South Coast
Air Quality Management District

# Report on air and soil samples taken in Wildomar, CA in January 2013

## Background and Summary of Results

SCAQMD was one of several agencies that participated in a community meeting on December 18, 2012 organized by the City of Wildomar. At that meeting, SCAQMD staff committed to collect and analyze air samples from two or three homes in the Autumnwood development and report the findings back to the community. This report summarizes the sampling effort, analysis, and results. There are technical appendices attached which include the detailed information for the samples taken.

Overall findings are that the air samples collected from inside and outside the three homes did not have higher levels of compounds listed in the appendices than typically seen in indoor or outdoor air. While some soil samples at one home had unusually high levels of sodium and aluminum, these are metals that are part of naturally occurring minerals. Other compounds in the soil samples were of typical concentrations for soil reported in scientific literature, with a couple exceptions.

## Sampling

Two homes on Amaryllis Court and one home on Front Street were selected for sampling. On Wednesday, January 2, 2013, three types of sampling were done:

1. Hand-held monitors were used to measure hydrocarbons in the air and at the surface of soil at each home. This was used as a screening tool to help staff choose a location to take an outdoor sample. However, all readings were very low, so this did not factor in to the outdoor sample location selection.

2. Air samples were collected in stainless steel canisters at each of the three homes, with one sample collected in the backyard, and two taken inside each home. If the home was two-story, one downstairs sample was taken, and one upstairs sample was taken. The indoor samples were taken in a living area and master bedroom. An outdoor sample was taken upwind of the housing development on Front Street, as well. These samples were all 'grab' samples, which means the sample was collected over a short period of time, less than one minute. Prior to sampling, the canister is evacuated and air is then let into the canister by opening a valve.

   Once a sample is collected, the canister is brought back to a laboratory for analysis. An instrument known as a Gas Chromatograph/Mass Spectrometer (GC/MS) analyzes the sample by identifying compounds in the sample. A Flame Ionization Detector (FID) measures how much of each compound is present.

3. Soil samples were collected at two of the homes. A sample was also collected at the SCAQMD headquarters in Diamond Bar for comparison.

Staff returned to one of the homes on Amaryllis Court on Tuesday, January 15, 2013 to take additional samples. This included several soil samples, and canister samples including indoor and outdoor grab samples, a 3-hour sample indoors, and a 3-hour sample outdoors.

## Analysis

All analysis was done in SCAQMD's laboratory at its Diamond Bar headquarters following SCAQMD's Standard Operating Procedures and rigorous quality assurance measures, which ensure that samples are collected and analyzed properly.

Fourteen canister samples were collected and analyzed by GC/MS, a technique used to separate and characterize chemicals in a sample. The GC/MS targets over 50 compounds, however, other compounds can be found, identified and measured if they are present. These samples were analyzed following U.S. EPA Method TO-15.

Soil samples were also collected and analyzed for metal and mineral content. While SCAQMD does not normally analyze soil samples, our laboratory has this capability. Most samples were collected at the surface, with the exception of two samples, which were collected 11 inches below the surface. Several samples were also collected of a white material on top of the soil. All samples were analyzed by Energy Dispersive X-Ray Fluorescence (ED XRF), which can identify and quantify metals using x-rays. The samples with the white material were also analyzed by microscopy and X-Ray Diffraction (XRD), which uses x-rays to identify compounds based on their crystalline structure.

## Results

In summary, all samples were within typical expected ranges for outdoor air, indoor air and soil, with the exception of soil samples collected specifically to evaluate the white material collected. For comparison purposes data from literature studies of typical concentrations are provided in the appendices. Further review of results would be welcomed. Please see appendices for the detailed sample results.

Indoor air samples were compared to two studies of indoor air from California homes; one with 34 homes and the other with over 100 homes. Results from the samples taken in Autumnwood and average values from the studies are shown in Appendix 2. All samples collected and analyzed by the SCAQMD staff are within the range of these studies.

