

NORTHERN CALIFORNIA GEOLOGICAL SOCIETY



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MEETING ANNOUNCEMENT

DATE: Wednesday, November 16, 2005

LOCATION: Orinda Masonic Center, 9 Altarinda Rd., Orinda

TIME: 6:30 p.m. Social; 7:00 p.m. talk (no dinner) **Cost:**
\$5 per regular member; \$1 per student member

RESERVATIONS: Leave your name and phone number at 925-424-3669 or at danday94@pacbell.net before the meeting.

SPEAKER: *Dr. Eldridge Moores, Department of Geology, University of California, Davis*

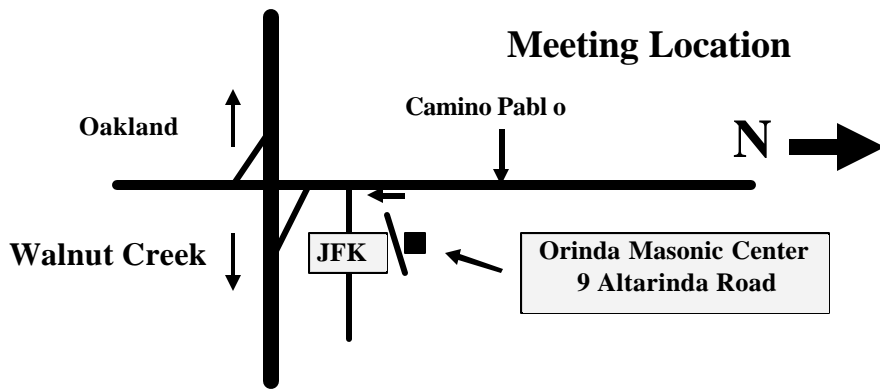
Earth and Space Sciences and California

In the past year there have been ample examples in California, the U.S., and the Indian Ocean of the need for Earth and Space Sciences (E&SS--including geology, geophysics, soil science, oceanography, astronomy, and atmospheric science) knowledge on the part of populations as a whole. Particularly in California, lying on a major complex plate boundary region, E & SS knowledge has a direct impact upon welfare of every resident.

For example, E&SS provide 1) good background for biology, chemistry, and physics, 2) are tangible and hook students into science; 3) are good for disadvantaged students; 4) are exciting and inspiring, with two revolutions (plate tectonics and planetary) to draw from in instruction; 5) are needed in CA for daily life (e.g. landslide, earthquake, volcanic, flood, water, aggregate, energy, health, soil issues). Furthermore, California has two major space science facilities--JPL and NASA-Ames, and the state has been and remains a major source of petroleum and other minerals.

The Earth and Space Sciences are a crucial part of K12 science education. The Council of Scientific Society Presidents, the AAAS, and the NRC (1996) National Science Education Standards all list E & SS on a co-equal basis with physical sciences (physics and chemistry) and life sciences (biology, etc.). Nevertheless, in contrast to states such as New York and North Carolina where virtually every high school student takes Earth Science, only about 10% of California high school students take college-eligible E&SS classes. There is reluctance in some circles to approve the E & SS as a 9-12 class satisfying university admission requirements for laboratory science. Many academics perceive of E&SS as being inferior to physics, chemistry and biology, despite the growing general need for such knowledge. There is still a perception on the part of some that science education needs to emphasize a reductionist approach, as exemplified by physics or chemistry, rather than the broad, holistic view of E&SS.

To win approval of E & SS as a laboratory science for admission to a University, as provided for in the NRC Standards, requires convincing both University faculty (mostly) and, to a lesser extent, administration of the desirability of such a move. A statewide mobilization of E & SS professionals and other interested people could help move this process along.



