



Association of Environmental and Engineering Geologists

## Inland Empire Chapter

of the Southern California Section

Vol.8 No. 1

### January Newsletter

## *In-situ arsenic removal during groundwater recharge through unsaturated alluvium*

**John A. Izbicki,**  
Groundwater Hydrologist, USGS

### Wednesday, January 18, 2012

6:00 – Social	Spaghetti Factory, Banquet Room
6:30 – Dinner	Spaghetti Factory, Banquet Room
7:30 – Speaker	Spaghetti Factory, Banquet Room

### Location

**The Old Spaghetti Factory, Rancho Cucamonga, CA**  
(Meeting Cost \$25; Students \$5); see meeting details on page 3

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## Abstract

John A. Izbicki, [jaizbick@usgs.gov](mailto:jaizbick@usgs.gov)

Arsenic in excess of the U.S. Environmental Protection Agency Maximum Contaminant Level (MCL) of 10 micrograms per liter (mg/L) is common in aquifers throughout much of the southwestern United States. A field-scale experiment is being done in Antelope Valley, Calif., in cooperation with Los Angeles County Department of Public Works and Antelope Valley East Kern Water Agency, to determine if naturally occurring iron, manganese, and alumina oxides present on the surfaces of mineral grains in the unsaturated zone can be used to remove arsenic in applied water containing high concentrations of arsenic. In the study area, a shallow unconfined aquifer with arsenic concentrations less than the MCL overlies a deeper aquifer with an average arsenic concentration of about 30 mg/L. High-arsenic groundwater will be pumped from the deeper aquifer into a half-acre pond and then infiltrated through a 300-foot thick unsaturated zone to recharge the shallow aquifer, where it later could be pumped and delivered for public supply. An unsaturated-zone monitoring site consisting of multiple tensiometers, heat-dissipation probes, and suction-cup lysimeters will be constructed adjacent to the pond to monitor the movement and quality of the applied water as it infiltrates to the underlying water table. Cores and cuttings collected during the construction of the site will be used in column experiments to determine the physical and chemical factors that control sorption of arsenic under different geochemical conditions, thereby facilitating transfer of the technique to other areas having similar geologic

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inland areas of Southern  
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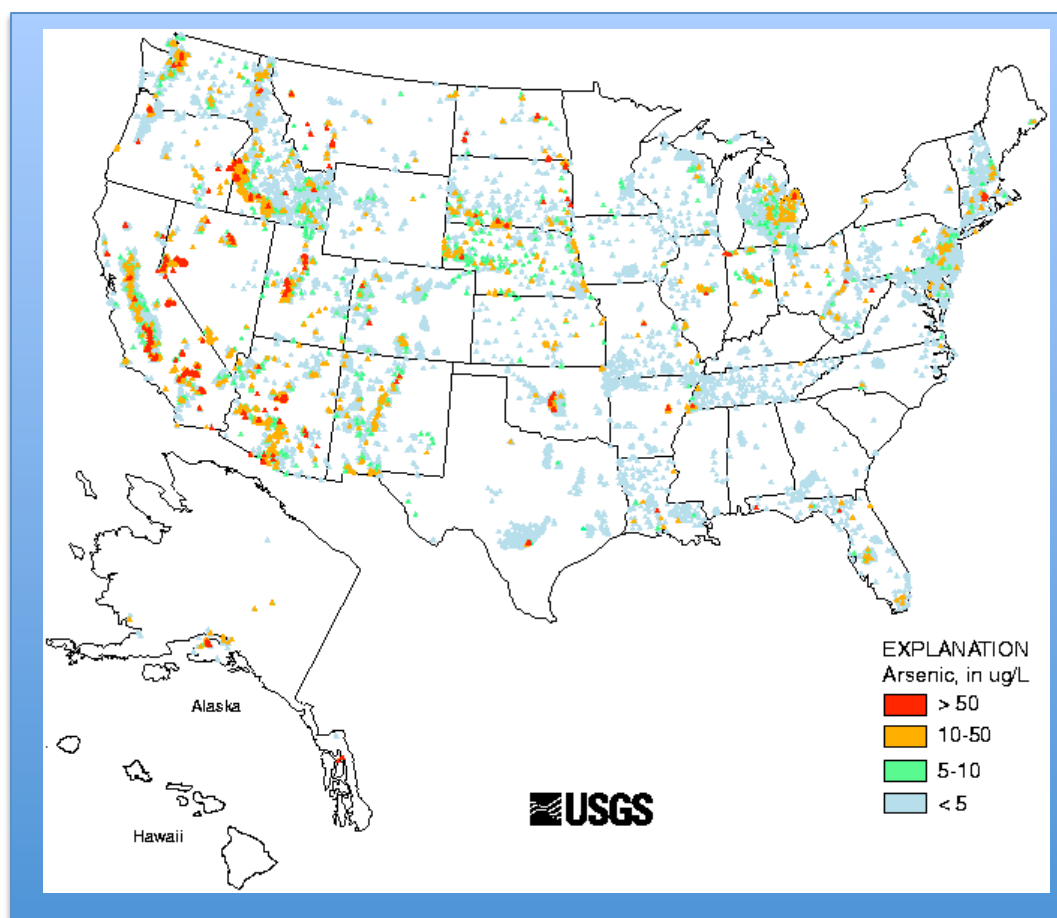
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## Abstract (continued)

