elementary School was 0.25 ng/m$^3$ during the month of August.

DPH met with the Paramount Unified School District and the Paramount City Manager on August 30, 2017 regarding the District's indoor air sampling at schools. The District informed DPH that it is testing indoor air for Chromium-6 at several schools, and advised that they would share the testing protocol. DPH will provide recommendations to the District on its testing protocol when it is received.

**Soil Assessment**

DPH worked with the Fire Department to sample surface soil from 10 locations in public areas adjacent to residential areas that are downwind of the Anaplex and Aerocraft facilities. Sampling results to date suggest that emissions from Anaplex and Aerocraft have not resulted in significant amounts of deposition of Chromium-6 in soil in residential areas. The findings are detailed in Attachment 1.

**Enforcement**

As follow-up to the health directives issued in July 2017, DPH continues to track compliance with SCAQMD rules and permit applications to implement more effective pollution control measures.

SCAQMD reported that it is currently reviewing permit applications for new pollution control equipment for Weber Metals, Press Forge and Mattco Manufacturing.

On August 23, 2017, the SCAQMD's independent Hearing Board approved issuance of a stipulated Order for Abatement requiring Lubeco Inc., a metal-finishing facility in north Long Beach (6859 Downey Ave), to reduce its emissions of Chromium-6. The Hearing Board's order includes short and long-term measures to reduce Lubeco's emissions of Chromium-6. Lubeco will be required to curtail its Chromium-6 emitting operations when concentrations exceed 1 ng/m$^3$, based on a three sample average. Additionally, Lubeco will develop and submit a plan to SCAQMD that is expected to result in the addition of new air pollution control equipment at the facility, including emissions monitors and a meteorological station.

Additionally, Carlton Forge Works is complying with the SCAQMD Stipulated Order for Abatement to mitigate odors from its facility. SCAQMD continues to monitor odor reports to track the effectiveness of mitigation measures being taken by Carlton Forge Works.

**Occupational Health**
DPH is continuing to track previous referrals made to the California Occupational Safety and Health Administration (Cal/OSHA) regarding Anaplex and Aerocraft. The Cal/OSHA reports have been completed and DPH has requested copies for review.

**Communication**
DPH continues to distribute health education material to Paramount residents. In the past month, this has included staffing a table at the weekly farmers' market. p

DPH will continue to work closely with SCAQMD, the Fire Department, and County Counsel to report monthly on progress to protect the public's health in the City of Paramount. If you have questions or need additional information, please let me know.

BF:ab

c: Chief Executive Officer
County Counsel
Executive Officer, Board of Supervisors
Fire Department

# Residential Soil Sampling
## Chromium 6 in the City of Paramount

County of Los Angeles Public Health

**September 5, 2017**

## Soil Sampling Results
## Residential Areas Near Anaplex and Aerocraft Heat Treating

As part of ongoing efforts to control public health risks from industrial emissions of chromium 6 impacting residents in the City of Paramount, the Los Angeles County Department of Public Health (DPH) partnered with the Fire Department Health Hazardous Materials Division (Health Hazmat) and the City of Paramount to assess chromium 6 and other metals in surface soils. In May 2017, DPH selected ten locations in residential areas to sample surface soil downwind of Anaplex Corporation (Anaplex) and Aerocraft Heat Treating (Aerocraft), two facilities identified by the South Coast Air Quality Management District (SCAQMD) as contributing to air emissions of the chromium 6.

**Background**

Since October 2016, SCAQMD, in partnership with state and local agencies, has been conducting an investigation of chromium 6 emissions from industrial facilities in the City of Paramount, where concentrations of chromium 6 in the air were found to be up to 400 times greater than concentrations elsewhere in Los Angeles County. SCAQMD issued an Order of Abatement to Anaplex and Aerocraft to implement air pollution controls to reduce chromium 6 emissions.

Emissions from industrial facilities could have resulted in deposition of chromium onto nearby soils, possibility representing a hazard to residents. Dust accumulation indoors could contain soil that migrated from the outdoors. Young children are more susceptible to exposures to soil or dust.

