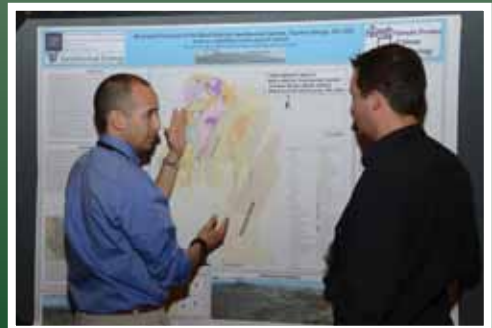




Geothermal Energy

Here and Now: Sustainable, Clean, Flexible



40th GRC Annual Meeting & GEA GEOEXPO+

October 23 - 26, 2016
Sacramento Convention Center
Sacramento, California • USA

PRELIMINARY PROGRAM



GRC Annual Meeting & GEA Expo

The official GRC Annual Meeting & GEA Expo application is available for download to iOS and Android devices. This app has everything you need to navigate your way through the upcoming event! Install it to have full access to the detailed guide and social functionality.

Scan to Download:



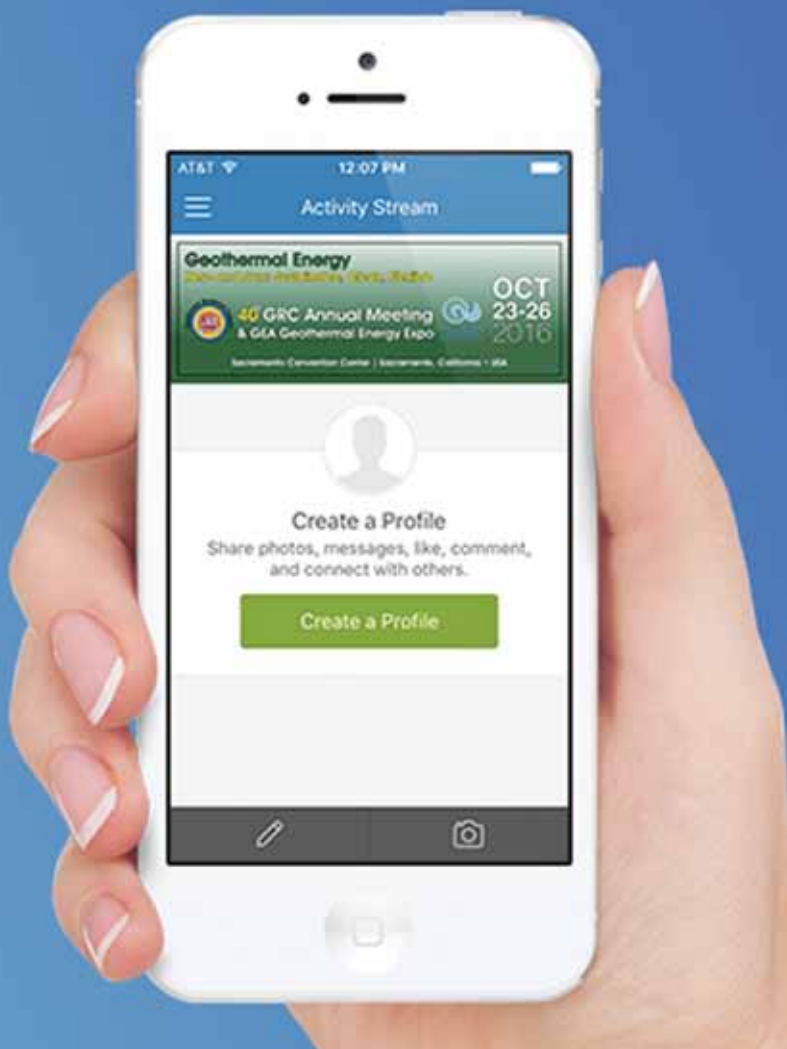
Search in markets:



