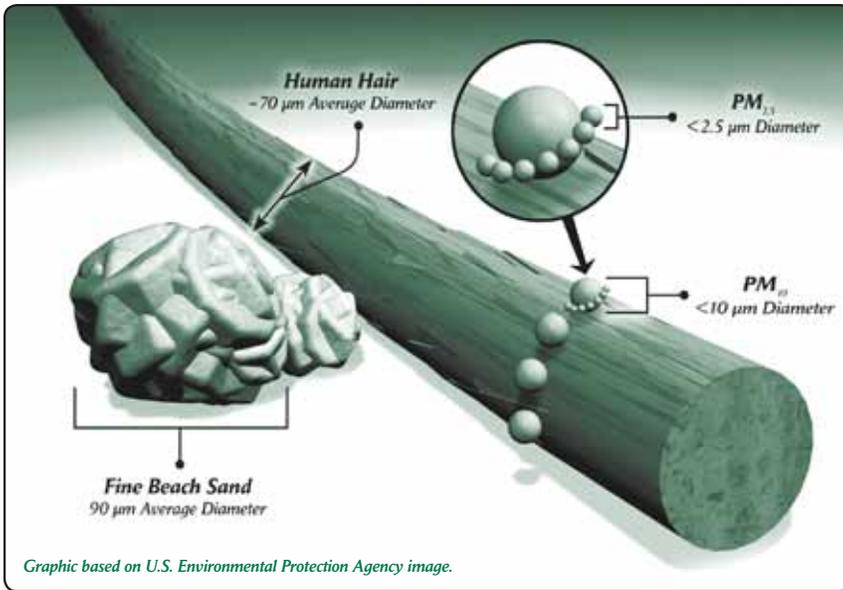




## Particle Pollution and Heart Impacts



Sizes of particulate matter smaller than 2.5 microns in diameter (PM2.5) and smaller than 10 microns in diameter (PM10) are compared against the average diameter of a human hair, which is approximately 70 microns in diameter.

**R**ecent studies have focused on the mechanisms that might be at work in the relationship between higher particle levels and cardiovascular impacts, including increased incidence of heart attacks.

The American Heart Association issued its first scientific statement on air pollution and cardiovascular disease in 2004, and expanded on the statement in 2010, saying that overall evidence is consistent with a causal relationship between exposure to particulate matter less than 2.5 microns in diameter (PM2.5) and cardiovascular illness and mortality.

A study published in June of this year in the *Journal of the American College of Cardiology* found that for people who already have

heart conditions, exposure to elevated levels of PM 2.5 can trigger the irregular heartbeats that can lead to heart attacks and strokes.

Researchers collected data from the implantable cardioverter defibrillators (ICDs) of 176 heart patients in the Boston area. The ICD equipment records abnormal electrical activity of the heart, and delivers shocks to try to correct the rhythm. The researchers found an association between elevated PM 2.5 levels and increased chances of onset of atrial fibrillation (AF), or irregular heartbeats. With every 6 micrograms per cubic meter increase in the PM 2.5 level, for example, the heart patients were 26 percent more likely to have an AF episode in the next two hours.

This study was particularly significant given that the Boston area does not experience the higher PM2.5 levels seen in more polluted areas of the country.

In April, early results from the Multi-Ethnic Study of Atherosclerosis and Air Pollution were published in *PLoS Medicine*. This study, funded by the U.S.

Environmental Protection Agency, is following more than 5,000 people from several regions of the U.S., gathering air pollution data from the areas they live, and using ultrasound to measure blood vessel characteristics at the beginning of the study and then three years later. Researchers are finding that exposure to higher levels of particle pollution is associated with thickening of blood vessels, a sign of hardening of the arteries, a condition that can lead to serious heart impacts.

The researchers found specifically that elevated levels of PM 2.5 were linked to faster thickening of the carotid artery, the main artery supplying the head and neck. The study also found that if levels of PM 2.5 went down, the pace of the thickening of the arteries slowed.

These studies contribute to a better understanding of how higher PM 2.5 levels can result in both short-term and long-term cardiovascular effects. People with existing heart conditions are considered more sensitive to the effects of air pollution, and may experience health effects even at lower levels. These individuals should be especially careful to protect themselves and avoid exposure to outdoor air during periods when particle levels may be elevated due to high winds or wildfire events.

