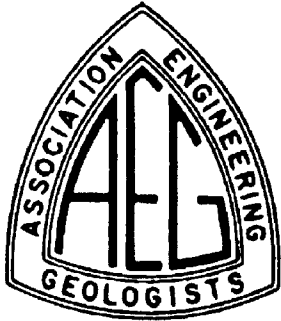


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Southern California Section

NEWSLETTER-August 1992

Dinner Meeting *Tuesday, August 11th*

- O The Quiet Cannon Restaurants
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- O Cost - \$20.00 (Full-Time Students - Free)
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- O 6:45 Dinner
- O 8:00 Program

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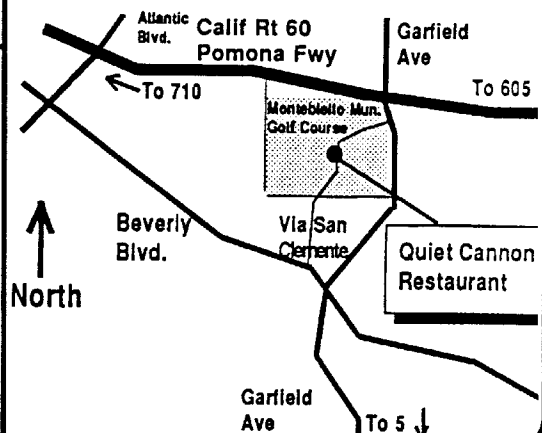
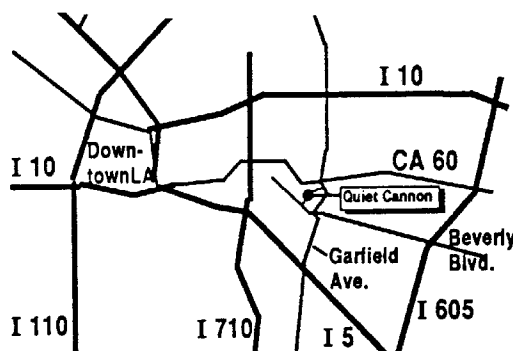
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Program

Soil-Gas Survey Guidelines and Implementation Issues

Phillip Chandler, R.G., R.Gp., C.E.G.
Senior Engineering Geologist
Regional Water Quality Control Board, LA Region

MAP to Meeting



PROGRAM

Topic & Speaker

Soil-Gas Survey Guidelines and Implementation Issues

Phillip Chandler, R.G., R.Gp., C.E.G.
California Regional Water Quality Control Board
(RWQCB), Los Angeles Region

Soil-Gas Surveys are currently being used in the San Fernando Valley and San Gabriel Valley Superfund areas as a tool for identifying and delineating volatile organic compounds in the vadose zone. Not only are these soil-gas surveys being used to screen sites for volatile compounds (VOC), but are also being used as a means to identify and delineate vapor plumes prior to design and installation of Vapor Extraction Systems (VES).

Soil-Gas survey techniques have been accepted by the EPA as a viable means for identification of VOC contaminants in the soil. Because of that acceptance, the RWQCB began using soil-gas surveys as screening tools for site investigations in the Superfund areas under investigation. This use, however, has evolved so that soil-gas sample collection and analytical techniques have been documented, evaluated, and re-instituted by the RWQCB. Formal guidelines were issued by the RWQCB in February 1992 as part of their Superfund Well Investigation Program (WIP). Mr. Chandler is one of the primary authors of the guidelines and will discuss the use of soil-gas surveys, the technical aspects of collection and analyses, and the implications for identifying soil and ground-water contamination using this method. A copy of the guidelines is included in this newsletter.

Mr. Chandler has over 20 years of experience in engineering geology. He has been with the RWQCB for 6 years and is currently a senior engineering geologist overseeing the San Gabriel Valley WIP. Mr. Chandler previously worked as a geophysicist at North American Rockwell and as an engineering geologist for Pacific Soils Engineering.

