

Contrails, not Chemtrails.

ADEQ's mission is to protect and enhance public health and the environment. Based upon all data presented in the paragraphs below, and the Department's understanding of the formation of contrails, ADEQ has not found any evidence that chemtrails exist. Furthermore, all the data ADEQ has gathered clearly supports that there are no elevated levels of metals or chemicals in the air, soil, and water of the state that would support the existence of chemtrails.

If you've ever spent a few moments watching a jet fly across the sky, you may have noticed it producing a thin white cloud as it passed. These clouds are trails of condensation and are referred to as contrails. Contrails are composed primarily of water in the form of ice crystals and may remain visible for very short periods if the humidity is low. The contrail may persist for longer periods of time if the humidity is high. Newly formed particles will continue to grow in size by taking in water from the surrounding atmosphere. These resulting contrails can grow to several kilometers in width and 200 to 400 meters in height. Contrails may also appear to be grid-shaped. The grid shaped contrails are the result of aircraft flying at east-west and north-south orientations designated at 2000 foot increments of elevation. Other shapes formed are by the dispersion caused by horizontal and vertical wind shear. A more detailed description of how contrails are formed is presented in an EPA guidance document which can be viewed by clicking on the following link:

[EPA Contrail Formation Guidance Document](#)

Occasionally, the Arizona Department of Environmental Quality (ADEQ) hears from members of the public who wonder if these contrails might actually contain harmful chemicals. They may have heard them described as chemtrails. ADEQ has reviewed data from soil, air and water samples and has also looked at outside reports claiming evidence of high levels of barium and aluminum in air, soil, and ground water. Based upon the Department's review of monitored samples tested by the ADEQ, it has been determined that the current levels of aluminum and barium contained in the air, water, and soil are all within acceptable guidelines, and have not varied significantly over the years. Additionally, evidence of reports showing the contrary are largely exaggerated and unverified as to authenticity and laboratory methods used.

One particular report widely circulated on the internet is called "The Phoenix Report" dated May 1, 2008. The Phoenix Report shows extremely high levels of aluminum and barium in the tested sample. ADEQ reviewed this report and found discrepancies and problems with the report which challenge its accuracy and/or authenticity.

[The Phoenix Report](#)

The Phoenix Report as seen in the above link provides unspecified monitoring locations, sampling methods, quality assurance procedures, and time (sampled over 28 days). Nor does it identify any source for the information. Additionally, it shows impossibly high levels of both aluminum and barium. The report shows aluminum at a level of 12,800,000 parts per billion (ppb). Based upon the molecular weight of aluminum, we can convert this ppb value to a milligram per cubic meter value (mg/m^3) which

is 14,134. This value can be converted as grams per cubic meter (g/m^3) which results in approximately 14. To illustrate how impossible this measured value of aluminum is, it is worth noting that the weight of an aluminum can is approximately 14 grams. To visualize a cubic meter of air, consider that a standard elevator has approximately 8 cubic meters of air inside – now picture 8 aluminum cans dispersed in it!

Contradicting the phoenix report is air quality monitoring data collected by ADEQ. The Department collects air quality monitoring data at various locations in the county and throughout the state. A regulated pollutant which the Department monitors is particulate matter with a diameter less than 10 microns (PM_{10}). PM_{10} not only includes aluminum but it is also comprised of other metals and compounds. To again illustrate the impossibility of the Phoenix Report, the highest reading of PM_{10} ever recorded in Phoenix during one of our worst dust storms (an example of which can be seen in figure 1 below) was $6,348 \mu\text{g}/\text{m}^3$ ($6.348 \text{ mg}/\text{m}^3$), and as mentioned in the previous sentence this value includes aluminum, barium, and many other metals. This reading of PM_{10} as a worst case scenario is still 2,000 times less than what is shown in the Phoenix Report. Consequently, the Phoenix Report cannot be considered a credible report.

Figure 1 – Dust Storm Approaching the Phoenix Metro Area



Additionally, The Department not only measures PM_{10} but it also measures finer particulates called $\text{PM}_{2.5}$ which is particulate matter with a diameter less than 2.5 microns. The $\text{PM}_{2.5}$ data is further speciated to its individual components including metals. The following graph (click on link below) shows

the 2013 data for various metals measured at one of Maricopa County's monitors called the Phoenix Supersite.

[2013 Speciated Monitoring Data from Phoenix Supersite](#)

The Supersite is located at 4530 N. 17th Avenue in Phoenix, Arizona. The samples are collected and analyzed by a lab after they have sampled the air for a 24 hour period. The instrument used to record the sample runs every 3 days. Based upon the 2013 sampling data the highest reading for Aluminum was 1.24 $\mu\text{g}/\text{m}^3$. The highest reading for Barium based on this graph is 0.3 $\mu\text{g}/\text{m}^3$.

The Arizona Ambient Air Quality Guidelines which were instituted by the Arizona Department of Health (ADOH) Services, shows a health based guideline of 4 $\mu\text{g}/\text{m}^3$ set for Barium and 150 $\mu\text{g}/\text{m}^3$ for Aluminum. Based upon this data, the highest readings for these metals are well below the ADOH guidelines.

The Department has also analyzed soil samples for sites near the Kingman airport and at the Yucca Auxiliary Operating Base (AOB) in Mojave County. The samples which can be viewed by clicking on the following link below show aluminum and barium levels for the Kingman sample to be 6,395 mg/kg and 74.79 mg/kg respectively.

[Kingman Airport Soil Sample](#)

[Yucca AOB Soil Sample](#)

For the Yucca AOB site the aluminum and barium samples are 5,977 mg/kg and 81.79 mg/kg respectively. According to the Agency for Toxic Substances and Disease Registry, the typical soil ranges for aluminum are between 7,000 and 100,000 mg/kg_{soil} (0.7 to 10 percent). Likewise the typical ranges for barium are between 15 to 3,500 mg/kg_{soil} (0.0015 to 0.35 percent). To put these values in perspective the Arizona soil remediation levels (SRLs) are 76,000 mg/kg of soil for aluminum and 15,000 mg/kg of soil for Barium. These remediation levels are listed in the Arizona Administrative Code (A.A.C.) R18-7-710 which lists the SRLs for many elements and compounds. Based on these SRLs the sampled levels of aluminum and barium at the Kingman and Yucca sites are well below thresholds that would require any sort of soil remediation and within the typical ranges expected for soil

ADEQ also routinely monitors surface water data across the state. Sampling data for sites near Sedona and Flagstaff are shown in the following link below:

[Sedona and Flagstaff Area Water Samples](#)

The water standard for drinking water is 2,000 $\mu\text{g}/\text{l}$ (liter) for barium. Aluminum does not have a health standard but 50-200 $\mu\text{g}/\text{l}$ is used as a secondary standard for color and sediments. The maximum barium concentration reported in these samples was recorded near Red Rock Crossing and measured at 500 $\mu\text{g}/\text{l}$, which is well below the water standard. Aluminum was recorded as a non-detect (ND) in these samples, meaning that the aluminum content in the water was below the level that is detectable. The non-detect level for aluminum is 500 $\mu\text{g}/\text{l}$.

If you have more questions regarding chemtrails or the information presented above, or would like to provide the department with any other additional information or data please feel free to contact us at the email listed below and/or phone number listed below. Based upon Department resource issues ADEQ may not respond to all calls or emails, but will review and consider all comments received.

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