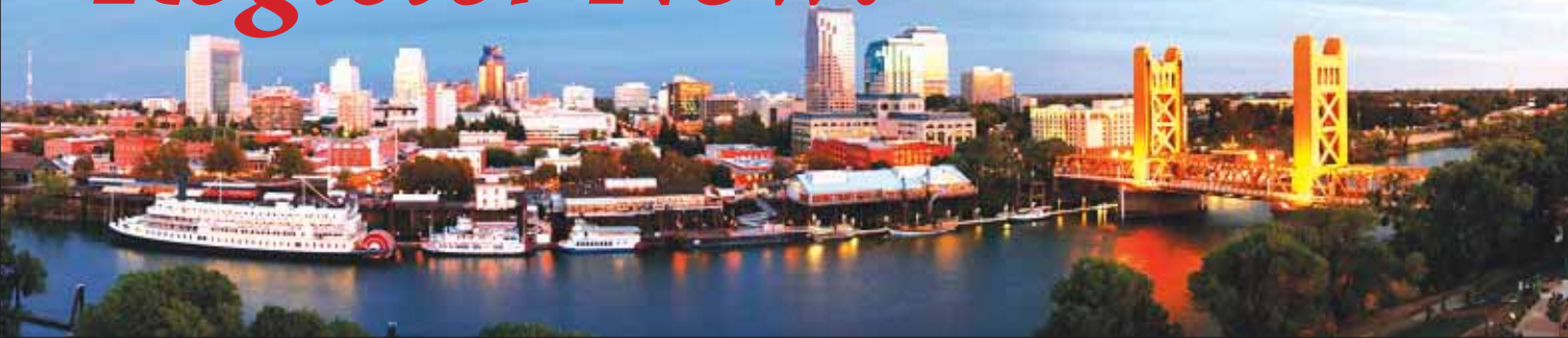
GRC Annual Meeting & GEA Expo



GRC Annual Meeting & GEA Expo



Register Now!



The Sacramento skyline at dusk COURTESY SACRAMENTO CONVENTION & VISITORS BUREAU

Join Us in Sacramento, California! "The city of trees"

The GRC Annual Meeting and GEA GEOEXPO+ promises to be the biggest geothermal energy event of the year. Don't miss it.

Connect for the latest news and event information on GRC's website
www.geothermal.org

Registration Now Open

REGISTER ONLINE AT: www.geothermal.org

Register by September 23 and save up to \$200

GRC Annual Meeting & GEA GEOEXPO+ features:

GRC Workshops

- Conceptual Models of Geothermal Systems (2-days)
- Reservoir Stimulation (2-days)
- Best Practices in Operations & Maintenance (1-day)
- Geothermal 101 (1-hour special workshop open to the public)

GRC Fieldtrips

- CAISO: Managing the Golden State's Electrical Grid (½ Day - Pre-meeting)
- Recharging The Geysers (2 Day - Pre-meeting)
- Recharging The Geysers (1 Days - Pre-meeting)
- EGS in The Geysers (1 Day - Post-meeting)

GRC Annual Charity Golf Tournament

GRC Opening Session

GRC/GEA Opening Reception

GEA GEOEXPO+

GRC International Luncheon

GRC International Session

GRC Technical Sessions

GRC Student Networking Reception

GRC Mixer

GRC Poster Session and GEA Expo Networking Reception

GRC Membership Meeting & Awards Luncheon



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Scan to download the Event App

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Geothermal Energy

Here and Now: Sustainable, Clean, Flexible

OCT
23-26
2016



40th GRC Annual Meeting & GEA GEOEXPO+



Sacramento Convention Center | Sacramento, California • USA

The Geothermal Resources Council (GRC) invites you to be part of the biggest annual geothermal conference and expo in the world.

Promoting "Geothermal Energy Here and Now: Sustainable, Clean, Flexible," the 2016 GRC Annual Meeting & GEA GEOEXPO+ will be held October 23-26 at the Sacramento Convention Center, Sacramento, California, USA.

In 1977, the 5-year old Geothermal Resources Council held its first Annual Meeting at the Royal Inn of the Wharf, San Diego, California. Over the years the GRC has also held the event in Hawaii, Nevada, Utah, Texas, Oregon, and even one memorable meeting in Morelia, Mexico. In 1998, the GRC asked the Geothermal Energy Association (GEA) to manage the trade show. Over the decades, the GRC Annual Meeting & GEA Expo has grown into the largest annual geothermal meeting in the world, regularly attracting well over 1,000 attendees and over 100 exhibitors from around the world.