Given the proximity of the nearest residential property (300 feet) to the Anaplex and Aerocraft facilities, DPH and Health HazMat initiated surface soil sampling in residential areas adjacent to the Anaplex and Aerocraft facilities.

# Residential Soil Sampling

## Chromium 6 in the City of Paramount

In November 2016, Health HazMat collected surface soil samples from public right-of-way areas around several industrial facilities in Paramount, including Anaplex and Aerocraft. Total chromium detected in soils near the Anaplex and Aerocraft facilities ranged from 51 to 4,670 mg/kg, which exceed typical background soil levels in the area of 21 to 64 mg/kg.[1] Preliminary sampling using X-ray florescence (XRF) technology showed a sharp decline of total chromium in soil in the closest residential area (300 feet away).

Measurement of total chromium does not tell the full story. Total chromium consists of several forms of chromium found in the environment, including chromium 3 and chromium 6. While chromium 3 naturally occurs and is an essential nutrient for humans, chromium 6 is produced from industrial processes and is a known cause of human cancer. DPH determined that it was necessary to test not only for chromium 6 in soil, but also for other important metals, to examine the extent of metals deposited on nearby soils and their potential public health impacts.

**Methods**

On May 20, 2017, ten surface soil samples were collected by Health HazMat from public right-of-way areas near residences (see Figure 1). Health HazMat collected the top 1-inch of soil for each sample. Vegetative matter was removed from the surface sample, and soil sampling equipment was decontaminated prior to sampling and in between samples.

At the request of the City of Paramount, split soil samples were collected from each of the ten sampling locations. A split sample means that a sample is divided into two equivalent portions to be analyzed separately, typically by two different laboratories. The soil samples collected for DPH were analyzed by American Environmental Testing Laboratory, Inc. (AETL) in Burbank, California and the split soil samples were delivered to the City of Paramount's contractor, Tetra Tech, for analysis by Eurofins CalScience.

Each soil samples were analyzed for 21 metals: antimony, arsenic, barium, beryllium, cadmium, chromium (total), chromium 6, cobalt, copper, lead, manganese, mercury, molybdenum, nickel, selenium, silver, thallium, tin, titanium, vanadium and zinc (EPA Methods 6020B/7470A, 6010B and 3060A/7199).

A summary result for each location was determined by selecting the maximum concentration reported from the two split soil samples taken at each of the ten locations. In the case where there were non-detected concentrations for both split samples, the value for the lowest laboratory reporting limit was selected.

In order to assess the potential for health impacts from metals in soil, the summary results for the surface soil sampling were compared to standards established by federal and state agencies, including the *Residential Soil Regional Screening Levels* (U.S. Environmental Protection Agency) and the *California Human Health Screening Levels* (California Environmental Protection Agency).[2,3] These screening levels are designed to protect the most sensitive populations, including children, from long-term cancer and non-cancer health risks. Additionally, summary results were compared to local background reference levels previously established by soil sampling conducted in the City of Paramount and overseen by the Department of Toxic Substances Control.[1] Note that these background soil samples were collected upwind and away from industrial sources.

**Results**

For each of the 21 metals, the minimum, maximum, and average concentrations are presented in Table 1, as well as the summary results for the split soil samples taken at each of the ten locations. Four metals were detected at a concentration above state or federal health screening levels, namely, arsenic, cadmium, chromium 6 and lead. Arsenic, cadmium and lead were found to be within typical local background levels. A background reference value was not established for chromium 6, however, because it was not detected in any of the background samples. Since chromium 6 does not occur naturally in soils, any detectable level of chromium 6 would be in excess of background levels. Ten other metals (antimony, beryllium, cobalt, copper, manganese, molybdenum, nickel, titanium, vanadium and zinc) were detected at concentrations above local background levels, but below all available health screening levels.