Pre-Dinner Topic and Speaker

Mr. Frank Denison, "Observations on Structural Features Related to Flexure Folding in the East Santa Monica Mountains"

DIBBLEE GEOLOGIC FOUNDATION PUBLISHES NEW GEOLOGIC MAPS

The Dibblee Geologic Foundation, a nonprofit organization, has just released eight contiguous geologic maps of areas in Los Angeles and Ventura Counties. These updated maps are based on recent field mapping and compilation by Tom Dibblee. Each map features a structural cross-section, a detailed legend, references, and sources of geology. The maps include the geology of important areas never before available at this scale.

The Topanga/Canoga Park S1/2 map (DF-35) details the structure and stratigraphy of the central Santa Monica Mountains. The Oat Mountain/Canoga Park N1/2 map (DF-36) includes the northwestern San Fernando Valley and the complex faulting and folding of the Santa Susana Mountains. The Calabasas quadrangle (DF-37) covers the westernmost San Fernando Valley, southern Simi Hills, and areas of rapid development along the Hwy 101 corridor. Four new quadrangle maps extend westward from Santa Susana (DF-38) and include Simi (DF-39), Moorpark (DF-40), Santa Paula (DF-41), and Saticoy (DF-42). These maps include important regional faults and folds, major oil fields, and areas undergoing rapid development.

The Dibblee Foundation is a nonprofit organization relying on sponsorship and support from municipalities, companies, and individuals. Major contributors are acknowledged in print on the maps. All proceeds from map sales go toward production of more maps. Maps are available from the Dibblee Foundation, c/o Mr. E.R. Blakley, 958 Isleta Avenue, Santa Barbara, CA 93109 (\$10 folded/\$12 rolled). They are also available over the counter or by mail from the Division of Mines and Geology, 107 S. Broadway, Rm. 1065, Los Angeles, CA 90012. Inquiries, please contact Helmut Ehrenspeck, Editor, (805) 968-0481.

Positions Available

Ads in this section are welcome at no cost.

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CHAIRMAN'S COLUMN

As the summer progresses we come closer to the annual classic fall event, the AEG National Meeting. As you know, it will be held at the Sheraton in Long Beach, October 3rd to the 9th. Plan to be there and get other interested professionals to plan to be there. The July AEG NEWS has copies of our registration forms. Call There will be excellent technical sessions, short courses, and field trips.

Special Field Trip to Landers

A special all-day field trip to interesting sites related to the recent Landers 7.5 Earthquake is now being planned for Friday, October 9th, the last weekday of the AEG meeting. (Surprise, Perry Ehlig, absent 1992 Long Beach Meeting field trip chairman.) This should be a unique experience you should not miss. It gives AEG members from across the country and around the world the opportunity to see damage done from this great quake, with the guidance from local geologists.

Many people have already gone to the area and have seen fascinating exposures and damage. The field trip is currently being organized and planned by our current Southern California Section Field Trip Chairman-Dave Ebersold (818) 889-0844, with significant help and leadership from Gary Rasmussen and Eldon Gath. Other participants for the field trip will include geologists from the Calif. Div. of Mines & Geology, Cal Tech, and the USGS. I may even go.

At the September 8th AEG meeting, at the Quiet Cannon Restaurant, pictures of damage in Lander's area will be discussed and presented in a slide show. This will probably be a preview of the field trip.

The AEG July joint meeting with the San Diego Association of Geologists was interesting regarding Jerry Kuhn's topic and it was worthwhile refreshing friendships with SDAG members. Well-known Dr. Frances Shepard from Scripps Inst. of Oceanography co-authored the study with Jerry: "Volcanic Eruptions and Historical Climate Change". Their abstract was reprinted in last month's newsletter. At the meeting, Jerry reviewed the California climate changes over the last 200 years and correlated them to known volcanic events.

The conclusions he reached are rather alarming and warrant additional research. He pointed out that his work was presented at the recent Chapman Conference, along with work from many other scientists. I quickly obtained a copy of the special report from this conference and briefly reviewed it. The following is some background on the conference, how to get a copy of the report, and the summary from the report reprinted here.

Volcanism & Climate Change - American Geophysical Union Special Report May 1992. The report is an outgrowth of research presented at the AGU Chapman Conference on Climate, Volcanism, and Global Change held March 23-27, 1992 in Hilo, Hawaii. The conference brought together a broad range of leading geophysicists in the atmospheric sciences, volcanology, petrology, and climate modeling. The Chapman Conference was convened by Stephen Self of the University of Hawaii and Richard P. Turco of UCLA. Copies can be obtained, at a cost of \$4.00. (VISA accepted) from the AGU publications office: (202) 939-3200 (FAX 202-328-0566).