*The U.S. Environmental Protection Agency's Green Heart Initiative summarizes the latest in research on air pollution and heart impacts, and details steps that people with heart conditions can take to reduce their exposure to pollution. For more information, see: [www.epa.gov/greenheart/](http://www.epa.gov/greenheart/).*

### Inside...

-  **Ron Tan Retires**
-  **Learning About Air Pollution**
-  **Compliance Division Enforces, Educates**
-  **Delay of NOx Standards for Ships**
-  **Seeing Isn't Always Breathing**

## Ron Tan Retires After Almost 30 Years

**R**on Tan, District Planning and Technology Supervisor, retired in August after almost 30 years at the District, where he's seen some things come full circle.

When he first started at the District as a consultant in 1984, the office was on the county health care campus in Santa Barbara. In 1987, the office moved to Goleta where it stayed for 16 years. Then the District moved back to the health care campus, just a few hundred yards from where he started out.

He wrote his doctoral dissertation on particulate matter at a time when air pollution agencies were focusing more on ground-level ozone, a principal component of smog. But in recent years, agencies have re-focused on particulate matter.

Tan's first job in air pollution was working on an ozone attainment plan for the South Coast Air Basin—and one of his last projects has been the 2013 District Clean Air Plan, an ozone attainment plan.

Tan was born in Canton (or Guangzhou), China. His father worked for the United Nations, which had established an office to spur post-war economic development in China. When Mao Zedong proclaimed the founding of the People's Republic of China shortly after Tan's birth, the UN office moved to Bangkok, Thailand, and the family moved there too.

When he turned fifteen, Tan went to Andover, Massachusetts to attend boarding school. He remarked, "I wanted to go to high school in Hawaii, where a lot of my cousins lived, but my father thought I'd turn into a surfer dude there."

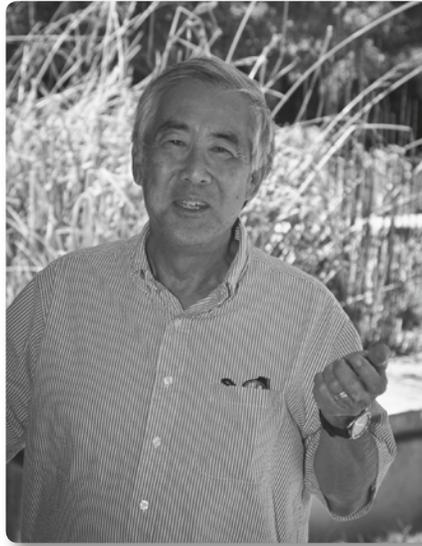
Something about the appeal of the surf and the beach lingered, though, as Tan attended Stanford University, receiving his Bachelor's degree in Math. He went on to receive a Masters in Engineering at UC Berkeley, and then a Ph.D in Environmental Science and Engineering at UCLA in 1976.

His thesis focused on the challenges of reducing particulate matter levels in a desert community (the Phoenix area) as compared with a Southern California urban center (Los Angeles). He said, "In the urban center, motor vehicles are one of the largest sources of particulate, whereas in a desert environment much of your problem is windblown dust, due partly to disturbances in the crustal surface caused by development. I concluded that it was easier to work on reducing particulate in the non-desert urban environment because you can plan for controls of vehicles and equipment, while it is much more difficult to develop control strategies for a desert community."

**"When I think of all the pollution reduced through our funding programs, and all the benefits to our farmers, our fishermen, our schoolchildren, and the general public, I am proud."**

*– Ron Tan, District Planning and Technology Supervisor*

Before he joined the District, Tan worked for an environmental consulting firm. In fact, his first experience with the District was in 1981, when he arrived at the District office with an application for a boiler permit, in connection with a missile project



at Vandenberg Air Force Base. He met with Doug Grapple to discuss the permit; Grapple is still at the District, and worked with Tan for several years in rule development.

After consulting for four years, Tan joined District staff in 1988 as an Engineering Supervisor, working on compliance and permitting of oil and gas facilities. During his time at the District Tan took on a variety of roles and tasks. In a senior scientist role, he researched special issues, such as assessing air pollution impacts of burning oil slicks during an oil spill. He led a team working on California Environmental

Quality Act (CEQA) review of new projects. He co-authored four Clean Air Plans, and led rule development efforts.

In recent years he managed the District's Innovative Technologies Group Program, which provides

grants to businesses to purchase cleaner engines and equipment, and oversaw programs including the popular Old Car Buy Back program, the Lower Emission School Bus Program, and the Electric Vehicle Public Charging Station program. He remarked, "When I think of all the pollution reduced through our funding programs, and all the benefits to our farmers, our fishermen, our schoolchildren, and the general public, I am proud."