Outdoor air samples were compared to typical levels found by the SCAQMD in the South Coast Air Basin. Outdoor air sampling results are shown in Appendix 1. All samples collected and analyzed by the SCAQMD are within typical expected range.

Autumnwood soil sample results were compared to western soil data from the U.S. Geological service. All soil samples, with the exception of some samples collected specifically to analyze the white material seen in a small portion of one yard, are within typical ranges in scientific literature. This includes Barium, for which typical soil ranges are up to 5,000 ppm.

Some of the samples taken of the white material on top of the soil had levels of aluminum, phosphorous, sodium, sulfur, molybdenum or uranium higher than the top of the typical range reported by the U.S. Geological Service. Many of these compounds are naturally occurring. Uranium levels were 4 and 77 percent higher in 2 soil samples. Uranium is naturally occurring and is present in nearly all rocks and soil. The levels seen in these soil samples, while not within typical reported ranges, should not cause health concerns. These results can be found in Appendix 3.

## Appendices

The attached appendices contain detailed data for the samples taken:

Appendix 1. Data for outdoor air samples

Appendix 2. Data for indoor air samples

Appendix 3. Soil data

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**Appendix 1**

**Outdoor Samples**

Organic Analysis by Gas Chromatography(GC) - Mass Spectrometry(MS) and Flame Ionization Detection(FID)

| Sample Date | 1/2/2013 | 1/2/2013 | 1/2/2013 | 1/2/2013 | 1/15/2013 | 1/15/2013 | |
|---|---|---|---|---|---|---|---|
| Sampling type | Grab | Grab | Grab | Grab | Grab | 3 hour | |
| Sampling Location | Cicarelli backyard | Marcella backyard | Villanueva corner backyard | Upwind, Corner of Front & Penrose St | Villanueva corner backyard | Villanueva corner backyard | Typical Ambient Air |
| **Total NMOC, ppbc** | **38** | **39** | **32** | **35** | **79** | **62** | **100-700** |
| **Compound** | **Conc. (ppb)** | **Conc. (ppb)** | **Conc. (ppb)** | **Conc. (ppb)** | **Conc. (ppb)** | **Conc. (ppb)** | **Conc. (ppb)** |
| ethanol | 0.9 | 0.7 | 0.8 | 1.0 | 2.7 | 0.89 | |
| acetone | 1.9 | 1.4 | 1.2 | 1.6 | 1.3 | 4.4 | 3.7-13.7 |
| methylene chloride | N.D. | N.D. | N.D. | N.D. | 0.12 | <0.1 | 0.1-0.4 |
| methyl tert butyl ether | 0.1 | 0.1 | 0.1 | 0.1 | N.D. | N.D. | <0.1 |
| 2-butanone (MEK) | N.D. | 0.1 | 0.1 | 0.1 | N.D. | N.D. | 0.3-0.8 |
| benzene | 0.1 | 0.1 | 0.1 | 0.1 | 0.21 | 0.11 | 0.3-1.3 |
| carbon tetrachloride | 0.1 | 0.1 | 0.1 | 0.1 | <0.1 | <0.1 | 0.1 |
| 1,2-dichloropropane | 0.1 | 0.2 | 0.1 | 0.2 | N.D. | N.D. | <0.1 |
| toluene | 0.1 | 0.1 | 0.2 | 0.1 | 0.31 | 0.11 | 0.8-4.1 |
| m+p-xylenes | 0.1 | 0.1 | <0.1 | <0.1 | 0.17 | <0.1 | 0.3-1.5 |
| styrene | 0.1 | 0.1 | <0.1 | 0.1 | N.D. | N.D. | <0.1-0.2 |
| isoprene | 0.1 | N.D. | 0.1 | <0.1 | <0.1 | <0.1 | |
| acetylene+ethylene | 0.7 | 0.6 | 0.5 | 0.5 | 3.0 | 1.5 | 1.4-8.3 |
| ethane | 2.2 | 2.1 | 2.0 | 2.1 | 4.4 | 2.6 | 1.0-5.0 |
| propylene | 0.2 | 0.2 | 0.2 | 0.2 | 0.41 | 0.18 | 0.5-2.0 |

