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TRANSPORTATION AND
INFRASTRUCTURE



CONGRESS OF THE UNITED STATES
HOUSE OF REPRESENTATIVES
WASHINGTON, DC 20515

October 9, 2003

Ms. Rosalind Ruth Peterson
PO Box 499
Redwood Valley, California 95470

Dear Ms. Peterson:

You were one of several people who had contacted me regarding the number of contrails lingering in the skies over Mendocino and Lake Counties. Many of you were concerned that these phenomena may be caused by government testing of biological or chemical agents or by weather modification experiments conducted by the government.

I asked for your patience while I contacted government, academic, health care and industry experts in an effort to determine why contrails seemed to be more prevalent on the North Coast now than they were several years ago and what impact, if any, these contrails could have on our environment. I thank you for your patience and I would like to now share my findings with you.

Contrails:

Condensation trails, or contrails, are produced by aircraft engine exhaust. Contrails are mostly water, but also may contain carbon dioxide, nitrogen oxides, hydrocarbons, carbon monoxide, sulfur gases, soot and metal particles that are emitted by the aircraft.

There must be suitable weather conditions immediately behind a jet engine for a contrail to form: high humidity and cool air. The high humidity will cause water in the engine exhaust to condense on either the exhaust gases or other particles already existing in the atmosphere. If the air temperature is cold enough, these water droplets will freeze and form the ice particles that become a contrail.

If humidity is on the low side, the contrail will be short lived. If the humidity is high, the contrail will persist as the newly formed ice particles absorb water from the surrounding atmosphere. These persistent contrails can be quite large and can last for hours. Air turbulence can cause them to spread and disperse so that they resemble cirrus clouds or take on unusually shapes. Numerous airplanes passing through an area on established flight paths can all produce contrails that criss-cross one another in the typical and sometimes alarming checkerboard pattern. This all, in turn, can turn the sky hazy, a feature many of you have commented on.

These contrails, consisting as they do of ice particles, can also reflect light in the sky, causing some of the unusually colorations in some of the photos that have been sent to me.

Contrails can only develop between 25,000 and 30,000 feet and will completely evaporate before reaching ground level.

Contrails do contribute to both warming and cooling changes in the earth's temperature. Jet fuel produces greenhouse gases in engine exhaust that, taken together with other greenhouse gases, contributes to warming the lower atmosphere and the earth's surface. On the other hand, contrails have a higher density of ice crystals than natural cirrus clouds and persistent contrails can, therefore, decrease the amount of solar radiation reaching the earth's surface, thus making it cooler.

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Two university scientists in Wisconsin and Pennsylvania conducted temperature studies during the three-day period following the 9/11 terrorist attacks when all aircraft over the United States were grounded. They found the average temperature between night and day, the diurnal temperature, during this period to be three degrees higher than normal, confirming the effect of persistent contrails on surface temperature. You would have to conclude that jet aircraft traffic, particularly when persistent contrails result, is a weather modifier, whether intentional or not.

Volume

It is then instructive to examine the amount of air traffic passing over the North Coast. There is a VHF Omni Directional Range Tactical Air Navigation Center (VORTAC) located in the sky above eastern Mendocino County. This is not a tangible entity but a navigational point on a map that pilots use as they exit and enter Bay Area airports. It is also used by pilots on transcontinental and intercontinental flights.

Pilots aim for the Mendocino VORTAC so that on any given day, there are hundreds of planes passing overhead. Many of these planes departing San Francisco and Oakland airports reach cruising altitude where contrails can form as the pass into Mendocino and Lake Counties.

I have enclosed a map provided by the FAA showing the number of flights passing through Lake and Mendocino Counties on July 17, 2003, a date picked at random. On this day, there were more than 400 flights, many criss-crossing, although at different altitudes. If weather conditions are right on this or any other typical day, people are going to see a lot of contrails.

There is another VORTAC due east along Interstate 5 that has even heavier traffic than the Mendocino VORTAC. Depending on the direction of the winds, contrails from these aircraft can also drift westward into the North Coast counties.

I have also enclosed two more maps showing arrivals and departures at Bay Area airports on July 17. If incoming traffic using the Point Reyes VORTAC is significant, air traffic controllers will pull them planes of this approach and route them northward along the Mendocino coast. These maps demonstrate this occurring on July 17.

From this information we can conclude that the North Coast is a highly traveled hub for aircraft.

While this traffic is high, it is not atypical according to the FAA, commercial and military pilots I have spoken to who travel in this area and small aircraft pilots who fly into and out of airports on the North Coast. None of these sources could anecdotally confirm either a greater number of planes or corresponding contrails in the sky.

Nonetheless, it is a huge volume and when weather conditions are right, people will notice both the planes and the contrails.

Military Exercises

Navy and Air Force planes do travel through and off the North Coast in training exercises, routine patrols and in support of our armed services overseas. I have spoken with both Navy and Air Force personnel at Travis Air Force Base and at the Pentagon in Washington. I am satisfied that they are not conducting experiments of any kind nor are they engaged in any weather modification programs, other than by contributing to the volume of air traffic in the region, which in turn has been shown to affect temperature.

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Health and Environmental Impacts

According to county public health officials, there have been no spikes in reported illnesses over the past few years. Our counties also do not record any variation in the California norm for respiratory illnesses in specific. This leads to the conclusion that contrails, even if they did not dissipate before they reach the ground, which I am advised, they do, are not impacting public health.

The negative impacts to air quality on the North Coast comes primarily from wood smoke. Air quality is otherwise in compliance with all state standards. Lake County, where the FAA maps show has the highest concentration of jet traffic, continues to record the cleanest air in the state.

Many of you have expressed concern about whether contrails could contribute to the dead and dying trees in our counties. I have spoken with representative in the Department of Forestry and with one of the most respected plant pathologists in the state regarding this issue. Both men have years of personal experience in our counties. Their conclusions, reached quite independently, are that the dead and dying trees many of you are seeing are normal and cyclical. In other words, these trees are part of a normal mortality pattern that does not raise any red flags with the scientists.

They also advise that if a causative agent falling from the sky was contributing to tree mortality, there would be wide swatches of dead and dying trees instead of isolated dead trees near healthy trees, which is what we are seeing.

We do know that environmental conditions such as draught or air pollution can stress trees, causing them to be more susceptible to disease. We know that contrails affect temperature and I believe there is more to learn about whether this, in turn, could impact changes in crop growth and/or the emergence of insect pests and diseases. However, my research does not lead me to believe that either the government or anyone in the private sector is deliberately trying to alter the environment. It is more a consequence of our way of life.

In conclusion, hundreds of airplanes pass over the North Coast daily. Jet aircraft produce contrails that with the right atmospheric conditions, can persist and form unusual shapes or cirrus-like haze. We are experiencing more of these hazy days than we have in the past. There haven't been any reported public health anomalies nor is the vegetation dying in patterns that are alarming scientists.

I am satisfied with the explanations I have received, but I intend to keep an open mind about this issue.

Thank you for bringing your observations and concerns to my attention and thank you for providing me with background materials. I am returning them with this letter. I appreciate your commitment to making our beautiful North Coast as healthy and safe as possible.

Sincerely,



MIKE THOMPSON
Member of Congress
First District of California

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enclosures