Tan commented, "Our mission is to control stationary sources of air pollution—and we've done a good job. But in the future we have to find ways to address the land use-transportation connection. Yes, cars are getting cleaner, but population and the distances people are driving are increasing. This has to be addressed regionally. Each individual jurisdiction needs its own identity, but we need to put the focus on working together."

After retirement, Tan will continue to serve as one of the seven commissioners on the County of Santa Barbara Housing Authority, which manages public housing in the county (except for that within the City of Santa Barbara). He will continue to enjoy family time, including time with four grandchildren. He noted, "What I am looking forward to the most is the idea that I will actually have unallocated time. I don't need to fit everything into a two-day weekend."

What will he miss the most? He said, "I will really miss the people, the give and take, the camaraderie, the kidding. We have a good crew here."

## Learning about Air Pollution

### District Board Roundup

Highlights of March, May and June meetings.

#### March

- Received summary of grants and notices of violation.
- Received report on the Offsets Workgroup.
- Appointed Board member Wolf representative to South Central Coast Basinwide Control Council.
- Signed letter of support for use of Cap-and-Trade auction funds for a vessel speed reduction incentive program on California coast.

#### May

- Received summary of grants and notices of violation.
- Received FY 11-12 Financial Audit.
- Amended Conflict of Interest Code with revised job classifications.
- Adopted a Resolution of Appreciation for Janice Robinson on her retirement.
- Directed staff to return with Offsets Workgroup next steps.
- Received report on permitting program.
- Held public hearing on FY13-14 Budget and scheduled adoption hearing for June 20.

#### June

- Received summary of grants and notices of violation.
- Appointed Larry Lavagnino to the District Hearing Board.
- Held public hearing and adopted FY13-14 Budget.
- Amended Rule 810, Federal Prevention of Significant Deterioration.
- Authorized letter urging International Maritime Organization to retain the original deadline of 2016 for NOx standards for new ships.
- Heard report on California Air Pollution Control Officers Association Greenhouse Gas Registry.
- Provided comments on draft 2013 Clean Air Plan.

Jonah Mau is learning about air pollution this summer. Mau, who is entering eleventh grade at Pioneer Valley High School (PVHS) in the fall, is using a handheld particle counter to study levels of fine particles, smaller than 2.5 microns in diameter, suspended in the air. His project is part of a summer science camp at the Allan Hancock College campus, run by PVHS science teacher Riccardo Magni.

monitors report data in terms of 24-hour average concentrations and represent the air quality over a broad region.

As part of the camp, Mau will prepare a final report of his results, and he and the other students will submit their projects to the County Science Fair. Last year, five of Magni's students qualified for the State Science Fair held at the University of Southern California in Los Angeles.

Magni was Santa Barbara County Teacher of the Year last year, and also was selected for a national Presidential Innovation Award for Environmental Educators from the White House Council on Environmental Quality and the U.S. Environmental Protection Agency. He has led a Summer Science Institute at PVHS for the past three years; this is the first year the Institute has been held at Allan Hancock College, which helped fund the program through a Science, Technology, Engineering, and Math (STEM) grant. Additional support and funding were provided by Phillips 66 and Hardy Diagnostics.

Other camp projects range from testing the effects of runoff water (formulated to include a percentage of motor oil) on sage plants and on the hummingbirds that visit the plants, to studying how the use of social media affects short-term memory, and more. Magni notes, "I am so proud of these students. I love the ideas they come up with. And it's important to me that they are the ones doing these projects. I am here to help, but these are their projects."



Jonah Mau uses a particle counter to measure particle levels.

"I have been measuring levels of particles in parking lots on campus, and finding that the lowest levels occur in the areas that are farthest from construction zones. The closer you get to the construction, the higher the count," says Mau. He is using portable equipment designed to collect localized particulate counts for short durations. The District maintains a network of particulate monitors at strategic locations that collect data over longer periods using methods that directly relate the data to the state and national health-based standards. These



District Director Dave Van Mullem (left) visited the Institute and talked with student Jonah Mau and teacher Riccardo Magni (right) about air pollution and Mau's project.