| Sample Date | 1/2/2013 | 1/2/2013 | 1/2/2013 | 1/2/2013 | 1/15/2013 | 1/15/2013 | |
|---|---|---|---|---|---|---|---|
| Sampling type | Grab | Grab | Grab | Grab | Grab | 3 hour | |
| Sampling Location | Cicarelli backyard | Marcella backyard | Villanueva corner backyard | Upwind, Corner of Front & Penrose St | Villanueva corner backyard | Villanueva corner backyard | Typical Ambient Air |
| **Compound** | **Conc. (ppb)** | **Conc. (ppb)** | **Conc. (ppb)** | **Conc. (ppb)** | **Conc. (ppb)** | **Conc. (ppb)** | **Conc. (ppb)** |
| propane | 0.7 | 0.7 | 0.8 | 0.7 | 3.6 | 1.7 | 1.3-16.0 |
| isobutane | 0.2 | 0.2 | 0.2 | 0.1 | 0.37 | 0.17 | 0.8-3.7 |
| 1-butene | 0.1 | 0.1 | N.D. | 0.1 | <0.1 | N.D. | 0.1-0.3 |
| n-butane | 0.4 | 0.4 | 0.6 | 0.3 | 0.84 | 0.43 | 1.2-6.8 |
| n-pentane | 0.1 | 0.1 | 0.1 | 0.1 | 0.24 | 0.11 | 0.6-2.9 |
| n-hexane | 0.1 | 0.1 | <0.1 | 0.1 | 0.10 | <0.1 | 0.2-1.0 |
| n-dodecane | N.D. | N.D. | N.D. | 0.1 | N.D. | N.D. | <0.1 |
| **Additional Compound (Concentrations estimated within ± 50%)** | | | | | | | |
| limonene | N.D. | 0.1 | N.D. | N.D. | N.D. | N.D. | |

NMOC = Non-Methane Organic Compounds
N.D. = Not Detected
ppb = Parts per billion
ppbc = Parts per billion carbon
Note: The following compounds were not detected in these samples: vinyl chloride; 1,3-butadiene; 2-propenal (acrolein); chloroform; 1,2-dichloroethane; trichloroethylene; 1,2-dibromoethane; tetrachloroethylene; ethylbenzene; o-xylene; 1,4 dichlorobenzene; 1,2 dichlorobenzene; 1-hexene; n-heptane; n-octane; n-nonane; n-decane; n-undecane; alpha pinene and isopropyl alcohol

## Appendix 2

### Indoor Samples

Organic Analysis by Gas Chromatography (GC) – Mass Spectrometry (MS) and Flame Ionization Detection (FID)

