



## Association of Environmental & Engineering Geologists San Francisco Section

---

### ANNOUNCING THE AEG SAN FRANCISCO SECTION AUGUST 2013 MEETING

## Mercury Deposits of the California Coast Ranges and Their Environmental Impacts

William E. Motzer, PhD, PG, CHG of Todd Engineers

#### MEETING DETAILS

##### Restaurant

Sinbad's  
Pier 2 Embarcadero Street  
San Francisco, CA

[Map](#)

##### Date and Time

Tuesday, August 13, 2013  
6:00 pm—Social Hour and Sign-in  
7:00 pm—Dinner  
8:00 pm—Presentation

**Cost:** \$45 Members; \$50 Non-Members, \$20 for Students

##### **Menu**

- |                     |                    |
|---------------------|--------------------|
| 🍷 Salmon Florentine | 🍷 Chicken Picatta  |
| 🍷 Snapper           | 🍷 Shrimp Louis     |
| 🍷 London Broil      | 🍷 Vegetarian Pasta |

**Reservations\*:** To RSVP, please fill out the online form at <http://goo.gl/dJY83> by **12 PM, Friday, August 9<sup>th</sup>, 2013**

**Driving Directions:** From the Bay Bridge, take the Fremont Street Exit and the Folsom Street Ramp. Go left (east) on Folsom Street, then left (north) onto the Embarcadero (Herb Caen Way). The driveway for Sinbad's is on the right, south of the historic Ferry Building. Please watch out for the pedestrians and cyclists when turning into the driveway. Thank you.

**BART Directions:** Exit the Embarcadero Station; walk up Market Street toward the Ferry Building (less than ½ a mile toward the Bay and to the east). Cross Embarcadero and Sinbad's is located next to the Alameda ferry pier on the south side the historic Ferry Building.

**Parking:** \$4 valet parking is available or there are meters located on nearby side streets.

\*Please RSVP in advance. Walk-ins are welcome, but not guaranteed. No shows will be charged.

**See next page for abstract and speaker biographies.**

## Mercury Deposits of the California Coast Ranges and Their Environmental Impacts

**William E. Motzer, PhD, PG, CHG**  
Senior Geochemist

Todd Engineers

William E. (Bill) Motzer holds a Ph.D. in Geology from the University of Idaho. He is a registered California Professional Geologist (PG) and Certified Hydrogeologist (CHG), with PG registrations in five other states. Bill has extensive experience in conducting surface and subsurface water quality chemistry and environmental forensic investigations. He formerly was a minerals exploration/mining geologist with projects from Alaska to Mexico that included the search for hot spring-type mercury/gold deposits. Bill is a recognized expert in forensic geochemistry, with particular expertise in stable and other isotopic “fingerprinting” and age dating techniques, water quality/contaminants, and emerging contaminant geochemistry. He has conducted more than 400 environmental projects, including mine litigation support, throughout California and other western states. He is a current AEG member, past President of the San Francisco Bay Branch of the Groundwater Resources Association of California, and the current Northern California Section Chair for the Society for Mining, Metallurgy, & Exploration (SME).

**Abstract** - Mercury (Hg) deposits occur at sites throughout California's Coast Ranges: e.g., New Idria (the largest producer), New Almaden (west of San Jose), and Clear Lake in the Mayacamas Mining District (the second largest). The major Hg ore is red cinnabar (mercury sulfide) although a black variety, metacinnabar, also occurs. Ores were deposited from hydrothermal (“hot spring”) activity, generally along active faults/fractures in Jurassic to Cretaceous [~200 to 100 million year old (Ma)] Franciscan complex host rocks. These were altered by the hot waters producing a silica carbonate rock, commonly having a “lighter” or bleached appearance. Hydrothermal activity is younger than the host rocks, ranging from Miocene (~23 Ma) to Pleistocene (~2.6 Ma). Ore deposits typically occur as masses, veins, and disseminations ranging from  $\leq 1,300$  to  $\geq 600,000$  tonnes, grading from  $\leq 0.23$  to  $\geq 0.65\%$  Hg.

Except for the Almaden Quicksilver Historic County Park and its historic trail, few old Hg mines are readily accessible. Prior to European discovery and mining, Almaden was used by the Ohlone Indians as a source of the deep red cinnabar for pigment and paint. It subsequently became a busy mining center for more than 125 years, from 1845 until 1976, with seven mines producing nearly 84 million pounds of valuable liquid Hg used for amalgamating fine placer and lode gold, Civil War explosives, Victorian glass, and 20th century battery cells and thermometers. Mine wastes however, have contaminated the Guadalupe River drainage and San Francisco Bay with elemental mercury being biologically converted to toxic methylmercury.

**Thank you for the RSVP! See you on Tuesday, August 13th, 2013!**