Out of the ten sampling locations, only one soil sample had a detectable concentration of chromium 6 at 0.4 mg/kg, which exceeds the EPA's Regional Screening Level of 0.3 mg/kg but is below the California Human Health Screening Level of 17.0 mg/kg for residential soil. Summary results for chromium 6 at the other nine locations were either below or estimated to be below the laboratory reporting limit of 0.4 mg/kg.

**Conclusion**

Out of ten sampling locations, one surface soil sample detected chromium 6 at a concentration above the EPA Regional Screening Level but below the California Human Health Screening Level. This soil sample was taken at a location that was downwind and closest to one of the metal facilities, Aerocraft, at a distance of approximately 300 feet.

The low detection of chromium 6 at the ten soil sampling locations suggest that the majority of air emissions of chromium 6 from Anaplex and Aerocraft have either not settled or not persisted on the surface soils of nearby residential areas. In addition, historical deposits of chromium 6 may have converted to chromium 3, the non-toxic form of chromium, by organic matter in the soil environment.[4] At this time, direct contact with or accidental ingestion of these surface soils would not appear to represent an exposure pathway of public health concern for chromium 6. Inhaling chromium 6 poses the most significant threat to public health, and efforts to reduce health risks should continue to focus on reducing air emissions from facilities emitting chromium 6.

It is important to note that these surface soil samples were limited to a specific area downwind of Anaplex and Aerocraft. As the interagency investigation continues, additional soil sampling may be warranted to evaluate soil near other industrial sources of chromium 6 in the City of Paramount.

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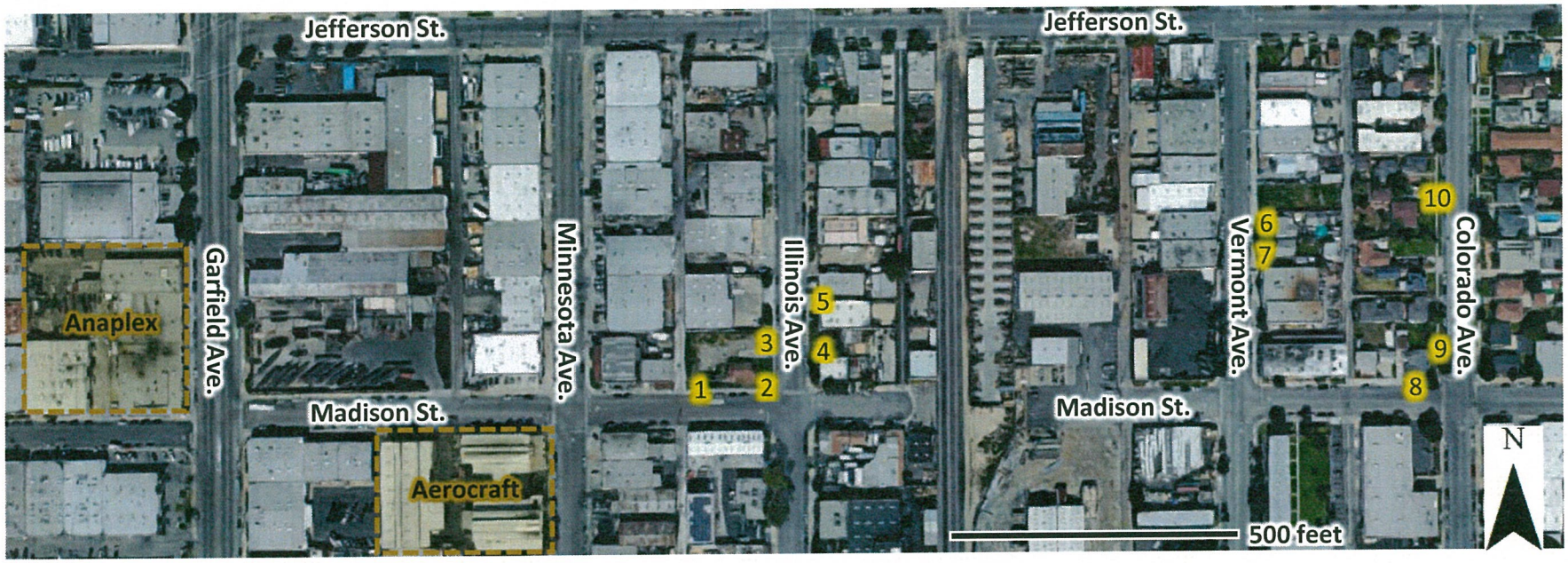
1. ToxStrategies, 2015. Summary Results for Soil and Dust Samples Collected in the Vicinity of Carlton Forge Works. Retrieved from http://www.envirostor.dtsc.ca.gov/public/deliverable_documents/5807800114/CFW%20Sampling%20Report%20%202015%20%2003-31.pdf
2. United States Environmental Protection Agency (USEPA). Regional Screening Levels – Residential Soil Table (June 2017). Retrieved from https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables-june-2017.
3. California Environmental Protection Agency (Cal/EPA). California Human Health Screening Levels – Residential Soil. Office of Environmental Health Hazard Assessment. Retrieved from https://oehha.ca.gov/chhsltable, accessed on June 2017.
4. Xiao, W., Zhang, Y., Li, T., Chen, B., Wang, H., He, Z., & Yang, X. (2012). Reduction kinetics of hexavalent chromium in soils and its correlation with soil properties. *Journal of Environmental Quality, 41*(5), 1452-8. http://doi.org/10.2134/jeq2012.0061

