

SAN DIEGO ASSOCIATION OF GEOLOGISTS

www.sandiegoeologists.org

SDAG MEETING ANNOUNCEMENT

Wednesday, February 15, 2017

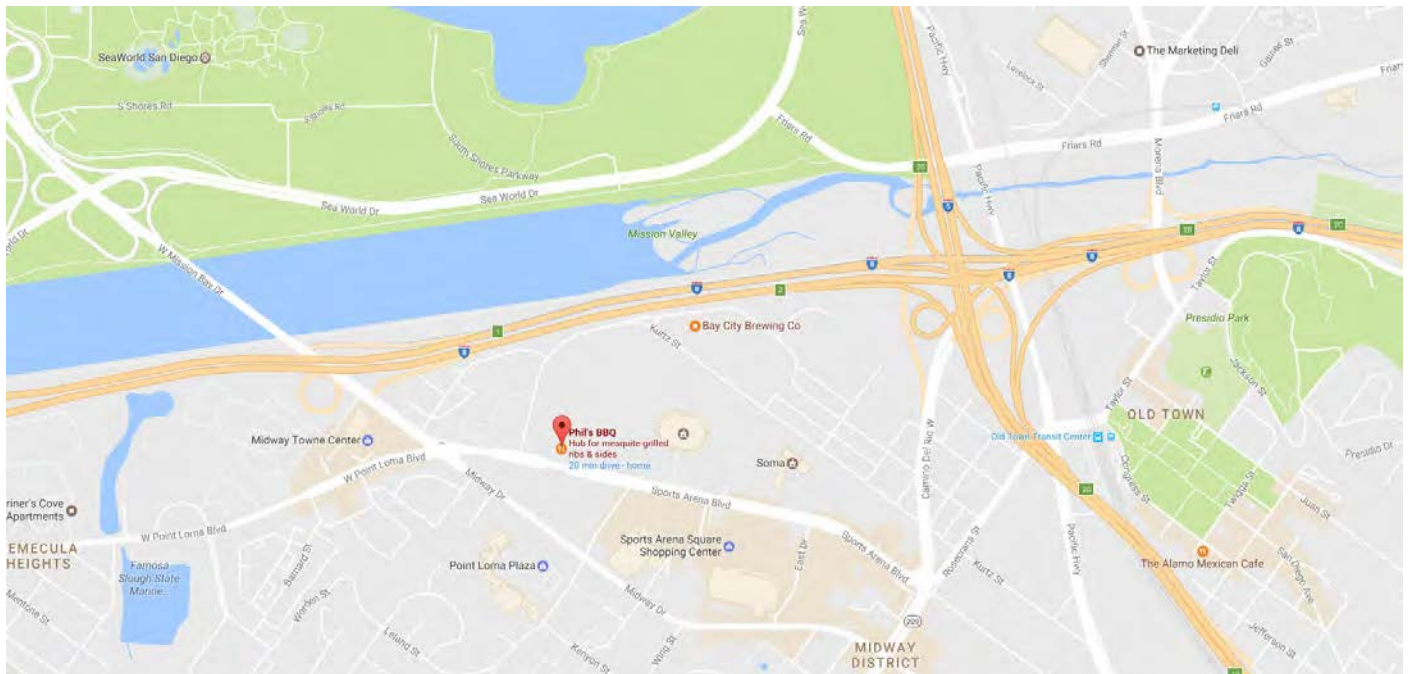
Use of fossils, cuttings, and geophysical logs obtained from deep wells to develop the first 3D geologic model of the San Diego-Tijuana area, USA and Mexico

Presented by:

N. Scott Rugh, Dr. Geoff Cromwell, & Wes Danskin

- Where:** **Phil's BBQ – Point Loma**
3750 Sports Arena Blvd, San Diego, 92110 (See Map)
- When:** 5:30 pm - Social Hour
6:30 pm - Dinner
7:30 pm - Program
- Dinner:** Pulled Pork and Tri-Tip Sandwiches or Veggie Burger. Cash bar
- Cost:** \$40 per person, \$5 discount for members, STUDENTS: \$20. Add \$5 if you did not make a reservation.
- Reservations:** Make your reservation **online** at www.sandiegoeologists.org **no later than noon, Monday January 16th**. Reservations cannot be guaranteed after Monday at noon; but are always preferred over walk ins. **EARLY reservations well before the deadline are MUCH appreciated!**
- Directions:** FROM INTERSTATE 5: Take Exit 20 or Camino Del Rio West south towards Rosecrans Street. Make a right onto Sports Arena Boulevard and head west for approximately 0.7 miles. The restaurant is on the right hand side (see the Map).
FROM INTERSTATE 8: Head west past Interstate 5. Take Exit 1 West Mission Bay/Sports Arena Boulevard. Make a left under the freeway and another left at Sports Arena Boulevard. The restaurant is on the left in approximately 0.2 miles (see the Map).