Summary of 1992 Chapman Conference

One of the fundamental natural forces that acts upon climate-volcanism-helped to create the Earth's atmosphere and continues to modify it, including the planet's ozone layer. Both climate and ozone, so vital to life, are also being altered by human-generated chemical emissions. It is now clear that to understand how human activity is changing the Earth's environment—a vital concern of both the public and policy-makers—the complex, natural variations in the Earth's atmosphere and climate system must first be deciphered. When volcanic effects on climate and the atmosphere can be distinguished, global climate models will be better able to predict the impact of greenhouse gases on the atmosphere.

Major advances are being made in pinpointing the volcanic variables that make an eruption likely to affect the Earth's climate and atmosphere. New observations of the atmospheric effects from the 1991 eruption of Mt. Pinatubo in the Philippines, which produced the largest climate-modifying cloud since Krakatau erupted in Indonesia in 1883, are proving invaluable for studies of volcanism and climate. Climate modelers who seek to predict global change will soon learn how their predictions stack up against Pinatubo's actual effects.

Key findings emerging from studies of Pinatubo include the following:

Research underway on the climatic effects of Pinatubo suggests the greatest natural "forcing," or alteration, of the Earth's energy balance this century. Studies of Pinatubo are also providing an important check for climate models developed to predict global change resulting from greenhouse gases. Although results are preliminary, Pinatubo has apparently cooled the Earth for the time being—in agreement with forecasts of some models.

New studies, again particularly after Pinatubo, show that volcanic sulfur aerosols may also cause significant depletion of the ozone layer. Fresh evidence suggests that volcanic chlorine, a volatile that can deplete ozone, may actually be dissolved in water and rained out above the volcanic vent, or "scrubbed out" rapidly on ash particles, thus not staying for long in the upper atmosphere. It appears, rather, that sulfur aerosols—the same particle responsible for cooling the Earth's surface—can provide sites to accelerate ozone destruction by chlorine already put into the stratosphere by human activity.

Preliminary data reveal disturbing new evidence for ozone depletion after Pinatubo—a 15-25% loss at high latitudes (near the poles), with suggestions of a drop in ozone in the tropics and possibly also at temperate latitudes. These findings strongly suggest that ozone is being destroyed in the vicinity of volcanic aerosols, and they indicate an unexpected decrease at lower latitudes.

More general new insights into the effects of volcanism on climate include:

Studies contrasting the explosive but sulfur-poor eruption of Mount St. Helens, Washington (1980) to sulfur-rich Pinatubo and El Chichon, Mexico (1982) verify that the sulfur content of the eruptive cloud, and not dust or ash, is the essential volcanic variable responsible for altering climate, at least in explosive eruptions. Larger eruptions inject considerable sulfur dioxide into the stratosphere, leading to the formation of a sulfuric acid layer that blocks radiation and cools the Earth's surface.

Satellite measurements reveal that some recent eruptions have expelled twenty times or more sulfur to the atmosphere than studies of their sulfur-depleted deposits would suggest. Work is now concentrating on identifying the source of this "excess" climate-modifying sulfur.

Comparative studies of Pinatubo and other volcanoes show that tropical eruptions have greater potential to alter global climate than those at higher latitudes. In spring and fall, however, when air mixing between latitudes is stronger, high latitude eruptions could potentially have substantial climate impact.

Studies of volcanic debris of various kinds can clarify the roles of key variables in climate modification such as a magma's sulfur content, the style of eruption, and the character and movement of the volcanic cloud.

Investigations of less explosive but massive and prolonged eruptions of flood basalts in the past may also provide clues about how emissions of volatiles into the lower atmosphere, including human-generated greenhouse gases, alter climate.

To tie a past eruption to particular environmental effects, a more precise chronology is needed than can be constructed from radiometric dating of erupted rock and ash. Advances in using proxy records of past climate such as ice cores, tree rings, and even historical evidence are helping volcanologists to date past eruptions and reconstruct their climatic effects. In case of an event in 536 A.D., for example, which had profound effects on climate and life, narrow tree rings across different continents and historical records of widespread famine point to a major eruption in that year, although the volcano has never been identified.

