



## Sulfur Oxides

### Toxin of the Quarter

**S**ulfur Oxides are gases that form when Sulfur bonds with Oxygen. This may happen naturally in the environment or through industrial processes. Worldwide, most sulfur oxides in the air are produced by power plants that burn sulfur-containing fossil fuels such as coal or petroleum to produce electricity. Locally, most sulfur dioxides are generated by traffic (including trucks and trains). The most common sulfur oxides found in the air are sulfur dioxide ( $\text{SO}_2$ ) and sulfur trioxide ( $\text{SO}_3$ ). Sulfur dioxide is a heavy, colorless gas that has the smell of a just-struck match. It is naturally emitted during volcanic eruptions and by fumaroles which are vents that open up from the Earth's crust and emit steam and gases. Sulfur dioxide may combine with oxygen in the air and form sulfur trioxide.  $\text{SO}_3$  is the precursor to acid rain. Acid rain occurs when sulfur trioxide and water in the atmosphere react with each other and form sulfuric acid ( $\text{H}_2\text{SO}_4$ ).

Sulfur dioxide has many useful purposes. It is used in the winemaking process to stop wine from spoiling. It is also used as a preservative for fruit. Its antimicrobial properties make it very valuable in the food and beverage industry. Historically, it was used as a fumigant to get rid of pests as well as disease. Sulfur dioxide was used in the 19<sup>th</sup> century to eliminate smallpox, measles and scarlet fever. The fumes stopped the viruses from replicating but little was known about the effects of the exposure of this gas to the human respiratory system and to the environment.

Sulfur dioxide's lifespan in the atmosphere is 4-10 days as a component of smog. In that short time,  $\text{SO}_2$  can cause great damage to many things. Acid rain can harm plants, trees, crops, textiles, building materials, animals and humans. It has the ability to destroy ecosystems. Some freshwater lakes are unable to be in

habited by wildlife due to the contamination of its water by acid rain.  $\text{SO}_2$  turns leaves yellow and decreases the growth rate of crops; its corrosiveness can even destroy statues over time.

Long-term exposure to sulfur dioxide can lead to respiratory issues and even premature death in humans. Irritation of the eyes and throat may occur. The inhalation of  $\text{SO}_2$  causes airway constriction and an increase in the flow of mucous which also contributes to blockage of the air passages. Asthmatics especially have a hard time when sulfur dioxide is present. It aggravates other respiratory illnesses as well, such as emphysema and it even affects those who have heart

disease. Studies have shown an increase in hospitalizations for respiratory issues on days where there is an abundance of sulfur oxides in the air. Children and the elderly are highly susceptible.



The Eastern Kern Air Pollution Control District (District), Environmental Protection Agency (EPA), and California Air Resources Board (CARB) have taken measures to actively reduce emissions of sulfur oxide ( $\text{SO}_x$ ) emissions in the atmosphere. One way to reduce  $\text{SO}_x$  emissions is to control the amount of sulfur in

fuel that is burned (low sulfur fuels). Another methodology is utilizing Flue Gas Desulfurization; sulfur dioxide is removed from the exhaust gas before it is emitted into the atmosphere.

The District currently monitors multiple several facilities in its jurisdiction to assure sulfur dioxide emissions do not exceed regulation limits.

District Rule 407 establishes a Sulfur emission standard for the District; however, there are other regulation the District utilizes to minimize  $\text{SO}_2$  emissions. Currently, the District meets the National Ambient Air Quality Standard for sulfur dioxide.

## MEET THE EKAPCD BOARD OF DIRECTORS

### Message from Director, Chairman Ed Grimes / Councilmember of Tehachapi



My name is Ed Grimes. I have lived in the Tehachapi area for about 53 years. I went to school here and raised my four children here. I also have seven grandchildren, of which five currently live here. I have a BA in Criminal Justice and I am a retired Supervising Parole Agent III. My wife is a school teacher and is scheduled to retire this June.

My passion for Tehachapi is very deep-rooted. Everything that I am, I can attribute to some kind of learning experience here in Tehachapi whether it be the school system, church activities, or friends I hung out with. My basic philosophical ideas were largely shaped here. I feel I am a success because of all the positive experiences I have encountered here. Therefore, I can't think of a better way to give back to the city what it has given me.

Tehachapi is going to grow whether we like it or not. My focus is to see that growth continue in a responsible way. Our sewer system, roads, hospital, schools, and housing will all be impacted by growth. If we are not responsible, then the aforementioned items cannot provide an adequate service. I also want the city to be fiscally sound and graffiti free. Other areas of concern are the airport, and water quality.

By working hard and showing good judgment in our decision-making process, I believe the City of Tehachapi can be the best in Kern County if not in the State. I hope this tells a little about me and how I think.

### Message from Director, Vice-Chairman Rick Warren / Councilmember of California City

I moved to California City, November 25, 1991, from Lompoc, California. I had a friend that said this was the place; small town, home prices were low and near Edwards AFB were the Shuttle landed often, so I came.

My first job was at Jim Burke Ford in Bakersfield. The parts manager told me there was an opening at Kieffe and Sons Ford and I took it. (The truck traffic on HWY 58 is crazy to this day!)

Well that's how I got here, now for things I have done. I was a soccer coach for two years; Sunday school teacher for three years; Director on the Chamber of Commerce; Director on the Economic Development Corporation; and on the planning commission for five years. The job I liked best was doing chimneys for 24 years, that's where I met people in their own homes. Working in real estate for the past 9 years has been a tough market but, when I obtained my first college degree in 2012, in real estate, it felt great. I am currently working on my second degree in Business and have submitted to take the State Brokers License to someday start my own firm.

