



Community Based Odor Sampling Programs in the Bay Area

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What is a community monitoring network?



A community monitoring network is a set of air monitoring systems that are specifically set up to identify pollution sources, track their movement and then assess their impact on a local community.



ConocoPhillips Rodeo Refinery Fenceline Data					
Note: These are raw data values that have not undergone quality assurance or quality control review and are subject to change.					
These data were recorded at 2009-02-18 20:50:34 Pacific Standard Time					
FTIR Data			UV Data		
Chemical (values in PPB)	South	North	Chemical (values in PPB)	South	North
Signal Strength	NA	NA	Signal Strength	3512.35	1251.08
Data date	2009-02-18	2009-02-18	Data date	2009-02-18	2009-02-18
Data time	20:50:51	20:46:21	Data time	20:49:56	20:52:06
1,3 Butadiene	0	0	Benzene	2.5	2.5
Carbonyl Sulfide	0	0	Carbon Disulfide	0	0
Total Hydrocarbons	19.9	0	Ozone	15.15	2.364
Carbon Monoxide	0	115.1	Sulfur Dioxide	2.5	9.496
Ethanol	0	0	Toluene	2.5	2.5
Ethylene	0	0	Xylene	2.5	2.5
Nitrous Oxide	309.7	284.95	Weather Conditions		
Ammonia (NH3)	1.1	0.5			

Why are Community Monitoring Networks Important?

- They provide information about fugitive gas emissions. These emissions are often short in duration and dependent on wind direction.
- They can include sampling methods that are specifically tailored to the latest issues associated with air pollution on at-risk populations.
- They can be used for goals such as odor (nuisance) issues which cannot be adequately addressed with traditional monitoring stations.



Background Information

The first community air monitoring program started in 1994 as a result of the Catacarb incident at the Unocal Refinery in Rodeo, California.

- Original system composed of fence-line monitoring systems
- In 2004 the systems were upgraded to include real-time Internet feed.
- In 2008 a point sampler was installed in Crockett.
- In 2010 the community was outfitted with sample collection kits



In 2003, the VIP settlement at the Valero refinery included a one year study to examine air quality in the city of Benicia

- Included in the agreement was the purchase of a portable real time air monitoring system
- In September of 2007 the BAAQMD located a monitoring station in Benicia
- The station and a portable air monitoring system were operated for 15 months
- The site now has a community air monitoring station that is equipped with a full compliment of technologies

Identify Sources of Pollution

- The ideal method is to locate the system as close to the pollution source as possible.
- Use a system that can cover a broad sampling area such as an entire fence line of a refinery
- Focus on indicator species that are easy to detect and are included in traditional monitoring stations
- Need to be able to update quickly (every five minutes)
- The key element is to not focus on trying to EXACTLY quantify the indicator gases. The focus should be on being able to identify gas releases with a high degree of confidence....

Track Where the Gases Go



- Once a gas plume is detected, the next step to track where it's going. To do this we measure wind speed, direction, and temperature using Meteorological towers.
- In addition to Met towers, local air monitoring stations can be used to show where the downwind migration is occurring.
- Once the migration pattern is known, health officials can use the information to protect the public from unnecessary exposure.

Into the Community

- Once the pollutants have migrated into the community, the goal is to have stakeholders operate portable monitoring equipment to determine the chemical content.
- Stakeholders can include local government, community members and industry.
- The key parameter is time. The sample needs to be taken when the odor is present.

Critical Elements of a Community Monitoring Network

Focus on finding the technologies that fit the situation:

At the Fenceline:

Focus on low maintenance technologies that can provide indicators of events.

Between the Fenceline and the Community:

As the plumes leave the source, it's imperative to have Met stations to track the movement of the plume.

In the Community:

When the plume reaches the community you want to have technologies that can identify the exact nature of the plume.