Map:



ABSTRACT

The San Diego Hydrogeology project is a cooperative effort by the United States Geological Survey (USGS) and local water agencies to determine the quantity and quality of groundwater in the San Diego–Tijuana area. Historically, most groundwater in the San Diego area has been extracted from the Plio-Pleistocene San Diego Formation and the overlying Quaternary deposits. In order to understand how groundwater flows through these units, additional information is needed to quantify the location and thickness of these units and the underlying sedimentary formations. The first step was to develop a comprehensive three-dimensional (3D) geologic framework model, in particular using data collected from 12 multiple-depth, monitoring-well sites, which were installed by the USGS over the last 20 years. Drill cuttings were collected at each site, which provided fossil and lithologic data that are heavily relied on in developing the geologic model.

Fossil identification and lithologic descriptions of drill cuttings from the USGS well sites enabled evaluation of the subsurface extent and thickness of local geologic units. Nine of the 12 well sites contain sandstone with common-to-abundant invertebrate fossil shell fragments, ranging in size from .05 to 0.5 inches, and ranging in depth from 20 to 1,600 feet below land surface. Sediment identified as the San Diego Formation, by the presence of several indicator species, was found in the nine wells; fossil species unique to younger Quaternary deposits are common in at least one well. The geographic distribution of the USGS well sites and the prevalence of fossils at depth allows for a robust analysis of the upper and lower members of the San Diego Formation. The lower member, deposited in seawater between 100 and 300 feet deep, is identified in all nine wells and ranges in thickness from 380 to 1,160 feet. The upper member, deposited primarily at depths less than 100 feet, is more limited in lateral extent; it is identified in only two northern wells where its thickness is 70 and 180 feet.

The vertical characterization of geologic units was integral to development of the first 3D geologic model of the San Diego–Tijuana area. In total, eight geologic units and 10 fault systems are defined in the model, which extends roughly north-south from La Jolla, California, to Tijuana, Mexico; and east-west from El Cajon, California, to the offshore Coronado Bank. The geologic model provides new insight into the geologic history and characteristics of the San Diego–Tijuana area and will serve as a useful tool for geologic and hydrologic investigations.

SPEAKER BIOS

Mr. N. Scott Rugh

N. Scott Rugh, is an independent invertebrate paleontologist who specializes in Neogene invertebrate fossils of southern California. His more than 20 years of experience as a paleontologist includes identification of the late Miocene invertebrate fossil species of the Stout Research Center, including the Susan M. Kidwell collection of the University of Chicago, and as collections manager of the invertebrate fossil collections of the San Diego Natural History Museum for 13 years. As additional experience, he works as a invertebrate paleontology specialist who works with various southern California archaeology and paleontology consulting companies. Mr. Rugh earned his M.S. degree in Biology with an emphasis in Ecology at San Diego State University.

Dr. Geoff Cromwell

Geoff Cromwell is a geologist with the U.S. Geological Survey in San Diego, California. He received his PhD in Earth Sciences from Scripps Institution of Oceanography at U.C. San Diego in 2014, and taught at Occidental College in Los Angeles before joining the USGS full time in 2015. Geoff specializes in developing regional hydrogeologic framework models that define aquifer characteristics, and are used with numerical groundwater flow models. He also has a background in paleomagnetism, with a focus on estimating the intensity of the ancient geomagnetic field.

Mr. Wes Danskin

Wes Danskin is a senior Research Hydrologist for the United States Geological Survey, living and working mostly in southern California. For the past 40 years, Mr. Danskin has applied and taught how to apply simulation and optimization techniques to complex, real-world, water-management problems. For the past 15 years, Mr. Danskin has led the USGS San Diego Hydrogeology project, which is providing the foundational geologic and hydrologic information in the San Diego–Tijuana area. Results of this study are being used to develop additional local water supplies, in particular brackish groundwater that is being desalinated and distributed for municipal use.

UPCOMING MEETINGS

Meetings are usually held on the 3rd Wednesday of the month but may change to accommodate the speaker and meeting place schedules. Check the SDAG web site for updates.