California Las Vegas, Texas, Reno, Morelia, Mexico, Santa Fe, Portland, Reno, Kailua-Kona, Lake City, Diego, Vegas, Hawaii, Indian, Oregon, Houston, Sacramento, Nevada, Mich, San

The GRC Annual Meeting has been held most often in California.

The GRC Annual Meeting, now in its 40th year, was created for the fellowship of the leading voices and minds of the geothermal industry from every corner of the globe. Designed to encourage networking, business and educational opportunities for all attendees, the meeting is a technological showcase of the latest geothermal research, exploration, development and utilization.

Here are some of the highlights:

In addition to the main event of the GRC Annual Meeting & GEA GEOEXPO+, there will be three workshops and three fieldtrips before the conference, a special Geothermal 101 workshop on the last day of the event and another fieldtrip just after.

Two pre-event geothermal workshops will be held over two days. *Conceptual Models of Geothermal Systems* and *Reservoir Stimulation* will take place on October 21 and 22, before the start of the main geothermal event. A one day *Operations & Maintenance* workshop will be held on Sunday, October 23. The presentations will be given by experts from private industry, national laboratories and universities, and should prove valuable

for anyone interested in learning about the latest exciting developments in geothermal energy.

In addition, there will be three pre-event fieldtrips and one post-meeting fieldtrip. There will be three fieldtrips to The Geysers, the largest geothermal field in the world. A one-day and an extended two-day trip will see how the area has recovered from a devastating wildfire that caused infrastructure damage and some loss of life in September 2015. The fieldtrips will also look at how the geothermal reservoir beneath The Geysers has been recharged using wastewater from neighboring communities. Another post-meeting one-day fieldtrip will visit Calpine's EGS field demonstration project. There will also be a half-day trip to the headquarters of the California Independent System Operator (CAISO) the manager of the Golden State's electrical grid in nearby Folsom.

On Sunday, the annual GRC Charity Golf Tournament will be held at the William Land golf course, just three miles from the Sacramento Convention Center. Proceeds from the tournament will go to the GRC Scholarship Fund. Registration is now open for this popular networking event.

Back at the Sacramento Convention Center, the GRC and the GEA will host the big kick-off to the event with an Opening Reception on Sunday night and over the following days the GRC will host an Opening Session, Technical Sessions, a Poster Session, a GRC social event, an International Luncheon and Session, a Leadership Reception for students, the Annual Membership Meeting and Awards Luncheon, and a showcase of the GRC Amateur Photo Contest winners.

The GRC Annual Meeting will feature distinguished keynote speakers from around the world at its Monday Opening Session. More than 130 papers have been accepted for the Technical Sessions. Over 40 hours of presentations are offered.

An important part of the event, the GEA's GEOEXPO+ hosts North America's largest gathering of vendors providing support for geothermal resource exploration, characterization, development, production and management. *Entry to the trade show is free with GRC Annual Meeting registration.*

With GRC's strong track record of bringing together the people and issues most relevant in the industry, attendees will find tremendous value in the GRC Annual Meeting & GEA GEOEXPO+.

For more information visit our website at www.geothermal.org or call (530) 758-2360

SACRAMENTO

> DISCOVER MORE ABOUT WHAT THERE IS TO DO IN SACRAMENTO AT VISITSACRAMENTO.COM



A Special Thanks to Our Sponsors & Contributors

The success of the Geothermal Resources Council Annual Meeting depends on the generous sponsorships and contributors of corporate and individual members. The GRC would like to thank the following for their generous support.



GRC Mobile App
Poster Session Printing
Student Poster Awards



Poster Session
GRC Mixer
WinG Reception
Student Networking Reception



Neck Wallets



Audio Visual
Abstracts & List of Attendees
General Contribution



Opening Reception
International Luncheon



GRC Mixer



GRC Mixer



GRC Mixer



International Luncheon



GRC Mixer

A complete list will be posted at the Annual Meeting, in the event's *Final Program*, and in the November/December issue of the *GRC Bulletin*. If you would like to make a contribution to the GRC 2016 Annual Meeting, please contact Estela Smith at (530) 758-2360 or E-mail at grc@geothermal.org. We are still accepting sponsorships and contributions!