Santa Barbara County  
Air Pollution Control District

## Board of Directors

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Santa Barbara County

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Mayor Jim Richardson  
Chair  
City of Solvang

Mayor Roger Aceves  
City of Goleta

## District Board Calendar

All meetings start at 1:00 p.m.  
For meeting agendas,  
call Sara Hunt, 961-8853, or see:  
[www.OurAir.org/apcd/agenda.htm](http://www.OurAir.org/apcd/agenda.htm).

**August 15**  
Board of Supervisors'  
Hearing Room  
105 East Anapamu Street  
Santa Barbara, California 93101

**October 17**  
Board of Supervisors'  
Hearing Room  
105 East Anapamu Street  
Santa Barbara, California 93101

**December 19**  
Board of Supervisors'  
Hearing Room  
105 East Anapamu Street  
Santa Barbara, California 93101

## Community Advisory Council

The District Community Advisory Council meets as needed at the Days Motor Inn in Buellton. The public is welcome. For more information, call Sara Hunt, 961-8853.

## Seeing Isn't Always Breathing



US Forest Service/Sam Wu photo of smoke from the Mountain Fire.

In July, the Mountain Fire burned near Palm Springs, almost 200 miles from Santa Barbara. The smoke dispersed over a wide area. In Southern Santa Barbara County on the morning of July 20 there was a pronounced haziness to the air. Said Eric Boldt, Meteorologist at the National Weather Service in Oxnard, "You get haziness and a strange color to the sun and the light when the smoke is high up. You can't smell it, and you're not breathing it, but you can see some effects."

Boldt noted that on July 19 and 20, upper level winds were out of the southeast, and satellite images over a six-hour period showed smoke moving into Ventura County and in the direction of Santa Barbara County.

When smoke is high up it is not likely to drop to ground level, he explained. This is because inversion layers—typically 1,000-2,000 feet up—act like a lid, trapping air below, and separating it from the air above. Inversions are formed when the air closer to the ground is cooler than the air above it. When smoke is trapped under an inversion layer it can impact ground-level air quality. Large fires like the Mountain Fire, which burned more than 27,000 acres, produce so much heat that the smoke plume reaches higher into the atmosphere. Boldt commented, "That's why we say that fires can create their own weather. That plume is heating the air, and sucking air into it like a thunderstorm."

During the period the Mountain Fire was actively burning, District ground level monitoring stations did not see elevated particulate values.



Santa Barbara County  
Air Pollution Control District

### Office

260 N. San Antonio Rd. Suite A  
Santa Barbara, CA 93110-1315

### Business Assistance

(805) 961-8868

### Daily Air Quality Report

[www.OurAir.org](http://www.OurAir.org)

### Complaints/Public Information

(805) 961-8800

### Air Quality Advisory Information

(805) 961-8802

### World Wide Web

[www.OurAir.org](http://www.OurAir.org)

### On the Air

is written by Mary Byrd,  
published by the Community  
Programs Section of the Santa  
Barbara County Air Pollution  
Control District.

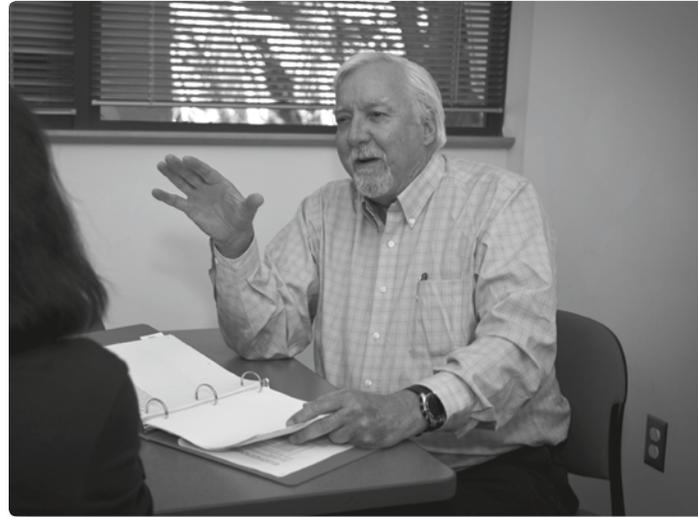


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## District's Compliance Division Enforces and Educates

**C**raig Strommen, the District's Compliance Division Manager, does not believe in looking for violations. He remarks, "I like to think of it this way: you look to document a source's compliance with District rules and regulations. Out of that effort you may find a violation. But your goal is to document compliance, not look for violations."

Strommen, a District Engineering Supervisor since 1982, was selected in March of 2013 to head the Compliance Division when it was made a separate division—it was formerly part of the Engineering and Compliance Division. He notes, "Engineering focuses on the permits, and the advance work to make sure the regulations will be met.