March 22, 2017 (4 th Wednesday!!!)	<u>Understanding the Licensure Laws and Responsibilities of the Licensee &</u> Student Presentations
April 19, 2017	John Minch <u>The Greater Hanshin (Kobi) Earthquake</u>
May 17, 2017	John Wallace and Pat Shires <u>Sycamore-Ranchito Landslide — Santa Barbara</u>

2017 SDAG EXECUTIVE COMMITTEE

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SDAG PRESIDENT'S CORNER

Greetings SDAG members!

I would like to start by thanking Dr. Monte Marshall for stepping up to the plate once again for SDAG, as he has done many times for us in the past. Monte delivered another fascinating talk for our first meeting of the year, which resulted in almost 70 attendees...an excellent turn out for our group! In fact, it was very much a standing room only situation for those of us at the back of the dinner line! This brings up an important point in that I would like to try an encourage members to sign up as early as possible for the monthly meetings as this will allow us to better achieve the three key elements of a successful meeting ...enough seats, enough food and enough beer! Thanks again to Cari Gomes for selling out the Wallawender Tavern, the proceeds of which go to the SDAG student scholarship fund. I would also like to thank Adam Avakian, now officially our new treasurer, for jumping in and doing an excellent job as well.

For February, we have our friends from the USGS, Wes Danskin, Geoff Cromwell and Scott Rugh, who are coming to bring us up to date on the latest information regarding modelling of San Diego-Tijuana hydrogeologic system. This dovetails nicely with the drilling of a new multi-stage groundwater monitoring well in Chula Vista, which will be the subject of February's One Stop Wonder. Details of the OSW can be found in this newsletter. If you cannot make the OSW date, I believe that it is possible to drop by at other times to observe the drilling...please contact Wes Danskin for further details on this.

On other matters, the 2017 lecture series is slowly solidifying into what I hope will be a very interesting series of presentations that appeal to the wide spectrum of interests that the group has. Hopefully, for February's meeting, I will have enough dates and speakers pinned down to give you a reasonably accurate picture for the year.

As always, please feel free to contact me at adams@geoconinc.com if you have questions, suggestions etc. regarding all matters SDAG related. I am particularly interested to hear if anyone has any suggestions for other OSW's. This year's inclement weather aside, the early part of the year is usually the best time to schedule these to avoid overheating in the summer, so please let me know if you have any ideas.

I look forward to seeing everyone again on the 15th at Phil's BBQ in Point Loma (in the event center).

Regards,



Rupert Adams PG, CEG | *Sr. Project Geologist/SDAG President*

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ANNOUNCEMENTS

Call for Papers, Speakers, and Spectators

SDAG Fall 2017 Fieldtrip

San Diego is a county with abundant points of interest. There is active faulting, landslides, great weather, and mountains that overlook majestic landscapes. Julian, California encompasses all of these traits and more! The 2017 fieldtrip will focus on points of interest in the region, including gold mining and faulting; however the trip is in the early stages of planning and is subject to change in direction and core focus. Thus, submit your abstracts, articles, and ideas early!

One Stop Wonder

Wes Danskin is hosting SDAG at the USGS deep well site on February 18th and 19th!

The USGS is installing a deep multiple-depth, monitoring-well on Lagoon Drive just west of Interstate 5 in Chula Vista. With their \$2 million rig they plan to drill 2000 feet, collect spot corings, onsite paleontology, run geophysical logs, and install 5 – 6 wells at selected depths. Wes Danskin has graciously agreed to host a One Stop Wonder on Saturday February 18th and Sunday February 19th at 9 AM. More info will be provided at the next SDAG meeting. RSVP is greatly appreciated to secretary@sandiegogeologists.org or adams@geoconinc.com

Please see the attached flyer on the next pages for more information.

Prepared in cooperation with the Sweetwater Authority and the City of San Diego

Installation of a multiple-depth, monitoring-well site

Hydrogeology of the San Diego–Tijuana area, USA and Mexico

Multiple-depth, monitoring-well sites provide vitally important data to aid in understanding complex hydrogeology, such as that found in the coastal San Diego–Tijuana area. Because no comprehensive study of groundwater resources has been done for this area, a major component of the present USGS study is to install monitoring-well sites along the coast where saline groundwater is being extracted and treated for municipal use. Beginning January 23, 2017, a well site will be installed just north of Lagoon Drive (F Street), east of Interstate 5, in Chula Vista. The well bore will be about 2,000 feet deep, and will have five separate two-inch PVC piezometers, installed to selected depths. These piezometers will be monitored for groundwater levels and sampled for groundwater quality.