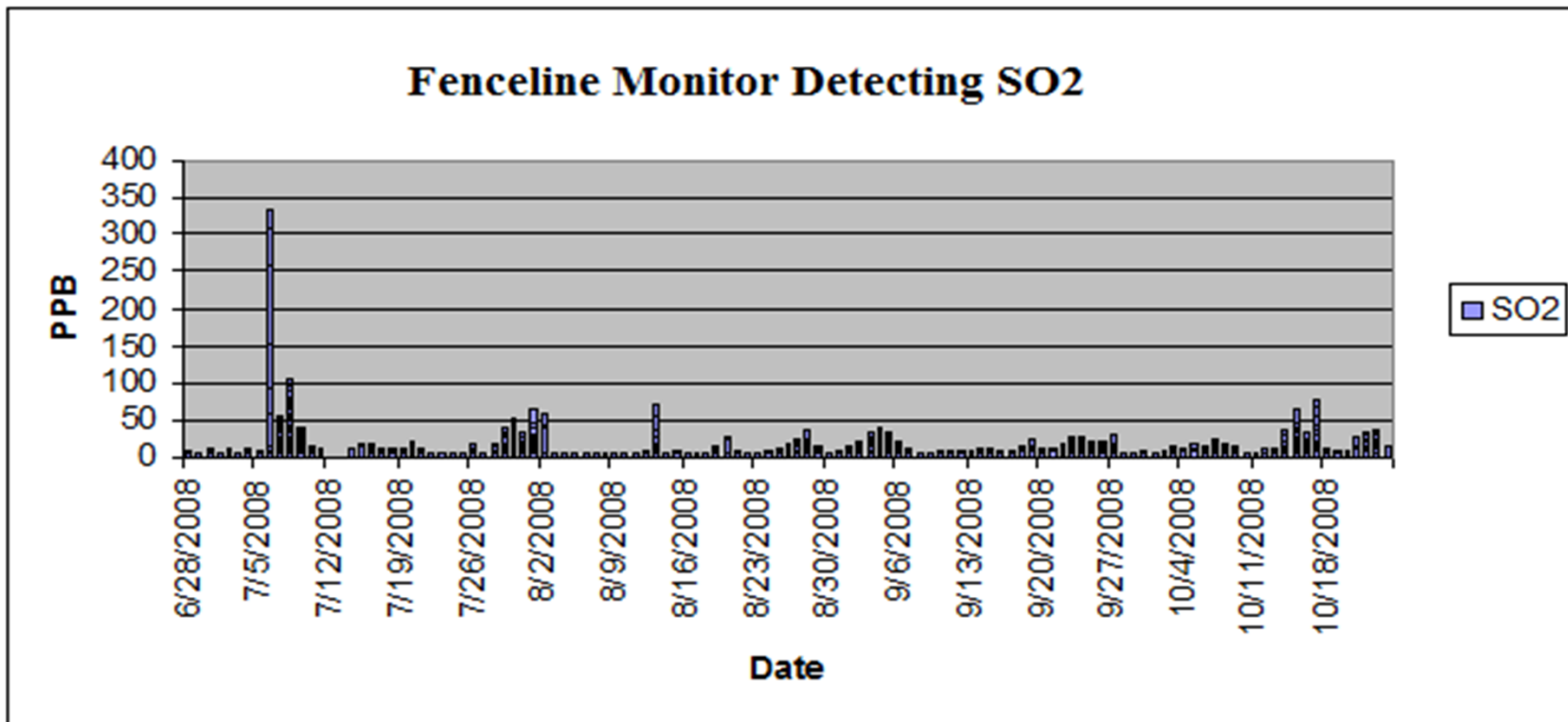
How the Process Works

Tracking an Emission Plume

- One of the gases that is reported by fence line monitoring systems is sulfur dioxide (SO₂). This gas is also detected at the other monitoring locations.
- SO₂ has a high odor threshold (not easy to smell), and relatively low health impacts at low concentrations.
- But it allows us to track sulfur based emissions occurring at emission sources.

This graph shows the SO₂ emissions recorded by a fence line monitoring system from July-December 2008.

We will focus on the large detection that occurred on July 6, 2008





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A Related Post on the Community Blog