# Residential Soil Sampling

## Chromium 6 in the City of Paramount

County of Los Angeles Public Health

**Figure 1: Locations of surface soil sampling near Aerocraft and Anaplex, Paramount, California.**



# Residential Soil Sampling

## Chromium 6 in the City of Paramount

County of Los Angeles Public Health

**Table 1: Summary of 21 metals from surface soil sampling, Paramount, California.**

| Metals | EPA Screening Level[a] | CA Health Screening Level[b] | Background Level[c] | Min[d] | - | Max[d] | Avg[e] | Spilt Soil Samples (1 – 10)[f] | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | 1A/1B | 2A/2B | 3A/3B | 4A/4B | 5A/5B | 6A/6B | 7A/7B | 8A/8B | 9A/9B | 10A/10B |
| Antimony | 31 | 30 | 1.04 | 0.32 | - | 1.25 | 0.59 | 0.52^ | 1.25^ | 0.41^ | 0.60^ | 0.49^ | 0.32^ | 0.47^ | 0.84^ | 0.60^ | 0.45^ |
| Arsenic | 0.68[†] | 0.07 | 5.50 | 1.74 | - | 4.16 | 3.0 | 3.41 | 3.51 | 3.83 | 2.76 | 4.16 | 2.88 | 2.61 | 1.74 | 2.63 | 2.89 |
| Barium | 15,000 | 5,200 | 200 | 87 | - | 176 | 130 | 132 | 176 | 139 | 145 | 172 | 103 | 87 | 103 | 118 | 130 |
| Beryllium | 160 | 16 | 0.29 | 0.21 | - | 0.33 | 0.27 | 0.28^ | 0.33 | 0.30^ | 0.24^ | 0.31^ | 0.21^ | <1.0 | <1.0 | 0.25^ | 0.27^ |
| Cadmium | 71 | 1.7 | 4.3 | 0.32 | - | 2.26 | 0.98 | 2.26 | 1.09 | 0.73^ | 1.22 | 2.08 | 0.32^ | 0.45^ | 0.41^ | 0.45^ | 0.81^ |
| Chromium | 120,000 | 100,000 | 64 | 21 | - | 57 | 34 | 49 | 45 | 27 | 30 | 41 | 23 | 21 | 24 | 57 | 23 |
| Chromium 6 | 0.3[†] | 17 | NA[‡] | 0.12 | - | 0.41 | 0.23 | 0.41 | 0.13^ | <0.4 | <0.4 | 0.25^ | <0.4 | 0.12^ | 0.22^ | <0.4 | 0.14^ |
| Cobalt | 23 | 660 | 12 | 8 | - | 22 | 12 | 16 | 15 | 10 | 11 | 10 | 9 | 8 | 11 | 22 | 9 |
| Copper | 3,100 | 3,000 | 140 | 57 | - | 151 | 93 | 102 | 85 | 151 | 74 | 80 | 67 | 68 | 138 | 113 | 57 |
| Lead | 400 | 80 | 465 | 29 | - | 106 | 62 | 35 | 83 | 106 | 74 | 72 | 29 | 31 | 45 | 64 | 79 |
| Manganese | 1,800 | NA[§] | 340 | 233 | - | 442 | 349 | 354 | 442 | 424 | 327 | 391 | 327 | 262 | 233 | 303 | 423 |
| Mercury | 11 | 18 | 0.69 | 0.02 | - | 0.11 | 0.06 | 0.03^ | 0.04^ | 0.03^ | 0.06^ | 0.09 | 0.02 | 0.02^ | 0.11 | 0.102^ | 0.10^ |
| Molybdenum | 390 | 380 | 6.3 | 1.6 | - | 11.1 | 3.7 | 4.8 | 7.0 | 2.0 | 2.6 | 1.7 | 1.6 | 1.8 | 2.8 | 11.1 | 1.9 |