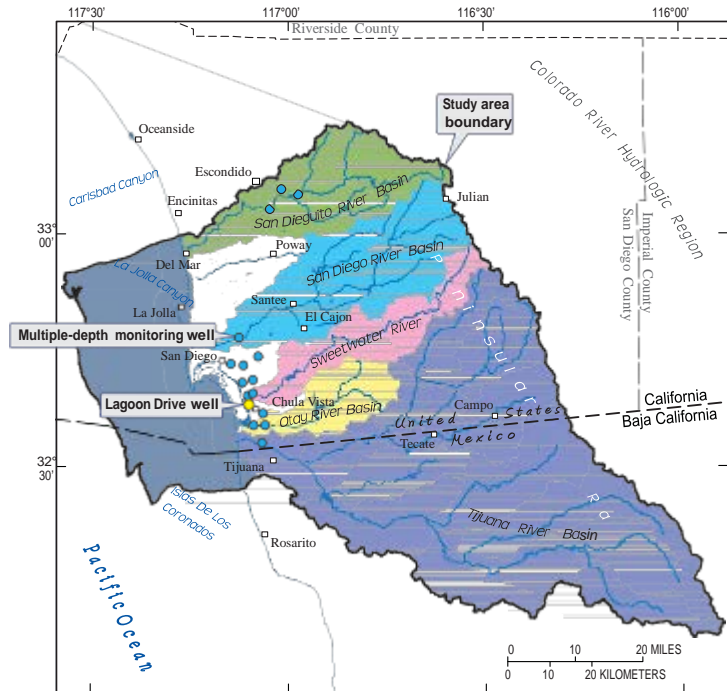


Figure 1. Location of multiple-depth, monitoring-well sites.

Well Site

The United States Geological Survey (USGS), in cooperation with the Sweetwater Authority and the City of San Diego, will be installing a 2,000-foot-deep, monitoring-well site north of Lagoon Drive in Chula Vista (fig. 1). This site was chosen to detect changes in groundwater storage and groundwater quality caused by additional extraction related to expansion of the Reynolds Groundwater Desalination Facility. Data from the well site will determine hydraulic and water-quality conditions between previously installed wells, identify geologic units, aid in development of a regional hydrologic model, and provide for long-term water management. The San Diego Lagoon Drive well site (SDLD) is designed to be permanent, providing data for many decades.

Well Drilling and Construction

Drilling will be done by the USGS research drill crew, using their new, much larger rig.

Drilling and well installation will take about four weeks. Hours of operation each day, including weekends, are 7 am to 7 pm. Noise levels will be typical of those associated with heavy equipment (fig. 2). Subsequent well development and water-quality sampling will be relatively unobtrusive. Typical photographs of the drilling process and completed well installation are shown in figure 3. All data will be available on the project website listed below. Interested individuals or groups are encouraged to visit the site.

Contacts

For questions concerning the USGS hydrogeologic study, or to visit the drill site, please contact:

USGS chief scientist and project manager, Wes Danskin,
858-663-6832, wdanskin@usgs.gov,

or refer to the project website,
<http://ca.water.usgs.gov/sandiego>.

For all questions concerning the well site or drilling, please contact:

USGS site supervisor, Tony Brown,
619-578-1294, anbrown@usgs.gov,
or
Sweetwater Authority,
Michael Garrod, 619-409-6752,
mgarrod@sweetwater.org.



Figure 2. New USGS drill rig will be used to construct the monitoring-well site.



Figure 3A. Educational outreach area with samples, story-board, and shade structure. Drill rig is in background.

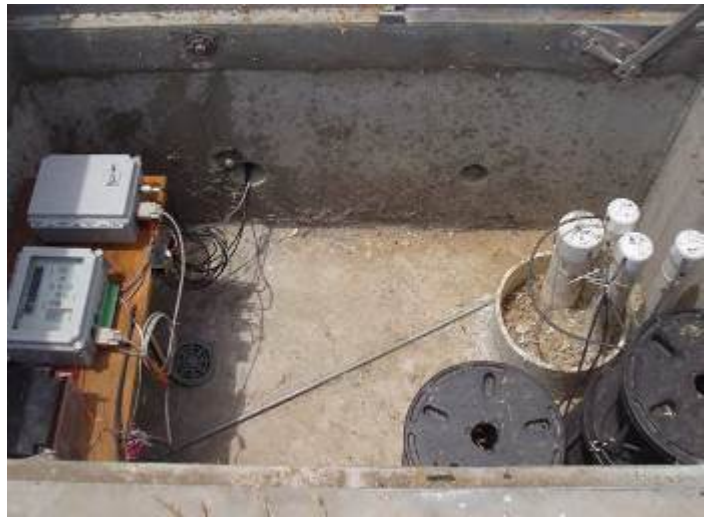


Figure 3D. Inside a typical vault showing piezometers, transducer wires, data logger, and satellite link. Real-time data is provided via the Internet.



