CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY

Name(s)
Bryton A. Horner

Project Number
J1010

Project Title
Legal Pollution: Geographic Distribution of Wind-Borne Particulates Surrounding Irvine Cement Plants

Abstract

Objectives/Goals
This project is based on air particulates surrounding Irvine Cement Plants. How do Irvine Cement Plants affect the city's air pollution in terms of dirt particulates in the air?
Hypothesis: Based on research, I hypothesize that Irvine Cement Plants are a significant contributor to the city's air pollution.

Methods/Materials
Calibrated Air Sampler; 400x Magnification microscope; 20 Glass microscope slides prepared with double-sided tape; Global Positioning System; City Map; Wind Vane; Anemometer; Stopwatch; Vehicle.

Data Collecting Procedure:
1. Using the city map, travel to 10 points up and downwind of the Irvine Cement Plants.
2. Record wind direction, speed, GPS coordinates, map location and time.
3. Run the air sampler for 5 minutes

Analysis:
1. View slides at 400x on the microscope.
2. Count the number of dirt particulates in 2 random spots near the center of the slide.
3. Use the following equation to find Particles Per Liter of air (PPL):
PPL = (Particles in Field 1 + Particles in field 2) / (5 * the number of liters drawn by the air sampler per minute)

Results
The average PPL of the upwind samples was 4.5 particles per liter.
The average PPL of the downwind samples was 8.5 particles per liter.

Conclusions/Discussion
According to the results of the tests, my hypothesis was supported. The number of particles in the air was significantly greater downwind of the cement plants compared to the upwind samples, which were noticeably cleaner. The strong correlation between the position of the samples and the number of particles is strong evidence indicating wind blows the piles of dirt in the Irvine Cement plants into the air, causing major air pollution in Irvine and possibly greater portions of Southern California.

Summary Statement
I took air samples surrounding Irvine cement plants to determine the distribution of dirt particulate air pollution.

Help Received
Dad helped print photos, drive and use power tools.