*Craig Strommen, District Compliance Division Manager*

Compliance is where the rubber meets the road. We make sure everything is working on the ground to reduce pollution in compliance with permit requirements."

Strommen received a Masters in Engineering from Cal Poly San Luis Obispo in 1979, and then went to Wyoming for three years, inspecting oil and gas and mining facilities all over the state.

In 1982, he took a supervisor position at the District and moved to Santa Maria with his family. He is based at the District's Santa Maria office, and typically spends one day a week at the Santa Barbara office.

Strommen thinks education is key to a successful compliance program. He remarks, "It's important to work with a company to make sure they understand the rules, and how these rules apply to their business. We have a terrific inspection staff, and all our inspectors understand the importance of education in their role."

Strommen oversees seven inspectors, who inspect businesses that range in size from large

*(continued on back)*

## Delay of NOx Standards for New Ship Engines Proposed

**I**n June, the District Board approved a letter to the U.S. delegation to the International Maritime Organization urging the delegation to vigorously oppose efforts to delay the implementation of nitrogen oxides (NOx) standards for new ship engines in Emission Control Areas, including the North American Emission Control Area.

Ships transiting along the Santa Barbara County coast produce significant NOx emissions. NOx is a precursor to ozone, and Santa Barbara County does not meet the state ozone standard and only

attains the federal ozone standard by a slim margin.

Most of these ships are foreign-flagged, and the agency with authority over these ships is the International Maritime Organization (IMO). Over the years, the District has urged the U.S. Environmental Protection Agency to adopt NOx standards for U.S.-flagged ships and to call on the IMO to take international regulatory action.

In 2011, at the request of the U.S. and Canada, the IMO

*(continued on back)*



*Exhaust stack on a container ship*



# Business Focus

## Compliance Division (cont'd)



Inspectors Jon Mundt (left) and Brent Kraushaar at an oil and gas site.

oil and gas facilities to small businesses such as autobody shops and dry cleaners. In 2012, inspectors performed 1,019 inspections. The District issues a Notice of Violation (NOV) to document violations found, and fines are assessed as appropriate.

Strommen remarks, "We work with the business in an effort

to settle each NOV. In the rare case that the violation cannot be settled, the matter may be referred to the Office of the Santa Barbara County District Attorney for prosecution."

He adds, "We want to ensure equity in the marketplace and a level playing field. It's the only way to keep things fair—to

make sure all businesses of a similar business type are held accountable to the same rules."

Businesses that cannot comply with a District rule may be able to apply to the District's Hearing Board for a variance. A variance is an administrative order granting a temporary exemption from the requirements of a District rule or permit condition. The variance can allow the business to continue with operations while taking the necessary steps to come into compliance.

**"Compliance is where the rubber meets the road. We make sure everything is working on the ground to reduce pollution in compliance with permit requirements."**

*– Craig Strommen,  
District Compliance  
Division Manager*

He notes, "Overall, compliance has been improving. I think we're seeing fewer violations and fewer major violations. There is more awareness on the business side, and we are doing our education job better."



Inspectors Matt Niro (left) and Glenn Griffin inspect a boiler.

## Standards for Ship Engines (cont'd)

established the North American Emission Control Area (ECA), which became effective in August 2012. Ships traveling within 200 nautical miles of the North American coast are required to meet a number of fuel and engine standards that are being phased in over time. As part of the ECA regulations, the most stringent NOx standards (Tier 3 level) for new ship engines were established to become effective in 2016. It will take some time to realize NOx emission reductions from the shipping fleet through this provision, since the standards

only apply to new ship engines. Nevertheless, the new Tier 3 engines produce 80% less NOx emissions than the engines currently in use.

However, at its May 2013 meeting, the IMO's Marine Environment Protection Committee approved a proposal to delay implementation of the NOx standards for five years—from 2016 to 2021. The U.S. delegation voted against the proposal, but delegations from other countries prevailed. The IMO Committee is expected to

take final action on this proposal in March of 2014.

In its June 20 letter to the U.S. Delegation, the District Board stated: "Without regulatory authority over these ship engines, the District relies on international

regulations to achieve reductions from this huge source of NOx emissions. We urge you to make forceful efforts to retain the original deadline of 2016."

*For more information, see:  
[www.OurAir.org/itg/shipemissions.htm](http://www.OurAir.org/itg/shipemissions.htm)*

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