Figure 3B. Core samples are taken from selected depths using a wire-line device. Cores help correlate geologic layers.



Figure 3E. Typical final installation of 3-by-5-foot, traffic-rated vault. USGS and well ID are welded on top of vault.



Figure 3C. Installation of 2-inch PVC pipe, which will allow access to specific depths to measure water levels and sample water quality. Note 3 other piezometers are installed already.



Figure 3F. Final installation of vault, solar panel, and satellite antenna at El Toyon Park, National City, CA.



San Diego Association of Geologists
Giovanni's Italian Restaurant, 9353 Clairmont Mesa Rd., San Diego
Contact: Rupert Adams
858-558-6900, adams@geoconinc.com

Understanding the Licensure Laws and Responsibilities of the Licensee

Wednesday March 22, 2017 6pm

Laurie Racca, PG

Senior Registrar, Geology & Geophysics

California Board for Professional Engineers, Land Surveyors & Geologists



The California Board for Professional Engineers, Land Surveyors, and Geologists (BPELSG) is charged with safeguarding the life, health, property, and public welfare by regulating the practices of professional engineering, land surveying, geology, and geophysics. Knowledge of the laws and regulations that govern licensed professionals in California is essential to ensuring that critical work is done by qualified professionals.

BPELSG is inviting you have an informal "round table discussion" focused on the recent changes to the licensing laws and regulations (2017 update), a review of key concepts regarding professional licensure, and the importance of mentoring young professionals. Some of the topics that we will cover include: promoting understanding of the difference between a practice licensing act (such as the PG license) and a title licensing act (such as the CEG or CHG specialty licenses), keeping our licensing tests current with the state of the practice by the different licensees, and keeping our procedures and statutory obligations current too. It is our belief that we need more frequent feedback from stakeholders about these issues, as well as greater participation by our licensees for activities pursued by the Board that impact our respective futures.

Laurie Racca, PG, is the Senior Registrar for Geology and Geophysics at BPELSG. Her 25+ years of experience includes working in private environmental and geotechnical consulting, providing regulatory agency oversight of large military and civilian environmental cleanups for the Department of Toxic Substances Control, and investigating fraud, waste and abuse as part of the Office of Enforcement at the State Water Resources Control Board.

31st Annual Desert Symposium and Field Trip

Eastern California Shear Zone (ECSZ) Changes in Altitude

Symposium: April 14 – 15, 2017

Field Trip: April 16 – 17, 2017 (This year the field trip will return to Desert Studies Center each night)

Share your desert research through an oral presentation or poster. The Desert Symposium is open to research presentations related to any area of desert studies. Students are especially encouraged to present and compete for the Adams Best Student Presentation Awards.

Abstract deadline for presentations is January 20, 2017

Manuscript Deadline for 2017 Symposium Volume is February 20, 2017. Examples of manuscript ppt format can be viewed in the 2016 Symposium volume at:

<http://goo.gl/vBjXbW>

Or see instructions for Authors on the DSD website. Additional information can be found by visiting California State University Fullerton

For expedited updates contact desertstudiescenter@fullerton.edu to join the email distribution list

NEW Interactive Fault Map for San Diego

As part of the update for the San Diego-Tijuana Earthquake Planning Scenario, Working Group No. 1's "Fault Map Subcommittee" has completed the first publicly available bi-national active and potentially active fault map. This interactive GIS map includes the first publicly available active and potentially active fault map locations from the City of San Diego. The City of San Diego fault locations and activity of faults are based chiefly on interpretation of information contained in geologic reports by private consultants. The City of San Diego identifies active faults as Holocene ($\leq 11,000$ yr) and potentially active as Quaternary (up to 1.6my). City of San Diego fault investigations are ongoing that may require future revision of this map. This map is not a substitute for a site specific fault investigation. The map also includes an updated fault map layer from the State CGS. CGS suggests users defer to the City of San Diego fault data, where marked, for increased accuracy. The map also integrated the faults south of the border for a bi-national cross border view. You can expand the map legend on the left side to see the fault ages and sources for each layer that can be turned on or off for the map view. You can select from 1 of 12 base maps. You can click on the fault line on the map to see the meta-data source. This map includes the yellow dashed SURFACE FAULT RUP-TURE location layer that will be used for the infrastructure, social, and economic impacts and emergency response for the update to the Earthquake Scenario. In addition, active and potentially active fault investigation locations from private companies are planned to be added to this map as a resource. This map is an on-going project and resource as our knowledge increases about local active and potentially active faults.