Biography: Eldridge Moores is Professor of Geology and author of several major books on the subject. He holds the Ph.D. from Princeton University (1963). The UC Davis website describes his research interests to include tectonics, structural geology and petrology; ophiolites of western U.S. and Tethyan belt, geology of Greece, Cyprus, and Pakistan; tectonic development of Sierra Nevada and Alpine--Himalayan systems. Recent projects have included geology and tectonics of the northern Sierra Nevada; processes of ophiolite emplacement; tectonics of spreading centers; late Precambrian correlations between Antarctica and North America (SWEAT); and late Precambrian environmental change. Dr. Moores was Vice President and President of the Geological Society of America in 1995 and 1996, respectively. He was editor of the journal *Geology* from 1982-1987, and is credited with turning the journal to a world-class publication. For this achievement, Dr. Moores was awarded one of the first GSA Distinguished Service Awards. Dr. Moores joined the Ocean Drilling Project Tectonics Panel in 1989 and became Chair the following year. Other honors include the 1994 Geological Association of Canada Medal and an honorary D.Sc. in 1997 from the College of Wooster. In 1991 Dr. Moores also proposed the SWEAT hypothesis, that Antarctica was the Neoproterozoic conjugate rift margin to western North America which has stimulated significant research in the Antarctica and generated many Late Proterozoic continental margin reconstructions. He additionally is a highly regarded populist and pundit, subject; for example, of the best selling book *Assembling California*, published in 1993 by the *New Yorker* writer John McPhee.

Northern California Geological Society
 c/o Mark Detterman
 3197 Cromwell Place
 Hayward, CA 94542-1209

Don't Forget to Renew!

Would you like to receive the NCGS newsletter by e-mail? If you are not already doing so, and would like to, please contact **Dan Day** at danday94@pacbell.net to sign up for this service.

NCGS 2005-2006 Calendar

Tuesday, November 15, 2005

Rebecca Latimer, Chevron Energy Technology Company **Distinguished Lecturer, AAPG**
Uses, Abuses, and Examples of Seismic-Derived Acoustic Impedance Data: What Does the Interpreter Need to Know?

1:00 pm at Chevron in San Ramon; Building: Bishop Ranch 1; Room 1240; Non-Chevron folk should contact Beverly Reynolds (phone (925) 842-2710 or beverlyreynolds@chevron.com) to request a visitor badge by Noon Monday November 11, 2005 (and pick them up in the Lobby in Building A).

Wednesday November 16, 2005

Watch the Early Date!!

Dr. Eldridge Moores, University of California, Davis
Future of Geological Education

7:00 pm at Orinda Masonic Center

As Usual - No December Meeting

Wednesday January 25, 2006

Sarah Andrews, Author, Em Hansen Forensic Geology Novels

The Mind of the Geologist

7:00 pm at Orinda Masonic Center

Wednesday February 22, 2006

Dr. Richard Buffler, University of Texas at Austin
Geologic Setting of the Abdur Archaeological Site on the Red Sea Coast of Eritrea, Africa

7:00 pm at Orinda Masonic Center

Wednesday March 29, 2006

Dr. Mary Lou Zoback, U.S. Geological Survey, Menlo Park

The 1906 Earthquake – Lessons Learned, Lessons Forgotten, and Looking Forward

7:00 pm at Orinda Masonic Center

Wednesday, April 26, 2006

Kathleen Burnham, Consultant
San Gregorio and Northern San Andreas Faults, Point Lobos to Point Reyes, CA

(This is a lead-in to the May 2006 field trip: *Point Lobos to Point Reyes: Evidence of ~180 km Offset of the San Gregorio & Northern San Andreas Faults*)

7:00 PM at Orinda Masonic Center

Wednesday May 31, 2006

Dr. George Brimhall, UC Berkeley

A History of Field Geology at UC Berkeley, and Issues Facing Field Geology Training Programs Today

(This is a lead-in to field trip in September 2006: *Field Geological Mapping Using Modern Technology*)

7:00 PM at Orinda Masonic Center

Wednesday June 28, 2006

Robert Kayen, US Geological Survey

Title TBA

7:00 pm at Orinda Masonic Center

Wednesday September 27, 2006

Dr. Doris Sloan, University of California, Berkeley
Dr. John Karachewski, Weiss Associates
Slide Show Lead-in to Book Publication (*Geology of the San Francisco Bay Region*, UC Press;
(<http://www.ucpress.edu/books/pages/9237.html>))

Wednesday October 25, 2006

Dr. Richard Stanley, **Dr. Russell Graymer**, **Dr. Carl M. Wentworth**, U.S. Geological Survey, Menlo Park

Subsurface geology, hydrology, basin evolution, and climatic cyclicity of the Santa Clara Valley area, CA/Fault and bedrock mapping from Sonoma into northernmost Contra Costa counties, CA (Title TBA)