Helping people has always been in my heart. I am not perfect by any means, I know at times I don't agree with everyone, but most people know I will always be there to help in a time of need.



### Message from Director Peggy Breeden / Mayor of Ridgecrest



My name is Peggy Breeden, a local business owner and Mayor of Ridgecrest. I was born in upstate New York on a dairy farm. We milked about 90 cows and raised pigs and chickens too. After College and working for others, I started a produce company in Victorville. I sold that business and moved to Ridgecrest, and have lived here since 1982. I now own The Swap Sheet which has been in business since 1946. I was elected to serve on the Indian Wells Valley Airport District, the Indian Wells Valley Water District and was elected Mayor of Ridgecrest in 2014.

I now serve on: Eastern Kern Air Pollution Control District; Kern Council of Governments; League of California Cities - Desert Mountain Division; Cerro Coso Community College Foundation Board; Navy Community Council; Indian Wells Valley Groundwater Management Group; Indian Wells Valley Economic Development Corp.; Disaster Council Ridgecrest; East Kern Economic Alliance.

When I came to Ridgecrest, I loved this community and I knew where I belonged. I wish that for all of us - to know where we belong.

## MEET THE EKAPCD BOARD OF DIRECTORS

### Message from Director Mick Gleason / Kern County Supervisor 1st District



Supervisor Mick Gleason was elected to serve the 1st District of Kern County on November 8, 2012 and took office on January, 7, 2013.

A former Navy Captain and base commander, CAPT Michael (Mick) Gleason (USN, ret) has lived in Kern County’s 1st District since 2004 after being selected as Commanding Officer of China Lake NAWS. He is dedicated to agriculture, energy and military issues confronting the 1st District and has pledged to foster a job-creating economy in Kern County.

Supervisor Mick Gleason was born in Nyack, New York and moved to Haverhill, Massachusetts. He graduated from the University of Notre Dame in 1972 with a Bachelor’s Degree in Business Administration.

As a Captain in the US Navy, his final assignment was as the Commanding Officer of Naval Air Weapons Station China Lake in 2008. Mick and Robynn have three sons, Wes, Paddy, and Jeff. After retiring from active duty after 27 years, Mr. Gleason accepted a job as a senior program manager with General Dynamics and has also helped launch the China Lake Alliance, a community advocacy group, designed to support the US Navy at China Lake.

Supervisor Gleason graduated from the Naval Postgraduate School in Monterey, CA in 1999 where he earned his Master’s Degree in Astronautical Engineering. He loves spending time with his family and kids.

### Message from Director Zack Scrivner / Kern County Supervisor 2nd District

Zack Scrivner is Kern County’s Second District Supervisor, proudly serving the communities of Bakersfield, Boron, Caliente, California City, Mojave, Rosamond and Tehachapi.

Elected to the Board in 2010, Zack served as Chairman of the Board in 2012, and represents the Board of Supervisors on Kern Council of Governments, Kern Land Agency Formation Commission (Chairman 2013), and the Kern Economic Development Corporation.

Before his election to the Board of Supervisors, Zack served six years on the Bakersfield City Council, representing Ward 7.

While on the City Council, Zack was the District Director for California State Assembly Member Jean Fuller (R-Bakersfield) from 2006-2010, and as the Field Representative for Assembly Republican Leader, and now Majority Whip in the House of Representatives, Kevin McCarthy, from 2002-2006.

Zack’s priorities are private-sector job growth, in the areas of aerospace, alternative energy, manufacturing and logistics, as well as tough fiscal management of taxpayer dollars in county government. He has been an outspoken advocate for public employee pension reform in local and state government, and spearheaded Measure D, the successful ballot measure, approved by voters in the City of Bakersfield in 2010, which reformed the city pension system for newly-hired public safety employees. Continuing those efforts at the county level, Zack and the Board of Supervisors successfully negotiated for comprehensive pension and healthcare contribution reform with county unions in 2012.

Zack is a member of the Rotary Club of Tehachapi and is a founding board member of the Kern County Wounded Heroes Fund, a non-profit volunteer organization that provides support to wounded service members and their families.

Zack and his wife, Christina, live in Tehachapi with their four children, Zachary (7), Robert (5), Jane (2), and Jacqueline (4 months).



The Board of Directors serves as the governing body of the Eastern Kern Air Pollution Control District, a special district in east Kern County. The Board consists of five members; three city councilmembers and two county supervisors. Board meetings are open to the public. Visit our website to view the Schedule of Meetings and Locations at [www.kernair.org](http://www.kernair.org).

**Board of Directors**

Ed Grimes, Chair (Councilman, Tehachapi)  
Rick Warren, Vice Chair (Councilman, California City)  
Peggy Breeden (Mayor, Ridgecrest)  
Mick Gleason (KC 1st District Supervisor)  
Zack Scrivner (KC 2nd District Supervisor)

Board of Directors usually meet once every two months starting in January at various locations.

**Air Pollution Control Officer**

Glen E. Stephens, P.E.

**Hearing Board Members**

Bill Deaver  
Herb Roraback  
Doris Lora  
Dr. Wallace Kleck  
Vacant



**Happy Holidays**

For news updates and other information, please visit the Eastern Kern APCD website at [www.kernair.org](http://www.kernair.org)

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