The link is available at: http://www.sandiegogeologists.org/Faults_map.html

I would like to thank Carolyn Glockhoff for her endless GIS work, Jim Quinn and the City for providing their data and time, Jerry Treiman with CGS for his time preparing the Surface Rupture and providing their new State fault data layer, and Luis Mendoza at CICESE for providing the faults south of the border. Please contact Diane Murbach (dianemurbach@gmail.com), Chair for the SD-TJ Earthquake Scenario Working Group #1 - Earth Science, if you have any questions, or see any errors on this new fault map.

Diane Murbach (619) 865-4333
Engineering Geologist, C.E.G.
www.murbachgeotech.com

Dear members and friends of the EERI San Diego Chapter,

HappyNewYear2017!Ourbestwishesforthisnewyear!

The Earthquake Engineering Research Institute (EERI) San Diego Chapter, the University of California San Diego (UCSD) Extension and the GeolInstitute San Diego Chapter are organizing the 2nd Workshop on Geotechnical Earthquake Engineering with the topic "Dealing with the Consequences of Liquefaction" on Wednesday-Thursday, March 29-30, 2017 in UCSD campus, San Diego, California. As you may remember, the first workshop in 2014 was a success with almost 300 attendees (<https://sandiego.eeri.org/?p=203>).

The second workshop will honor the lifetime achievements and contributions of Prof. Kenji Ishihara to the field of geotechnical earthquake engineering. An afternoon session of the second day of the workshop (Thursday, March 30, 2017) will be devoted to honor Prof. Ishihara and the session will be hosted by Prof. I.M. Idriss. We will have distinguished speakers from US, Japan, New Zealand, Europe and South America sharing with us their experiences with liquefaction mitigation, recent major earthquakes and highlighting the contributions of Prof. Kenji Ishihara. A one-day short course before the workshop on Tuesday, March 28 is also offered.

We would much appreciate your participation in this workshop and 1-day short course. Registration is available in these webpages <https://sandiego.eeri.org/?p=821> and <https://sandiego.eeri.org/?p=903>

If you have any question, feedback or wish to sponsor this event, please feel free to contact the Chair of the Organizing Committee, Dr. Jorge Meneses, at jmenesesl@gmail.com

Thanks and looking forward to seeing you all in beautiful San Diego,

Jorge
President, EERI San Diego Chapter

See Prof. Kenji Ishihara's profile on the next page.

PROF. KENJI ISHIHARA



Prof. Kenji Ishihara was born in Chiba, Japan in 1934. He started his studies in Civil Engineering at the University of Tokyo, obtaining BS-degree in 1957, MS-degree in 1959, and Ph.D-degree in 1963. During one-year period from 1966 to 1967, he was a Visiting Research Associate at the University of Illinois in Urbana, U.S.A. under the guidance of late Professor R. B. Peck. He has been affiliated with the University of Tokyo since then, taking the position of professorship in geotechnical engineering since 1977. On his retirement from the University of Tokyo in 1995 he took up the position of Professor of Geotechnical Engineering at the Tokyo University of Science and then at Chuo University in 2001.

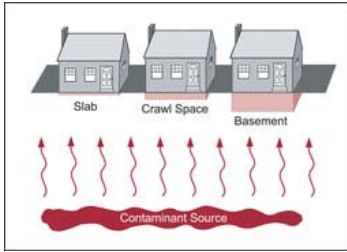
He served for ISSMFE as secretary of the Japanese National Committee for the period of 7 years between 1970 and 1976 during which time he attended the Executive Committee meeting of ISSMFE in Sydney, 1971 as a voting member representing the Japanese National Society. Since then, he often represented Japan in several Executive Committee Meetings of ISSMFE and those of Asian region. He acted as Vice-President of Asian region of ISSMFE during the period of 1989-1993.

His major research interest covers problems in soil dynamics associated with earthquakes, such as liquefaction of sandy deposits, and seismic stability of slopes and earth structures. He wrote about 250 papers on the these subjects.