| Sample Date | 1/2/2013 | 1/2/2013 | 1/2/2013 | 1/2/2013 | 1/2/2013 | 1/2/2013 | 1/15/2013 | 1/15/2013 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Sampling Type | Grab | Grab | Grab | Grab | Grab | Grab | Grab | 3 hour | | | |
| Sampling Location | Cicarelli family room | Cicarelli master bedroom | Marcella living room | Marcella master bedroom | Villanueva living room first floor | Villanueva master bedroom second floor | Villanueva living room | Villanueva living room | 34 Home Study* | 100 + Home Study** | EPA Study*** |
| **Total NMOC, ppbc** | **310** | **290** | **580** | **630** | **200** | **190** | **184** | **186** | N.R. | N.R. | |
| | | | | | | | | | **Mean (Range)** | **Mean (Range)** | **(Range)** |
| **Compound** | **Conc. (ppb)** | **Conc. (ppb)** | **Conc. (ppb)** | **Conc. (ppb)** | **Conc. (ppb)** | **Conc. (ppb)** | **Conc. (ppb)** | **Conc. (ppb)** | **Conc. (ppb)** | **Conc. (ppb)** | |
| ethanol | 20.1 | 21.7 | 35.5 | 42.5 | 8.0 | 6.4 | 5 | 4.3 | | | |
| vinyl chloride | N.D. | N.D. | N.D. | N.D. | N.D. | N.D. | N.D. | N.D. | | | (N.D. to 0.035) |
| 1,3-butadiene | 0.5 | 0.4 | 0.1 | 0.5 | 0.5 | 0.2 | <0.1 | <0.1 | | | |
| 2-propenal (Acrolein) | N.D. | N.D. | 0.3 | 0.3 | 0.2 | N.D. | N.D. | <0.1 | | | |
| acetone | 11.4 | 8.4 | N.D. | N.D. | 9.8 | 8.9 | 4.8 | 4.7 | | | |
| methylene chloride | 0.9 | N.D. | 2.1 | 1.9 | N.D. | 0.2 | 0.13 | 0.11 | 0.09 (N.D. to 0.14) | | (0.84 to 13.0) |
| methyl tert butyl ether | 1.7 | 1.6 | 0.1 | 0.1 | 0.4 | 0.4 | N.D. | N.D. | | | |
| 2-butanone (MEK) | 0.6 | 0.6 | 0.9 | 1.5 | 0.7 | 0.7 | N.D. | N.D. | | | |
| chloroform | 0.3 | 0.3 | <0.1 | 0.1 | 0.1 | <0.1 | <0.1 | <0.1 | 0.27 (N.D. to 2.58) | 1.5 | (N.D. to 1.5) |
| 1,2-dichloroethane | 0.2 | 0.2 | 0.3 | 0.4 | 0.1 | 0.1 | N.D. | <0.1 | | | (N.D. to 0.05) |
| benzene | 0.6 | 0.6 | 1.2 | 1.1 | 0.6 | 0.5 | 0.39 | 0.38 | 0.28 (N.D. to 0.81) | 0.5 (0.03 to 4.66) | (N.D. to 9.0) |
| carbon tetrachloride | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.10 | 0.11 | 0.1 (N.D. to 0.33) | | (N.D. to 0.18) |
| 1,2-dichloropropane | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | N.D. | N.D. | N.D. | | | |