7:00 pm at Orinda Masonic Center

Upcoming NCGS Field Trips

November 12, 2005

Coastal Cliffs and Landslides

Dr. Monty Hampton, Emeritus, U.S. Geological Survey

See Attached Field Trip Flyer

September 2006

Field Geological Mapping Using Modern Technology

Dr. George Brimhall, U.C. Berkeley

October 2006

TBA

Dr. Rolfe Erickson, Emeritus, Sonoma State University

For questions regarding these field trips, please contact Tridib Guha at: tridibguha@sbcglobal.net

1906 Earthquake Centennial

The *Northern California Geological Society* will be participating in the centennial observance of the San Francisco 1906 Earthquake. We are currently finalizing our contributions to the observance and the events will be posted to the website of the **1906 Earthquake Centennial Alliance** (as well as the NCGS website!). The full set of events range from professional meetings, an SSA professional conference, multiple museum exhibits, as well as commissioned music to be played by the Contra Costa Wind Symphony, (and much more). Please visit the website if you have not done so to see what is planned by the alliance:

<http://www.06centennial.org/>

NCGS Centennial Events

March 2006

Field Trip - A Walk Along The Old Bay Margin in Downtown San Francisco - Tracing The Events of The 1906 Earthquake and Fire, Dr. Ray Sullivan, Emeritus, San Francisco State University

March 29, 2006

Monthly Meeting - The 1906 Earthquake - Lessons Learned, Lessons Forgotten, and Looking Forward, Dr. Mary Lou Zoback, U.S. Geological Survey, Menlo Park

April 2006

Family Field Trip - Tracing the Hayward Fault - A Potential Disaster Area, Dr. Joyce Blueford and Others, Fremont Math Science Nucleus and California Geological Survey, respectively

April 26, 2006,

Monthly Meeting - San Gregorio and Northern San Andreas Faults, Point Lobos to Point Reyes, CA Kathleen Burnham, Consultant

May 20 – 21, 2006

Field Trip - Point Lobos to Point Reyes: Evidence of ~180 km Offset of the San Gregorio & Northern San Andreas Faults, Kathleen Burnham, Consultant

NCGS Scholarship Awards Year 2005 – 2006

The Northern California Geological Society is pleased to announce the availability of three scholarship awards for the 2005-2006 academic year:

Undergraduate Scholarship Award of \$500

For candidates working toward completion of a senior thesis or honors research program; Funding is provided for projects implemented during the 2006 calendar year. *Application deadline is November 11, 2005 for a December 2, 2005 award date*

Graduate Scholarship Award (MS Degree) of \$750

Graduate Scholarship Award (PhD Degree) of \$1,000
For candidates working toward the MS or PhD degrees; Funding is provided for projects implemented during the 2006 calendar year. *Application deadline is January 31, 2006 for a February 28, 2006 award date*

Individual scholarship announcements with instructions can be requested from and proposals submitted to:

Phillip Garbutt

Chair, NCGS Scholarship Committee
6372 Boone Drive
Castro Valley, CA 94552-5077
Voice: (510) 885-3440 or (510) 581-9098 (evening)
Fax: (510) 885-2526
E-mail: phillip.garbutt@csueastbay.edu

Funding priority will be directed to research programs focused on topics in mapping, structural, stratigraphic, economic, engineering or environmental geology, geophysics, stratigraphic paleontology, or paleoecology, implemented within the State of California or immediately adjacent western states. Funds are intended to support field and laboratory components of research programs. Candidates will be evaluated based on submission of a cover letter requesting the award, a brief (no more than 2 page) summary of the proposed research topic, and a faculty signature confirming departmental approval of the application. Winners will be invited to

speak or otherwise present their research at a regular evening NCGS meeting in Orinda, California.

Northern California Geological Society and the American Association of Petroleum Geologists

K-12 Earth Science Teacher of the Year Award

\$750 Northern California Geological Society
\$500 Pacific Section AAPG
\$5,000 National AAPG

Call for Nominations for the Year 2006 NCGS Competition

The Northern California Geological Society (NCGS) is pleased to announce that it will accept applications from candidates in the Northern California region for the Year 2006 competition for the Earth Science Teacher of the Year Award. The \$750 NCGS award is intended to recognize pre-college earth science programs already in place, and to encourage their organization in districts where they have not been fully developed. Nominations of qualified K-12 teacher candidates are solicited from teachers, school administrators, teacher outreach programs, and other interested parties.