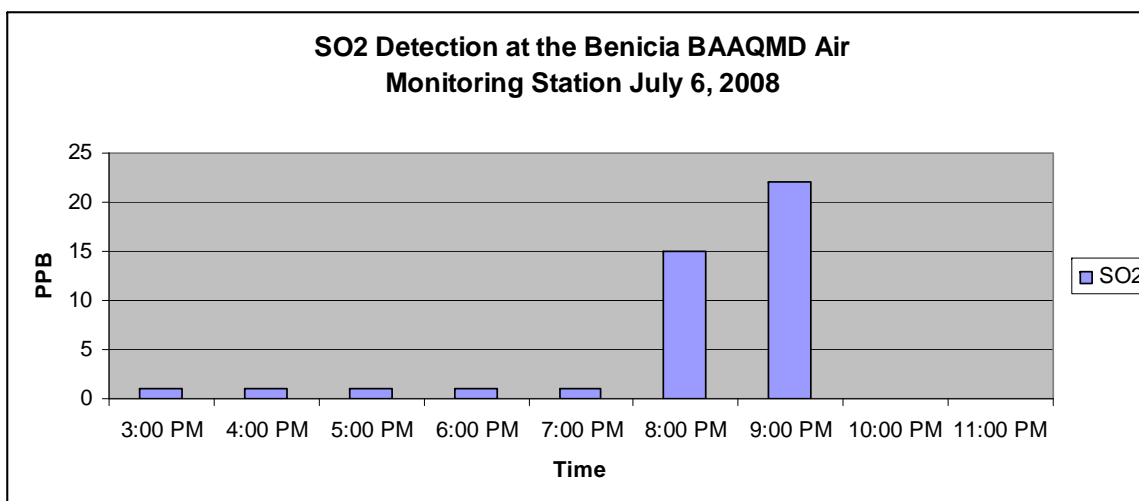
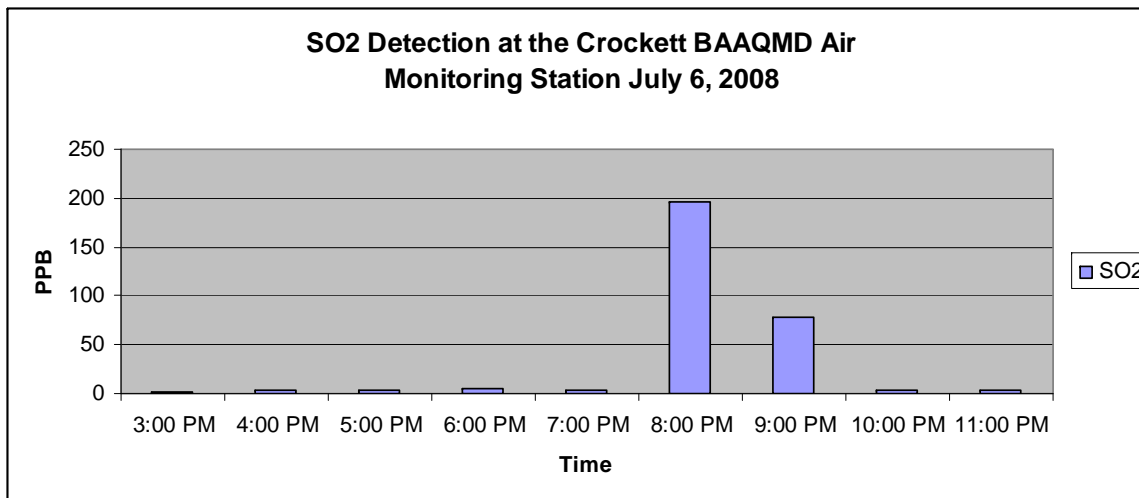
I felt it was a mixture of SO₂ and H₂S. Here's a time line:

North fence line picked up a sharp doublet for SO₂ lasting between 8 and 9 PM. Maximum of 325 ppb.

Confirmed by BAAQMD SO₂ monitor in Crockett with 196 ppb avg. for 9 PM and 78 ppb for 10 PM reading.

We got strong odor at 8:30 on Kendall.

During the same time period both of the Air District monitoring stations showed increases in SO₂ detection





What Does This Mean?

- The fence line monitoring system identified a source of SO₂ emissions that could be linked to odor complaints.
- Air District monitors confirmed that the emission plume migrated towards communities in the Bay Area.
- The fact that only some of the Air District and community monitoring stations detected SO₂ helped defined the boundary of the plume.
- The time difference between the SO₂ detections gave an indication of plume progression.
- The community corroborated the event through olfactory odor detection.

Long-term Benefits to the Local Community

- The community will have a better understanding of
 - Local sources of air pollution
 - Possible health effects
 - More comprehensive understanding of how air quality may impact policy decisions

- The information can be used as a mechanism to continue the process to identify the health impacts of pollution sources.

Conclusions

- Fence line monitors, Air District sampling stations, and community monitoring stations can be integrated to identify and track emission sources.
- Once tracked, a comprehensive point sampling system can be implemented to determine the chemical constituents of the plume.
- The information can assist health professionals to address community exposure