He has served on various occasions as consultant or adviser to UNESCO projects (Balkan region, India) and UNDP project (Chile, India, Iran). He has participated in the geotechnical investigations of earthquakes worldwide such as those in Romania (1977), Yugoslavia (1979), Chile (1985), Mexico (1985), Ecuador (1986), Soviet Armenia (1988), Soviet Tajik (1989), Philippines (1991) and Iran (1991). He is the author of the book “Fundamentals of Soil Dynamics” (1974) and the textbook “Soil Mechanics” (1988) both in Japanese. He recently published from Oxford Press an English book entitled “Soil Behaviour in Earthquake Geotechnics”

He has received the honor by being assigned on many occasions to deliver lectures worldwide including the theme lecture in the 11th ICSMFE in San Francisco and the 33rd Rankine Lecture of the British Geotechnical Society in 1993. He acted as chairman of the Technical Committee TC4 on Earthquake Geotechnical Engineering in ISSMFE for the two tenures of office from 1985 to 1993. His incessant endeavor in TC4 has led to the periodical holding of the International Conference on Earthquake Geotechnical Engineering of which the first in a series was held in Tokyo in 1995 and the second in Lisbon in 1999. He has also received honor by being awarded the H. B. Seed Gold Medal in 1998 from the American Society of Civil Engineers. For his significant contribution, title of Honorary Doctorate was given to him from Technical University of Bucharest, Romania in 1995 and from Istanbul Technical University, Turkey in 1999. In 2000, he was honored by being bestowed the most prestigious Japan Academy Prize. In 2010, he was elected to Foreign Associate of the United States Academy of Engineering.

In commemoration of his long-time contribution to the profession, the International Conference on Earthquake Geotechnical Engineering held in Istanbul by the efforts of Professors A. Ansal and M. Sakr, published two volumes of selected papers containing major publications by Prof. Kenji Ishihara.



The Vapor Intrusion Risk Pathway: A Practical Guide Classroom Training – 2 Day Course

Hartman Environmental Geoscience will be providing a comprehensive and practical training class in northern & southern California in February/March 2017. The course is open to all environmental professionals on how to understand and assess the vapor intrusion pathway. The course will also cover ramifications of the new ASTM Phase 1 Standard relating to the vapor encroachment condition in Phase 1 assessments.

The course is highly interactive with numerous class exercises from real sites and demonstrations of sampling methods. A draft topic outline follows this page. The course will include presentations by CA-DTSC staff on the agency's vapor intrusion guidance/policy and possibly also by regulatory staff from CA Waterboards.

Course Dates: Oakland: Tuesday February 28 & Wednesday March 1, 2017
Costa Mesa: Thursday March 2 & Friday March 3, 2017

Location: Venues to Be Announced

Pricing: Before February 1st: \$495 if by check; \$525 if by credit card (VISA) or PayPal
February 1st or after: \$595 if by check; \$625 if by credit card (VISA) or PayPal

Instructors: Dr. Blayne Hartman, Suzie Reed Nawikas and at least 2 additional instructors

Registration:

- By Check: Send e-mail to: blayne@hartmaneg.com or
Call Hartman Environmental Geoscience (858) 204-6170
- By Credit Card: Go to www.hartmaneg.com; CA VI Course Payment Page

Certificates of Course Attendance: Will be given for 13 hours of instruction

Want More Information? Contact Dr. Blayne Hartman at blayne@hartmaneg.com

TOPIC LIST/COURSE OUTLINE:

◆ OVERVIEW OF VAPOR INTRUSION

- What is it?
- Why do You Care About it?
- When Should You Care About It?
- At What Sites/Conditions Need You Care About It?

◆ REVIEW OF FEDERAL & STATE GUIDANCES

- EPA OSWER & EPA-OUST
- ITRC & ASTM
- Updates on CA VI Guidances by CA Regulatory Staff

◆ SOME KEY PRINCIPLES

- Units
- Partitioning (Henry's Constants & How to Use them).
- Transport Through the Vadose Zone (Diffusion & Advection)
- Site Conceptual Models
- Attenuation Factors. What are they? How to Use Them?
- Risk Basics

◆ METHODS TO ASSESS VAPOR INTRUSION

- Indoor Air Methods
- Groundwater Methods
- Modeling
- Supplemental & Unique Investigatory Tools

◆ SOIL GAS SAMPLING METHODS

- An Overview of Soil Gas Methods
- Details of Active Soil Gas Survey Sampling

◆ ANALYSIS METHODS

- Indoor Air Methods
- Soil Gas Methods
- Portable Field Meters

◆ MITIGATION

- A Review of the Various Methods
- Cost Effective System Design Considerations

◆ CASE HISTORIES

- Chlorinated Solvent Site
- Fuels Site

CALL FOR ARTICLES

SDAG invites members to submit articles on their current research or an interesting project they are working on for publication in the monthly newsletter. The article should be no more than 1 page in length. Photos are welcomed; too. Please submit articles to the SDAG secretary via email.