# Appendix 2

| Sample Date | 1/2/2013 | 1/2/2013 | 1/2/2013 | 1/2/2013 | 1/2/2013 | 1/2/2013 | 1/15/2013 | 1/15/2013 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Sampling Type | Grab | Grab | Grab | Grab | Grab | Grab | Grab | 3 hour | | | |
| Sampling Location | Cicarelli family room | Cicarelli master bedroom | Marcella living room | Marcella master bedroom | Villanueva living room first floor | Villanueva master bedroom second floor | Villanueva living room | Villanueva living room | 34 Home Study* | 100 + Home Study** | EPA Study*** |
| trichloroethylene | N.D. | N.D. | <0.1 | 0.1 | N.D. | N.D. | N.D. | N.D. | | | (N.D. to 0.61) |
| toluene | 2.3 | 2.3 | 7.1 | 6.7 | 1.8 | 1.8 | 0.97 | 1.1 | 1.1 (0.27 to 3.29) | 4.5 (0.08 to 30.5) | (1.27 to 38.2) |
| 1,2-dibromoethane | 0.8 | 0.6 | 1.5 | 1.3 | 0.4 | 0.4 | N.D. | N.D. | | | |
| tetrachloroethylene | N.D. | N.D. | 0.1 | 0.1 | N.D. | N.D. | N.D. | N.D. | 0.06 (N.D. to 1.1) | 0.08 (0.01 to 1.74) | (N.D. to 1.33) |
| ethylbenzene | 0.3 | 0.3 | 0.7 | 0.7 | 0.1 | 0.1 | <0.1 | <0.1 | 0.16 (0.02 to 0.46) | | (0.23 to 3.92) |
| m+p-xylenes | 1.1 | 1.1 | 3.0 | 2.6 | 0.4 | 0.4 | 0.28 | 0.26 | 0.51 (0.3 to 7.1) | 3.2 (0.02 to 13.8) | (0.35 to 14.6) |
| styrene | 0.3 | 0.3 | 0.6 | 0.9 | 0.4 | 0.3 | 0.16 | 0.15 | | 0.42 (0.02 to 14.6) | |
| o-xylene | 0.2 | 0.2 | 0.5 | 0.4 | 0.1 | N.D. | <0.1 | <0.1 | 0.23 (0.05 to 0.67) | 0.95 (0.02 to 4.61) | (0.25 to 4.61) |
| 1,4-dichlorobenzene | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | N.D. | N.D. | | 0.86 (0.02 to 36.4) | |
| 1,2-dichlorobenzene | N.D. | N.D. | N.D. | N.D. | N.D. | N.D. | N.D. | N.D. | | | |
| isoprene | 2.0 | 0.4 | 0.1 | 0.2 | 0.1 | 0.1 | 0.18 | 0.13 | | | |
| acetylene+ethylene | 1.4 | 1.5 | 1.2 | 1.4 | 1.2 | 1.2 | 5.3 | 5.1 | | | |
| ethane | 5.7 | 5.9 | 36.4 | 33.8 | 4.6 | 4.5 | 7.4 | 7.2 | | | |
| propylene | 0.8 | 0.8 | 0.9 | 1.1 | 0.8 | 0.7 | 0.93 | 0.87 | | | |
| propane | 2.8 | 2.9 | 6.6 | 7.6 | 5.1 | 4.8 | 7.7 | 7.6 | | | |
| isobutane | 0.6 | 0.6 | 1.1 | 1.4 | 0.6 | 0.6 | 0.71 | 0.71 | | | |
| 1-butene | 0.9 | 0.9 | 0.5 | 0.8 | 0.7 | 0.6 | 0.27 | 0.24 | | | |
| n-butane | 1.5 | 1.6 | 3.9 | 4.7 | 2.7 | 2.5 | 2.7 | 2.8 | | | |
| n-pentane | 1.2 | 1.2 | 2.6 | 2.5 | 0.5 | 0.5 | 0.59 | 0.57 | | | |
| 1-hexene | <0.1 | <0.1 | 0.1 | 0.1 | N.D. | N.D. | N.D. | N.D. | | | |

# Appendix 2

| Sample Date | 1/2/2013 | 1/2/2013 | 1/2/2013 | 1/2/2013 | 1/2/2013 | 1/2/2013 | 1/15/2013 | 1/15/2013 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Sampling Type | Grab | Grab | Grab | Grab | Grab | Grab | Grab | 3 hour | | | |
| Sampling Location | Cicarelli family room | Cicarelli master bedroom | Marcella living room | Marcella master bedroom | Villanueva living room first floor | Villanueva master bedroom second floor | Villanueva living room | Villanueva living room | 34 Home Study* | 100 + Home Study** | EPA Study*** |
| n-hexane | 0.7 | 0.7 | 1.1 | 1.1 | 0.1 | 0.1 | 0.17 | 0.16 | 0.26 (N.D. to 1.02) | 0.65 (0.03 to 6.81) | |
| n-heptane | 0.3 | 0.3 | 0.6 | 0.6 | 0.1 | 0.1 | <0.1 | <0.1 | 0.73 (0.05 to 4.83) | | |
| n-octane | 0.1 | 0.1 | 0.2 | 0.2 | 0.1 | 0.1 | N.D. | N.D. | 0.17 (0.06 to 0.92) | | |
| n-nonane | 0.1 | <0.1 | 0.1 | 0.1 | <0.1 | <0.1 | N.D. | N.D. | | | |
| n-decane | N.D. | N.D. | N.D. | 0.1 | N.D. | N.D. | N.D. | <0.1 | 0.14 (N.D. to 0.77) | | |
| n-undecane | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | <0.1 | N.D. | N.D. | 0.14 (N.D. to 0.72) | | |
| n-dodecane | <0.1 | N.D. | <0.1 | <0.1 | <0.1 | N.D. | N.D. | N.D. | 0.16 (N.D. to 0.72) | | |
| | | | | | | | | | | | |
| **Additional Compounds (Concentrations estimated within ± 50%)** | | | | | | | | | | | |
| alpha-pinene | 1.9 | 2.0 | 1.9 | 2.7 | 1.7 | 1.8 | 4.4 | 4.8 | 1.14 (0.07 to 10.4) | 3.2 (0.02 to 11.7) | |
| limonene | 1.3 | 1.1 | 5.2 | 6.2 | 0.4 | 0.4 | 1.2 | N.D. | 6.7 (0.14 to 13.4) | 3.2 (0.02 to 27.3) | |
| isopropyl alcohol | <0.1 | <0.1 | 4.0 | 4.7 | <0.1 | <0.1 | N.D. | N.D. | | | |