The NCGS awardee's application will be submitted to a regional competition sponsored by the American Association of Petroleum Geologists (AAPG) Pacific Section. The Pacific Section winner will receive a \$500 award at the Pacific Section regional meeting in Anchorage, Alaska in May, 2006, plus up to \$250 toward meeting expenses. The regional winner's project will be submitted to AAPG headquarters for the national contest. The national winner will receive an expense-paid trip to Long Beach in 2007 to attend the national meeting and receive the award.

At the national level, the AAPG Foundation presents an annual \$5,000 award to a K-12 teacher for *Excellence in the Teaching of Natural Resources in the Earth Sciences*. The award recognizes balanced incorporation of natural resource extraction and environmental sustainability concepts in pre-college Earth science curricula. It includes \$2,500 to the teacher's school for the winning teacher's use, and \$2,500 for the teacher's personal use. The award will be given at the April 2007 AAPG Annual Meeting in Long Beach, California.

The deadline for application submittal by candidates for the \$750 NCGS award is Friday, February 17, 2006.

Interested candidates or nominators can request Application Information and an Entrant Application Form, or submit an application, by contacting:

**John Stockwell, Chair, K-12 Geoscience Education
Committee**
Northern California Geological Society
1807 San Lorenzo Avenue
Berkeley, California 94707-1840
Tel: (510) 526-1646
e-mail: kugeln@msn.com

Northern California Geological Society K-12 Geoscience Teaching Award

\$500 Northern California Geological Society

Call for Applications for the Year 2005 - 2006 NCGS Competition

The Northern California Geological Society (NCGS) invites applications from candidates in the Northern California region for the Year 2005-2006 competition for the K-12 Geoscience Teaching Award. Applications may be submitted by any teacher regardless of experience.

Applications reflecting teaching of units addressed to any of the earth or environmental sciences, including but not limited to mineralogy, petrology, economic geology, geomorphology, paleontology, hydrology, and planetary geology are invited from physical science, earth science, and geology teachers.

The deadline for application submittal by candidates for the \$500 NCGS award is Monday, January 16, 2006.

The winner will receive a \$500 award at a Northern California Geological Society meeting in Orinda in late January, 2006.

Interested candidates can request Application Information and an Entrant Application Form or submit an application by contacting:

**John Stockwell, Chair, NCGS K-12 Geoscience
Education Committee**
1807 San Lorenzo Avenue
Berkeley, California 94707-1840
Tel: (510) 526-1646
e-mail: kugeln@msn.com

USGS Introduces New 3D Seismic Velocity Model for the San Francisco Bay Area

Slightly Modified from a USGS Press Release

Sixteen years ago, on October 17, 1989, the largest earthquake since 1906 shook Bay Area communities from Santa Cruz to San Francisco. The magnitude 6.9 Loma Prieta earthquake, whose epicenter was 50 miles from San Francisco, nevertheless created \$10 billion in damage and killed 63 people.

The U.S. Geological Survey and their partners have made significant advances since 1989 in their efforts to mitigate loss of life and property. These include real-time monitoring networks, scientific research, and state-of-the-art mapping products to better understand and characterize the many complex interactions that contribute to damaging earthquakes in the San Francisco Bay Region.

On October 13, 2005 the USGS released a new tool in these efforts, a 3D computer model of the upper 20 miles of the earth's crust in the greater San Francisco Bay Area that will enable researchers to recreate the shaking levels of past and future earthquakes.

The 3D computer model combines 100 years of surface geologic mapping with decades of research into the seismic properties of the rocks in the Bay Area. It is also based on information from boreholes and variations in the earth's gravity and magnetic fields. It is a "fault and block" model—that is, the upper 15-20 miles of the earth's crust has been broken up into irregular shaped blocks, bounded by faults. Including the faults in the subsurface provides key information, since seismic waves can reflect (bounce) off faults or can bend and be focused in certain directions as they cross faults.

"We expect this new 3D model to revolutionize our ability to forecast the location of 'hotspots' – where shaking occurs most intensely – throughout the Bay Area," said Tom Brocher, USGS seismologist and co-developer of the model.