PHOTO OF THE MONTH

A few photos from the trip to the Coyote Mountains led by Ann-Bykerk Hoffman. If you have a photo you would like to share with SDAG, send them to secretary@sandiegogeologists.org and we'll get them put into the newsletter!



SDAG RESEARCH TOOL

SDAG RESEARCH TOOL - A comprehensive listing of all papers published by SDAG, whether as annual field trip guidebooks or special publications, is now available on our website. Entries are sorted by primary author, or chronologically by date of publication, from our first guidebook in 1972, up the San Luis Rey River in 2013, from Coast to Cactus in 2014, and finally over the edge to the Coyote Mountains in 2015. These can be accessed or downloaded as .pdf files. They are fully searchable in Adobe Reader or Acrobat, so if you are researching a topic, "tsunami" for example, you can search for that keyword. This listing will be updated as new books are published. Thanks to Greg Peterson and Hargis + Associates, Inc., for making this possible. See the links below:

<http://www.sandiegoeologists.org/SDAGPubsauthors.pdf>

<http://www.sandiegoeologists.org/SDAGPubschronological.pdf>

REQUEST for 2017 SDAG/SDGS and PUBLICATION SPONSORS

On behalf of the San Diego Geological Society, Inc. (SDGS), a public benefit 501(c)3 nonprofit educational corporation, we would like to request tax deductible Donations for our San Diego Association of Geologists (SDAG) group. The list of paid Sponsors and the forms to become a Sponsor are located on the SDAG web site at: <http://www.sandiegoeologists.org/Sponsors.html>.

Your donation will further the SDGS mission to promote geology and related fields in the greater San Diego region, operating through the San Diego Association of Geologists (SDAG), a committee of SDGS. To achieve our primary educational objective, we organize frequent field trips and maintain a program of monthly meetings featuring speakers on current geological topics. We also publish field trip guidebooks and other publications related to geology and natural history. We encourage scholarship and research by awarding scholarships from the elementary through graduate levels. With your \$100 "EMERALD" donation, your name/business will be listed as a sponsor on the SDAG web site (<http://www.sandiegoeologists.org/>) and in the monthly SDAG meeting newsletters. With your \$500 "RUBY" or \$1,000 or more "DIAMOND" level donation, your business card will also be included on the SDAG web site and in the monthly SDAG meeting newsletters. In addition, as a "\$1,000 or more DIAMOND" level donation you will be presented with a thank you plaque.

Should you have any questions regarding a Sponsorship, please contact our non-profit SDGS Secretary (Diane Murbach) at 619-865-4333.



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HYDROGEOLOGY • ENGINEERING

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We invite you to explore our website to learn more about our firm and the services we provide. We welcome the opportunity to discuss our consulting expertise directly with you.

Contact: **Dr. David R. Hargis**



Mobile Geochemistry Inc.

H&P Mobile Geochemistry is an industry-leading provider of environmental lab services. With ten mobile labs and five direct push sampling trucks and unparalleled experience, H&P's repertoire of environmental lab services includes many forms of environmental lab sampling techniques all the way to on site field analysis services. H&P has successfully and accurately performed environmental lab services delivering quality results to our clients for over 16 years.

2470 Impala Dr., Carlsbad, CA 92010
(800) 834-9888

Contact: **Louise Adams or Suzie Nawikas**



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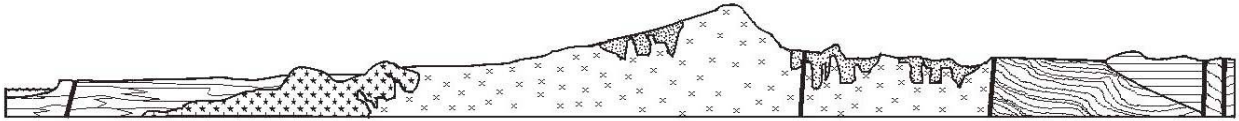


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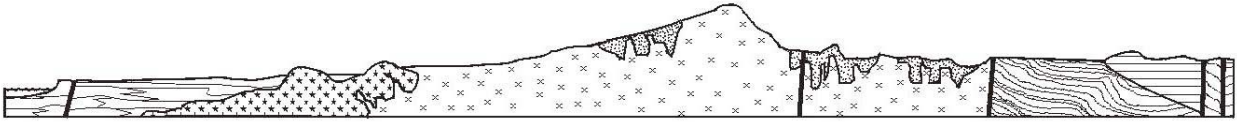
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