* = Report to the California Legislature "Indoor Air Pollution in California", California Air Resources Board (CARB), July 2005
** = "Ventilation and Indoor Air Quality in New Homes", CARB and California Energy Commission, November, 2009
*** = “Background Indoor Air Concentrations in North American Residences (1990-2005): A compilation of statistics for assessing vapor intrusion”, U.S. EPA, June 2011
Note: *, ** and *** values listed for compounds common to CARB, U.S. EPA and SCAQMD reports
NMOC = Non-Methane Organic Compounds (sum of all compounds analyzed, excluding methane)
N.D. = Not Detected
N.R. = Not Reported
ppb = Parts per billion
ppbc = Parts per billion carbon

## Appendix 3
## Soil Samples

| Compound | Units | Villanueva Res.* 01/02/13 | Marcella Res. 01/02/13 | Villanueva Sub-surface 01/15/13 | Villanueva Sub-surface 01/15/13 | Villanueva Res. * 01/15/13 | Villanueva Res. * 01/15/13 | Villanueva Res. * 01/15/13 | Villanueva Res. Composite 01/15/13 | AQMD Soil | Mean of Conc. of Soil in Western U.S. [1] | Range of Conc. of Soil in Western U.S. [2] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Aluminum | % | 1.1 | 11.4 | 11.3 | 11.6 | 6.86 | 29.8 | 5.21 | 11.4 | 8.98 | 5.8 | 0.5 - >10 |
| Calcium | % | 7.48 | 3.01 | 1.80 | 1.24 | 5.10 | 3.24 | 3.16 | 2.32 | 2.07 | 1.8 | 0.06 - 32 |
| Iron | % | 1.14 | 5.21 | 2.96 | 2.01 | 2.61 | 1.89 | 0.98 | 3.55 | 3.09 | 2.1 | 0.1 - >10 |
| Magnesium | % | 1.83 | 1.70 | 1.51 | 1.54 | 3.18 | 2.04 | 1.51 | 1.70 | 1.68 | 0.74 | 0.03 - >10 |
| Phosphorus | % | 26.3 | 0.23 | 0.09 | 0.07 | 0.23 | 7.15 | 0.31 | 0.13 | 0.09 | 0.012 | 0.04 - 0.45 |
| Potassium | % | 0.19 | 1.01 | 2.07 | 2.46 | 1.78 | 1.75 | 1.24 | 1.92 | 1.39 | 1.8 | 0.19 - 6.3 |
| Silicon | % | 1.88 | 23.4 | 31.4 | 38.2 | 23.3 | 0.23 | 20.4 | 29.0 | 31.5 | 30 | 15 - 44 |
| Sodium | % | 11.4 | 1.98 | 1.77 | 2.19 | 4.54 | 6.93 | 15.07 | 2.86 | 1.02 | 0.97 | 0.05 - >10 |
| Sulfur | % | 4.68 | 0.01 | 0.04 | 0.02 | 3.65 | 1.69 | 9.78 | 0.13 | 0.20 | 0.13 | <0.08 - 4.8 |
| Titanium | % | 0.11 | 0.39 | 0.30 | 0.22 | 0.30 | 0.21 | 0.09 | 0.34 | 0.39 | 0.22 | 0.05 - 2.0 |
| | | | | | | | | | | | | |
| Antimony | ppm | 1.8 | 1.3 | 2.0 | 2.2 | 1.7 | 2.4 | 1.6 | 2.0 | 1.1 | 0.47 | <1 - 2.6 |
| Arsenic | ppm | 11 | 0.4 | 5.6 | 12 | 13 | 7.1 | 8.8 | 11 | 7.3 | 5.5 | 0.10 - 97 |
| Barium | ppm | 440 | 570 | 990 | 1250 | 680 | 1060 | 540 | 970 | 500 | 580 | 70 - 5000 |
| Cadmium | ppm | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | NR | NR |
| Cobalt | ppm | 4.4 | 19 | 11 | 8.4 | 10 | 7.3 | 4.1 | 13 | 11 | 7 | <3 - 50 |
| Chromium | ppm | 28 | 30 | 26 | 23 | 32 | 22 | 13 | 29 | 61 | 41 | 3 - 2,000 |
| Copper | ppm | 34 | 23 | 27 | 25 | 36 | 27 | 21 | 34 | 30 | 21 | 2 - 300 |
| Gallium | ppm | 5.0 | 14 | 13 | 15 | 12 | 11 | 7.6 | 12 | 12 | 16 | <5 - 70 |
| Lead | ppm | 14 | 11 | 15 | 16 | 14 | 18 | 14 | 15 | 17 | 17 | <10 - 700 |
| Manganese | ppm | 210 | 1040 | 500 | 290 | 470 | 280 | 150 | 610 | 410 | 380 | 30 - 5000 |
| Molybdenum | ppm | 9.4 | 0.7 | 2.2 | 3.5 | 6.7 | 4.5 | 10 | 2.7 | 15 | 0.85 | <3 - 7 |
| Nickel | ppm | 4.0 | 4.8 | 9.4 | 12 | 13 | 8.2 | 6.0 | 6.6 | 30 | 15 | <5 - 500 |