Previous studies by the USGS and others have shown that the subsurface structure of the earth significantly influences how strongly an earthquake is felt locally, as well as the duration of the shaking. For example: the Cypress Structure, the freeway approach to the Bay Bridge from Oakland, collapsed during the Loma Prieta

earthquake, killing 42 people. At least two properties of the earth's crust conspired to cause this collapse—it was built on loose soils that shook much more strongly than surrounding regions on stronger ground, and variations in the thickness of the earth's crust between the epicenter of the Loma Prieta earthquake in the Santa Cruz Mountains and Oakland actually focused energy toward Oakland and downtown San Francisco.

"The new 3D model is a result of the long and productive collaboration between the California Geological Survey and USGS," said state Geologist John Parrish. "Its usefulness will be to test and predict the intensity and effects of shaking in future earthquakes and to build safer structures. This will be cost saving and life-saving for residents of the Bay Area, now and in the future."

The model also includes the subsurface shape, depth, and properties of basins that underlie the Santa Clara, Livermore, and Santa Rosa Valleys. The soft sediments in the basins trap seismic energy and greatly enhance shaking levels relative to surrounding regions. The 3D model incorporates geological knowledge in fine subsurface detail.

"The 3D velocity model will provide a much more detailed definition of the intensity of shaking, site by site," said Chris Poland, President of Degenkolb Engineers. "There are hundreds of billions of dollars of new construction each year in high seismic regions. The more we can design for the proper amount of strength and durability, the more we can achieve cost efficiencies, perhaps in the billions, while giving people greater safety during a large, damaging earthquake."

Efforts are underway to calibrate the model to reproduce ground shaking measured by seismographs in the 1989 Loma Prieta earthquake. For the centennial commemoration in 2006, year, the model will be used to simulate the ground shaking produced by the 1906 San Francisco earthquake as well as other potential damaging Bay Area earthquake scenarios.

Important applications of the new model include:

- forecasting strong ground motions that may damage buildings and essential infrastructure or destroy levees in the Sacramento Delta and predicting where destructive liquefaction of the ground may occur
- modeling permanent ground deformation produced by earthquakes (including ground subsidence that could cause flooding)
- locating earthquakes more accurately

USGS developers of the new model are Thomas Brocher, Robert Jachens, Russell Graymer, Carl Wentworth, Bradley Aagaard, and Robert Simpson. For more information about the 3D Bay Area model and some example images derived from it, visit the following web page:

<http://quake.wr.usgs.gov/research/3Dgeologic/>

An Evening with the Boy Paleontologists **Friday December 2, 2005, 6 – 9 pm**

A Fund Raiser for the *Wes Gordon Fossil Hall*
Highlighting the Ice Age Mammals of Irvington,
Fremont, California
Donation: \$150 per person

Wes Gordon and his **boy paleontologists** were noted throughout the United States in the 1940's. A band of boys ranging in age from 7 to 13 unearthed one of the best preserved fossil sites in North America. Fossils from the Irvington District created such an international event, that a section of time was honored as the Irvington Stage (1.8 – 0.3 million years ago).

This collection is currently managed by the Math Science Nucleus, a nonprofit organization, so that young students in the Fremont area can enjoy and learn from the collection. The Math Science Nucleus will be unveiling plans for a new museum at the current site so that this amazing collection can be kept locally and be shown with other science exhibits for public enjoyment and education. Please join the Math Science Nucleus on December 2, 2005, to meet **boy paleontologists Phil Gordon** and **William Charles**, to hear them recount their stories, to help raise funds for the new museum, and discover the geologic history of Fremont.

For more information please contact **Joyce Blueford** at blueford@msnucleus.org or go to their website at <http://msnucleus.org>. A map is also posted there.

PACIFIC NORTHWEST NATIONAL LABORATORY **ENVIRONMENTAL TECHNOLOGY DIRECTORATE**

Senior Scientist Employment Opportunities

Scientist IV/V: The Applied Geology and Geochemistry Group at the Pacific Northwest National Laboratory is seeking an exceptionally qualified geologist with strong field experience. The successful candidate will lead a highly diverse technical team in the development of novel high-pressure experimental systems. These innovative systems will be used for physicochemical property studies of supercritical

CO₂ rock water structures. Other applications will include analytical techniques for data interpretation, as well as utilization of geochemical and reservoir simulation codes for modeling geological storage of CO₂. This position will incorporate the following strengths:

- Extensive use of geophysical tools, deep well drilling and advanced well logging tools
- Excellent communication skills for team interactions, technical presentations, client interactions
- Technical writing skills for generating reports and peer reviewed journal articles
- Strong record of scientific publications, associated with subsurface science investigations and/or resource characterization
- Strong track record of accomplishments in working with private industry and the U.S. government
- Ability to develop contract research projects directly with industrial and government clients
- Ability to win competitive research proposals to build programs associated with carbon sequestration

Scientist V: The Applied Geology and Geochemistry Group at the Pacific Northwest National Laboratory is seeking a highly qualified individual, who has developed a strong relationship with numerous industrial parties within the energy market. The successful incumbent will lead a highly diverse technical team in the application of novel experimental systems. These systems will focus on analytical techniques, as well as utilization of geochemical codes to interpret empirical data. In addition, the incumbent will research new techniques to advance group capabilities. This position will incorporate the following strengths:

- Excellent communication skills for team interactions, technical presentations, client interactions
- Technical writing skills for generating reports and peer reviewed journal articles
- Strong track record of accomplishments in working with private industry and the U.S. government
- Ability to develop contract research projects directly with industrial and government clients
- Ability to win competitive research proposals to build programs associated with subsurface monitoring of carbon dioxide related to geological sequestration.

Key Requirements:

Level 4: Ph.D. in Geochemistry, Geology, Geophysics, Hydrology, Environmental Science or Engineering, Petroleum Engineering, or related Geosciences degree with a minimum of 6 years of experience.

Level 5: Ph.D. in Geochemistry, Geology, Geophysics, Hydrology, Environmental Science or Engineering, Petroleum Engineering, or related Geosciences degree with a minimum of 10 years of experience.

If you have an interest in these positions, please send your resume directly to Senior Staffing Specialist Robin Fielder @ robin.fielder@pnl.gov, reference number 107349 and 107349, respectively. For more information about PNNL go to www.pnl.gov.

NORTHERN CALIFORNIA GEOLOGICAL SOCIETY



NCGS FIELD TRIP

COASTAL CLIFFS-LANDSLIDES AND URBAN DEVELOPMENTS

Saturday November 12, 2005

Leaders:

Monty Hampton (retired USGS), Orville Magoon (retired Corps of Engineers), Lesley Ewing (California Coastal Commission), Tom Kendall (Corps of Engineers), Raymond Sullivan (retired SFSU) & others

The trip will begin at Ocean Beach (9 am) and end at Half Moon Bay (late afternoon).

Stop 1: North end of Ocean Beach (parking lot across from the end of Balboa Street) to discuss the history of the beach (beach fill, O'Shaughnessy seawall) and sediment dynamics. Stop 2: South end of Ocean Beach; Hot-spot erosion, threat to Westside treatment plant and Great Highway; engineering solutions. Stop 3: Ft. Funston or Thornton Beach: Large-scale landsliding. Stop 4: Mussel Rock: Subject to be determined by Ray Sullivan. Stop 5: Esplanade Beach: Coastal cliff erosion. **Discussion of Devil's Slide south of Pacifica. No stop, but observe during transit.**

Stop 6: (tentative) Moss Beach: Large-scale coastal landsliding. Stop 7: Princeton Harbor: History of the breakwater; coastal erosion. This itinerary is subject to change.

THIS FIELD TRIP WILL BE LIMITED TO 40 PEOPLE. CARPOOL/VANPOOL IS A MUST

***** **Field Trip Logistics** *****

Time & Departure: Saturday November 12, 2005, 8:30 am (sharp), gathering place TBA.

Cost: \$30/person for both members & non-members

*******REGISTRATION FORM (Coastal Cliffs-Landslides Field Trip)*******

Name: _____ E-mail: _____

Address: _____ Phone (day): _____ Phone (evening): _____

Lunch: Regular: _____ Vegetarian: _____ (Please check one) Check Amount: _____

Please mail a check made out to NCGS to: **Tridib Guha**
5016 Gloucester Lane,
Martinez, CA 94553

Questions: e-mail: tridibguha@sbcglobal.net Phone: (925) 370-0685 (evening - PREFERRED) (925) 363-1999 (day - emergency)
People who are willing to drive their car or SUV please indicate NCGS will pay for fuel cost.