| Nickel | 1,500 | 1,600 | 65 | 33 | - | 166 | 71 | 132 | 85 | 33 | 48 | 35 | 39 | 51 | 85 | 166 | 36 |
| Selenium | 390 | 380 | NA[‡] | 0.27 | - | 0.68 | 0.44 | 0.68^ | 0.59^ | 0.31^ | 0.34^ | 0.56^ | <1.0 | 0.27^ | 0.44^ | <1.0 | 0.37^ |
| Silver | 390 | 380 | NA[‡] | 0.26 | - | 0.80 | 0.46 | <1.0 | 0.26^ | <1.0 | 0.34^ | 0.80^ | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 |
| Thallium | 0.78 | 5 | NA[‡] | NA | - | NA | NA | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 |
| Tin | 47,000 | NA[§] | NA[‡] | 12 | - | 18 | 15 | 14 | 14 | 18 | 16 | 16 | 15 | 12 | 13 | 14 | 14 |
| Titanium | NA[§] | NA[§] | 1002 | 612 | - | 1040 | 882 | 961 | 836 | 1020 | 797 | 986 | 1040 | 878 | 612 | 843 | 845 |
| Vanadium | 390 | 530 | 33 | 19 | - | 36 | 28 | 30 | 31 | 36 | 26 | 31 | 29 | 25 | 19 | 28 | 25 |
| Zinc | 23,000 | 23,000 | 500 | 186 | - | 1650 | 467 | 399 | 654 | 231 | 524 | 1650 | 186 | 250 | 260 | 260 | 255 |

**Table 1: Continued**

| Notes: | |
|---|---|
| a | Regional Screening Levels published by the US EPA for residential soils with target non-cancer risk of 1 in one million[2] |
| b | California Human Health Screening Levels (Residential Soil) published by the Office of Environmental Health Hazard Assessment[3] |
| c | Upper bound background levels calculated by using U.S. EPA's ProUCL software based upon ten background samples collected in 2014[1] |
| d | Minimum and maximum values take into account detected values and "J-flagged" estimated values |
| e | Average takes into account detected values and "J-flagged" estimated values |
| f | The highest value for each split sample at the same location is presented |
| ^ | Result is a "J-flagged" estimated value that is less than the reporting limit but greater than or equal to the method detection limit |
| † | Screening level risk is based on target cancer risk of 1 in one million |
| < | Not detected, value below the laboratory reporting limit |
| ‡ | Not applicable (NA) because the metal was not detected in enough samples to calculate a background value |
| § | Not applicable (NA) because no Regional Screening Level or California Human Health Screening Level was developed for this compound |
| | Orange shading indicates result exceeds the health screening level |
| | Blue shading indicates result exceeds the background level |