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GRC 2016 Schedule of Events

GRC Workshops

FRIDAY & SATURDAY, OCTOBER 21 & 22

Conceptual Models of Geothermal Systems

Sacramento Convention Center-Room 313, 8am - 5pm
Cost: \$525 (Member), \$575 (Non-member), \$150 (Student)

Speakers and coaches include: *William Cumming*, Independent Consultant; *John Murphy*, Geothermal Science; *Glenn Melosh*, Independent Consultant; *Elisabeth Easley*, Thermochem; *Peter Stelling*, Western Washington University; *Max Wilmarth*, Geologica; *Dick Benoit*, Independent Consultant; *Richard Gunderson*, Chevron.

Best practice publications in the geothermal industry emphasize building geothermal resource conceptual models as the basis for well targeting and resource capacity assessments at all stages of exploration and development. This workshop is directed at geoscientists, engineers and managers who wish to better appreciate how conventional (non-EGS) geothermal conceptual models are constructed and how they are used to support resource decisions.

Lectures will include:

- an introduction to the components of volcanic and deep-circulation geothermal conceptual models and their use in geothermal resource decision-making;
- the thermodynamics of fluid flow in rock, permeability, natural state isotherms and the practical implications of well tests for conceptual model hypotheses;
- geological and structural constraints on >230°C volcanic geothermal conceptual models; geological and structural constraints on <180°C deep-circulation geothermal conceptual models;
- geochemistry constraints on geothermal conceptual models;
- geophysical constraints on volcano- and sediment-hosted geothermal conceptual models; and
- the power density approach to geothermal resource capacity estimation supported by conceptual models.

Interspersed with the lectures are exercises where participants will:

- evaluate real geoscience data;
- build an initial range of resource conceptual models;
- use the models to complete well target and resource capacity risk assessments;
- interpret initial drilling results;
- update conceptual models and resource assessments based on the well results;
- design an appraisal drilling program; and
- propose a power plant capacity and development well program.

This workshop will be supported by geoscientists whose collective experience includes building and revising conceptual models for a majority of the world's developed geothermal fields and 100s of conventional geothermal prospects of all types. The lecturers have provided conceptual model training for geothermal developers worldwide.

Exercises will be done in small groups encouraged to take advantage of complementary skills and sufficient expert coaches will be available to guarantee effective progress regardless of participants' backgrounds. **Simple Excel decision risk analysis tools will be provided to support the exercises, so participants should bring a laptop.** At the completion of this workshop, participants should expect to understand the basic components and construction of a geothermal resource conceptual model, the rationale for its use in well targeting and capacity assessment, and its strengths and weaknesses relative to alternative approaches.

Reservoir Stimulation

Recent Field Practices, Monitoring Techniques and Theoretical/Laboratory Investigations

Hyatt Regency-Carmel Room AB, 8am - 5pm
Cost: \$550 (Member), \$595 (Non-member), \$150 (Student)

Presented by: *Ahmad Ghassemi*, University of Oklahoma; *Sabodh Garg*, Program Manager - Resource Technology at Leidos.

The purpose of the Reservoir Stimulation workshop is to provide a platform for in-depth review and discussion of recent EGS field experiences and to provide the attendees a good knowledge regarding recent advances in monitoring technologies and advances in theoretical, laboratory and numerical modeling pertaining to reservoir stimulation. While the workshop will emphasize education, it will incorporate the latest research findings and practical experiences in geothermal and shale reservoirs. The workshop instructors are experts from geothermal and petroleum industry, academic institutions, and National Labs.

Speakers include: *Susan Petty*, *Jeff Tester*, *Trenton Cladouhos*, *John McLennan*, *Joe Moore*, *Eva Schill*, *Mike Montgomery*, *Francois Cornet*, *Gillian Foulger*, *John Pritchett*, *Tsuneo Ishido*, *Thordur Runolfsson*, *Joshua Tarun*, *Derek Elsworth*, *George Danko*, *Davood Bahami*, and *Steve Bauer*.