conditions. In addition, batch experiments will be done using radiolabeled arsenic-73 (a man-made isotope, having a half-life of 80.3 days) to determine partitioning of arsenic on alluvium and its potential incorporation from sorbed into mineral phases. These factors are believed to control the long-term fate of sorbed arsenic and its potential mobility if overlying land use changes. The experiment is designed to recharge 1,600 acre-feet of water from a half-acre pond over a two-year period. Preliminary estimates suggest that the unsaturated zone underlying the pond may contain enough naturally-occurring oxides to treat as much as 50,000 acre-feet of high-arsenic water. The cost of arsenic treatment and recharging the shallow aquifer is the cost of pumping the water.

## Speaker Biography

John Izbicki attended West Virginia University, Penn State University, and obtained a Ph.D. from the University of California Riverside in 2000. Dr. Izbicki has worked as a hydrologist for the U.S. Geological Survey for 25 years and spent the last 15 years in southern California. While in California, he has focused on studies designed to apply environmental tracers to further the understanding of physical hydrologic processes. These studies addressed issues related to seawater intrusion and brine invasion, natural and artificial recharge processes, stormwater and beach contamination, well-bore hydraulics, and the occurrence and distribution of trace elements in desert environments.



## AEG

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## OTHER MEETINGS

### AEG-Southern California Section:

TBD. For more information visit <http://www.aegsc.org/>

**ASCE** (Los Angeles Section): Jan 18, 2012 (Wednesday). Presentation: ***"Field Testing of Soil-Structure Interaction Effects for Structures with Shallow Foundations."*** Speaker: **Lisa Star, Ph.D.**, CSU-Long Beach Location: Stevens Steak House, Commerce, CA. For more information visit [www.ascelasection.org](http://www.ascelasection.org)

**EERI** (San Diego Chapter): Jan 18, 2012 (Wednesday). Presentation: ***"Structural and Geotechnical Considerations in Performance-Based Seismic Design of Tall Buildings."*** Speakers: **Jack P. Moehle, Ph.D.** (University of California Berkeley) and **Jonathan P. Stewart, Ph.D.** (University of California Los Angeles). Location: Handlery Hotel and Resort, San Diego. For more information visit <http://www.eeri.org/about-eeri/regional-chapters/>

**IGS**: Jan 12, 2012 (Thursday). ***"Overview of Mining Practices at Mitsubishi Cement Corporation."*** Speaker: **Austin Marshall**, Mitsubishi Cement Corporation. Location: LSA Associates office, Riverside. For more info visit <http://www.inlandgeo.org/>

#### DO NOT MISS THIS IGS Talk

Feb 1, 2012 (Wednesday)

***"Life-Cycle Economic Analysis of Water Wells—Considerations for Design and Construction."*** Speaker: **Mr. Marvin F. Glotfelty, RG**, 2012 McElhiney Lecturer.