Recent eruptions of greatly different magnitude have paradoxically cooled surface temperatures about the same extent—between 0.2-0.3°C globally and up to 0.5°C regionally. This indicates that the relationship between volcanic sulfur and climate is not simple of linear, complicating the extrapolation of climatic effects from modern eruptions to those of the past.

More research is needed across the boundaries between volcanology and climatology. Such studies should focus on pinpointing the source of climate-modifying sulfur in volcanoes, improving the measurements of volcanic plumes during eruptions, creating a better chronology of past eruptions, understanding the climatic effects of less violent but prolonged eruptions of flood basalts, and more precise modeling of the interactions between volcanic eruptions and climate. The climatic effects of Pinatubo should continue to be investigated through an organized and comprehensive research project, as part of ongoing global change studies of the Earth and its environment.

The July 1992 AEG meeting speaker, Mr. Jerry Kuhn, stressed some of the above concepts in his presentation. The focus of his talk was a prediction of the climatic changes that may take place this winter and perhaps next winter as a result of the sulfur emissions from Mt. Pinatubo. Specifically, Mr. Kuhn suggested that large storms in the Pacific may cause large seas off the California coastline, eroding sea cliffs, and potentially great rainfall events migrating onto land with associated floods. We can certainly use more rainfall in southern California, but it is currently very difficult to predict the weather patterns much farther than a month in advance. However, the conclusions from the recent Chapman Conference suggests concern over the potential for unusually large storms coming to the California coastline. We should at least have an infrastructure prepared to manage and withstand such events and to support additional near-term research on weather predictions.

Work Plan Requirements for Active Soil Gas Investigation

Well Investigation Program (WIP)

The objectives of these investigations are to: 1) evaluate potential waste discharges which may impact ground water, 2) determine variation and extent of soil contaminants, 3) establish vapor distribution for the design of vapor extraction system (VES), and 4) aid in determining the potential efficiency and appropriate design for any cleanup action, including VES. The work plan should include, but not be limited to, the following:

Survey Design (location, number, depth, data quality objectives)

1. Provide a scaled facility plot plan depicting potential source areas and proposed soil gas sample points. Include location and coordinate of identifiable geographic landmarks (i.e., street center-line, benchmark, street intersection or wells).
2. Locate soil gas sample points using 20-30 foot grid in potential source areas and no more than 100 foot grid for the rest of the site (coarse survey). Provide rationale for the number, location, and depth of sample points.
3. Conduct close interval (10-20 foot grid) multi-depth sampling (3 to 5 feet between points) in areas with known soil contaminants and where prior soil gas sampling has detected relatively high levels of VOCs at the site.
4. Real time analysis of samples allows for field modification of the sampling plan (for grid density, location, and depth) based upon test results. However, field adjustments are acceptable only if the decision-making criteria are included in the approved work plan and in consultation with Board staff.
5. If anomalous data (i.e., soil gas values 2 to 3 orders of magnitude different from trends indicated by surrounding samples) are obtained from a sample point, resample and reanalyze at that point.

Sample Collection

1. Obtain samples at an adequate depth (minimally 5 feet) below the ground surface to minimize atmospheric air interference.
2. Discuss techniques to determine optimal purge rates and volumes. Minimum purging (3 probe volumes maximum) is required so that the samples are representative of VOC levels in the formation around the probe tip. At the beginning of the survey, conduct a site-specific purge volume versus contaminant concentration test where VOC levels are expected to be highest, for major lithologic units or when significant pressure change is encountered to ensure that samples are representative of site conditions. Adjust purge rate and time to achieve optimal purge volume.
3. Explain the zone of influence for soil gas sample points, taking into consideration soil types, land cover, drive point construction, and sample purge time/rate/volume. The vertical zone of influence from soil gas purging and sampling must not intersect the ground surface.
4. Discuss procedures to minimize cross contamination between sample points.
5. Detail soil gas sample collection, handling, and testing procedures. Record the atmospheric pressure and evacuation pressure at which the sample is collected and the sample volume. Discuss procedures to prevent collection of samples under vacuum.
6. Select and specify soil gas sampling equipment (e.g., gas tight syringe) that will not affect sample integrity.