| Compound | Units | Villanueva Res.* 01/02/13 | Marcella Res. 01/02/13 | Villanueva Sub-surface 01/15/13 | Villanueva Sub-surface 01/15/13 | Villanueva Res. * 01/15/13 | Villanueva Res. * 01/15/13 | Villanueva Res. * 01/15/13 | Villanueva Res. Composite 01/15/13 | AQMD Soil | Mean of Conc. of Soil in Western U.S. [1] | Range of Conc. of Soil in Western U.S. [2] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Rubidium | ppm | 45 | 40 | 75 | 95 | 66 | 77 | 54 | 70 | 59 | 69 | <20 - 210 |
| Selenium | ppm | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | 0.23 | <0.1 - 4.3 |
| Strontium | ppm | 250 | 200 | 180 | 140 | 360 | 260 | 310 | 200 | 260 | 100 | 10 - 3,000 |
| Uranium | ppm | 6.6 | <0.01 | <0.01 | 2.5 | 14 | 6.7 | 8.2 | 2.6 | 3.6 | 2.5 | 0.68 - 7.9 |
| Vanadium | ppm | 30 | 140 | 75 | 68 | 78 | 63 | 28 | 95 | 120 | 70 | 7 - 500 |
| Yttrium | ppm | 12 | 26 | 23 | 18 | 16 | 15 | 10 | 22 | 21 | 22 | <10 - 150 |
| Zinc | ppm | 220 | 100 | 76 | 65 | 110 | 79 | 72 | 92 | 120 | 55 | 10 - 2,100 |
| Zirconium | ppm | 930 | 190 | 460 | 580 | 390 | 380 | 1350 | 480 | 280 | 160 | <20 - 1,500 |

* White substance on soil surface
Sub-surface = 11 inches below grade
[1] : Arithmetic mean reported by United States Geological Service
[2] : Range reported by United States Geological Service
NR : Not reported