**SCGS**: Jan 10, 2012 (Monday). ***"Reconstructing Late Pliocene to Middle Pleistocene Death Valley Lakes and River Systems as a Test of Pupfish (Cyprinodontidae) Dispersal Hypotheses."*** Speaker: **Dr. Jeff Knott**, CSU-Fullerton. Location: Double Tree, Santa Ana. For more info about SCGS visit: <http://www.southcoastgeo.org/>

**SDAG**: Jan 18, 2012 (Wednesday). ***"Geo-Aspects Of Multidisciplinary Study Of Qhapaq Ñan"(Chilean Earthquake/Inka Road)."*** Speaker: **Dr. Barry Keller**. Location: Emiliano's Mexican Restaurant. For more info visit <http://www.sandiegogeologists.org/>

**SME**: Jan 28, 2011 (Saturday). ***"Field Trip to the Rio Tinto Borax Mine"*** Leader: **Brandon Griffiths**, Hydrologist for Rio Tinto Minerals –Boron Operations. For more information visit <http://www.mine-engineer.com/socalmining/>

## January AEG-Chapter Meeting Info

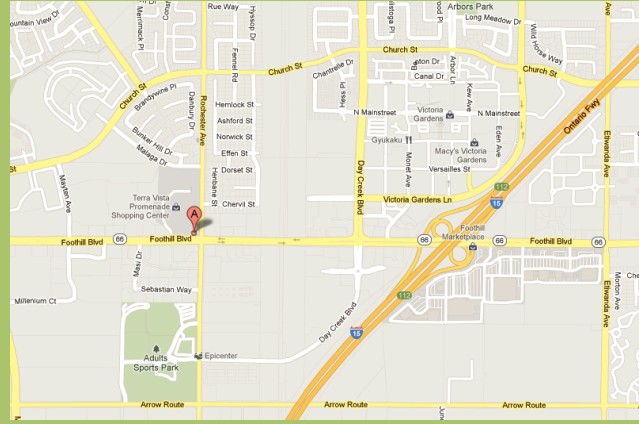
**The Old Spaghetti Factory, Rancho Cucamonga, CA**  
11896 Foothill Blvd., Rancho Cucamonga, CA  
•Banquet Room

### DIRECTIONS TO MEETING

From the I-15 north (north of the I-10): Take the Foothill Boulevard off-ramp. Proceed west (left) on Foothill about ¾ mile to Rochester Avenue. The Old Spaghetti Factory is on the northwest corner of Rochester and Foothill (easily seen from Foothill Boulevard).

From the I-15 south (south of the I-210): Take the Foothill Boulevard off-ramp. Proceed west (right) on Foothill about ¾ of a mile to Rochester Avenue. The Old Spaghetti Factory is on the northwest corner of Rochester and Foothill (easily seen from Foothill Boulevard).

### SEE ENLARGED MAP ON LAST PAGE



### Dinner choices: (\$25)

- Chicken Fettuccine
- Baked Lasagna
- Meat lovers special

Includes: garden salad, fresh baked bread, and dessert of vanilla ice cream or spumoni.

Drinks: Attendees will have a choice of iced or hot tea, coffee, soda, or milk. Wine, beer, and cocktails are available for attendees to purchase on their own.

**Cost**: Professionals \$25; Students \$5

**RSVP**: By Friday January 13, 2012 -  
[aeginland@gmail.com](mailto:aeginland@gmail.com)

## Map to The Old Spaghetti Factory (from I-15)

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