Sample Analysis

1. An on-site mobile laboratory with laboratory-grade certifiable instrumentation and procedures is required for real time analyses of individual VOCs. Non-specific portable organic vapor analyzers and/or GC-based handheld detectors may not be used for sample analysis.
2. Specify target compounds analysis list. Detection limits of 0.01 to 1.0 µg/l (soil gas) must be attained. Justify the use of higher detection limits.
3. Specify and justify time between sample collection and analysis.
4. Specify column characteristics, initial and final column temperatures, rate of column temperature increase per minute, calibration materials (liquid vs. gas sample) and sample flow rate employed in order to determine problems that may be associated with coeluting compounds. The chromatograms for calibration standards shall be included in the final report and provided to staff in the field for review to ensure that target compounds can be identified.
5. Provide QA/QC procedures essential for establishing support of analytical data. Include, at a minimum, field blanks, equipment blanks, initial and continuing checks, laboratory control standards, and sample replicates. Sampling equipment blank should be sampled from a contaminant-free source, if ambient air is not contaminant free.

Data Interpretation/Report of Findings

1. Methods to be used for data interpolation (contouring) must be detailed. At a minimum, where justified by the data, isoconcentration plots for each chlorinated volatile organic and aromatic hydrocarbon compound detected, and for total chlorinated volatile organics and for total aromatic hydrocarbons for each sampling depth must be presented in the final report. Provide cross-sections depicting the geology and changes in contaminant concentration with depth.
2. Data collected during field sampling and laboratory analyses must be compiled in tabular format and results are to be reported as mass/volume (i.e. µg/l).
3. Report all chromatographic peaks detected during the analyses run and any tentatively identified compounds.

Companion Soil Sampling

1. Conduct the soil sampling and VOC analyses per this Board's WIP WORK PLAN REQUIREMENTS for INITIAL SUBSURFACE INVESTIGATIONS.
2. Borehole locations and sampling intervals shall be based on soil gas survey results. Obtain discrete, undisturbed companion soil samples. Use a minimum 2-inch diameter sample tube.
3. Board staff must be part of the data review to determine companion soil sample locations and the need for additional soil/soil gas sampling.

**ANNUAL AEG MEETING 1992
WE NEED YOUR HELP!**

The committee is soliciting contributions from engineering geology and geotechnical consulting firms in the Southern California area. Three levels of sponsorship are planned: Gold - \$1,000 contribution, Silver - \$500 contribution, and Bronze - \$250 contribution. All sponsors will receive recognition in the section newsletter, the meeting bulletin, and posters at the meeting. Sponsors at the \$500 level will receive a framed, signed, numbered print of the artist gift which will be given to all registrants. Sponsors at the \$1,000 level will receive the signed print and special recognition at the awards dinner. We are happy to accept a contribution of any amount to help with fundings. And, if things get better, you can always up your contribution!

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***1992 ANNUAL AEG MEETING IN FINAL
PLANNING STAGES***

The 1992 Annual Meeting Committee is finalizing schedules and activities for the National AEG Meeting in October. There is still time and opportunity to promote attendance at this meeting. Cards announcing the National AEG Meeting are still available for inclusion in business correspondence to your clients, local vendors, and suppliers. These cards are provided by Rosenberg and Risinger and are available by calling Kim Corpus at (310) 397-6338. Donations are continuing to come in, but additional funds are still needed.

The 1992 Annual Meeting Chairman, Mr. John Byers and his various sub-committees have done an outstanding job in preparing field trips, proceeding publications, field-trip guidebooks, and meeting programs. There is still much to be done, so please provide your support to these volunteers in any way possible. Once more, let's make this 1992 Annual AEG Meeting the best annual meeting to date.

BOOK SALE

Association of Engineering Geologists, Southern California Section

- Blake, T., and Larson, R.A., Eds., 1991, Engineering Geology along the Simi-Santa Rosa fault system and adjacent areas. Simi Valley to Camarillo, Ventura County, California: Guidebook for the Southern California Section of the Association of Engineering Geologists Annual Field Trip, August 24, 1991, volumes 1 and 2, 383 pgs., 4 map sheets. **\$40.00**
- Buckley, C.I., and Larson, R.A., Eds., 1990, Geology and Engineering Geology of the western Soledad Basin, Los Angeles County, California: Guidebook for the Southern California Section of the Association of Engineering Geologists Annual Field Trip, November 3, 1990, 185 pgs., 2 map sheets. **\$25.00**
- Buesch, D., Ed., 1979, Geomorphic Applications in Engineering Geology: A State-of-the-Art Short Course: Short course held at California State University at Los Angeles, November 10-11, 1979, reprinted by the Southern California Section of the Association of Engineering Geologists, 145 pgs. **\$11.00**
- Byer, J.W., Ed., 1975, Sycamore Canyon Fault, Verdugo Fault, York Boulevard Fault, Raymond Fault, and Sierra Madre Fault Zone: Guidebook for the Southern California Section of the Association of Engineering Geologists Annual Field Trip, September 27, 1975, 68 pgs. **\$ 8.00**
- City of Los Angeles, 1982, Geologic Maps of the Santa Monica Mountains, Los Angeles, California: 333 map sheets at 1" = 400', compiled by the Bureau of Engineering, Department of Public Works, City of Los Angeles, reprinted by the Southern California Section of the Association of Engineering Geologists, 342 pgs. **\$26.00**

Books are available from: Joe Cota, Publications Chairman, AEG Southern California Section, c/o GeoSoils, Inc., 6634 Valjean Avenue, Van Nuys, California 91406, (818) 785-2158. Make checks payable to AEG Southern California Section. **Please add 8.25% sales tax and the following postage/handling charges:** \$2.50 for the first book and \$0.50 for each additional book.



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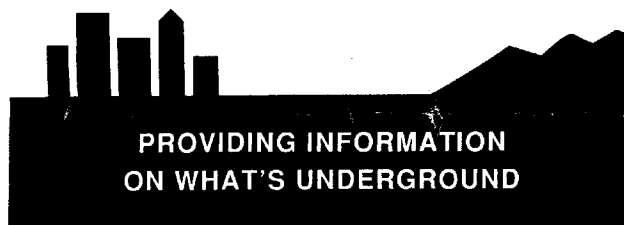
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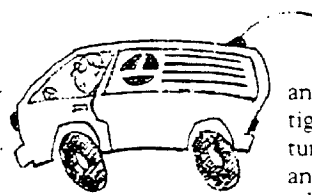
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17-20 Satellite Remote Sensing for Resource Management, Environmental Assessment, and Global Change Studies: Needs and Applications of Developing Countries, Boulder, CO. **CONTACT:** UN/ISY Conference, WT Chen & Company, Inc., 1745 Jefferson Davis Highway, Suite 500, Arlington, VA 22202.
30 Deadline for early registration for National AEG Meeting in Los Angeles.

SEPTEMBER 1992

16-18 Digital Geographical Information Systems, Washington D.C., Continuing Engineering Education Program, George Washington University, Washington D.C. 20052 Toll Free (800) 424-9973

OCTOBER 1992

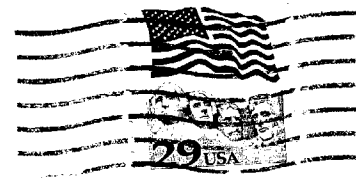
2-9 National AEG Meeting, Long Beach, California. "Engineering Geology into the 21st Century"
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9 Landers Earthquake Field Trip, Southern California Section, **CONTACT** Dave Ebersold, Field Trip Chairman (818) 889-0844

DECEMBER 1992

7-11 American Geophysical Union, Fall Meeting, San Francisco, California.

Kathleen R. Williams
 AEG Newsletter Editor
 c/o GeoResearch
 3960 Gilman Street
 Long Beach, CA 90815



Annual AEG Meeting in Long Beach OCTOBER 1992

S	S	M	T	W	T	F	S
3	4	5	6	7	8	9	10
Field Trips	Field Trips	Field Trips & Short Courses	Technical Sessions & Special Events			Field Trips & Short Courses	
			Optional Tour Programs				
			Exhibition & Poster Sessions				



FIRST CLASS POSTAGE