Lectures will include:

- Why Stimulation?
- Current Status: A summary of experimental data from EGS projects in the U.S. and around the world
- Reservoir Characterization & Monitoring Techniques

Workshops *continued*

- Conceptual Stimulation Models, Theoretical Advances/ Computational Methods
- Laboratory Experiments
- FORGE case studies, opportunities and challenges ahead

Costs for both of the above workshops include lunch on Friday and Saturday and a workshop reception on Friday from 5:00pm-6:30pm at the Capital View room at the Hyatt Regency.

SUNDAY, OCTOBER 23

Best Practices in Operation and Maintenance (O&M)

Hyatt Regency-Carmel Room AB, 10:00am -5:00pm
Cost: \$175

Presented by: *Kevin Kitz, Dan Hoyer*

Operations & Maintenance (O&M) is critical to the sustainable success of geothermal power plants, facilities and wells. Sharing lessons learned within the industry can help improve the bottom line of every operating plant, and potentially make new plants more competitive with natural gas, wind and solar alternatives.

This workshop is structured so that O&M supervisors, leads, staff and engineers can share approaches and solutions that have made a difference in their work, without the time commitment of a presenting a formal paper.

Each informal presentation will be a 10-20 minutes long, preferably using PowerPoint slides. Other participants will then be able to discuss their own approach in finding a solution to the issue.

The vision is that participants take away many ideas that could add value to their own work-place O&M practices.



Possible Topics:

- Capacity/availability improvements
- Turnarounds: Planning and Budget
- Turbine/equipment refurbishments
- Scale or corrosion control
- Work Orders: Management
- Predictive maintenance
- Vibration Monitoring
- Inspections for safety and reliability
- Fuel supply monitoring and well drilling/workover decision processes
- O&M Costs
- Production Well Pumps: Issues with Submersibles and Line Shafts
- NCG purging from binary plants
- Materials (metals, elastomers, etc.)
- Equipment upgrade successes
- Safety and Environmental

Any questions? Email Kevin Kitz at kkitz@usgeothermal.com or Daniel Hoyer at dan.hoyer@veizades.com

WEDNESDAY, OCTOBER 26

GEO 101 Workshop and Expo Tour

Sacramento Convention Center-Room 307, 9:00am -11:00am
Cost: Free

9:00-10:00am Visit Expo (*Expo open to public*)
10:00 -11:00am Workshop

Presented by: *Gene Suemnicht*

California legislators, energy regulators and their staff, educators, students and the general public are invited to a special workshop explaining the many benefits of geothermal energy. The information provided will be of a very basic level and easy to understand by a geothermal novice.



~~~~~  
Visit the GRC Annual Meeting Web Page for the full Workshop Agendas:  
[www.geothermal.org/meet-new.html](http://www.geothermal.org/meet-new.html)

**Information is subject to change.**

# GRC Fieldtrips

FRIDAY OCTOBER 21

## CAISO: Managing the Golden State's Electrical Grid

Depart 11:30am, returning by 4pm

Cost: \$30

Led by: *Mark Dellinger*

Tour the control center of the California Independent System Operator (CAISO). A spokesperson will greet our group and describe how the CAISO keeps the 25,500 miles of the California transmission grid reliable and efficient.

We will discuss the many companies and agencies CAISO coordinates with to deliver more than 50,000 MW of energy when needed. We will also address California's desire for renewable generating resources, including geothermal, and issues associated with integrating intermittent resources. CAISO manages a steady, dependable supply of about 1,000 MW of geothermal energy in the state.

**PLEASE NOTE:** International attendees will need to get security clearance before **August 21, 2016** to go on this tour. Upon registering for this field trip the GRC will email you the *Security Clearance Document Request form*.

**Bus starts boarding at 11:30am and arrives back in Sacramento by 4:00pm. (no lunch included) Limited seating, please register early!**



*The control room at CAISO. COURTESY CAISO.*

SATURDAY & SUNDAY OCTOBER 22-23

## Recharging The Geysers – Two Day

*2-Day Santa Rosa Geysers Recharge Project and Calpine Geysers Geothermal Operations Tour*

Depart 8am on Saturday, returning by 5:30pm on Sunday

Cost: \$625

Led by: *Mark Walters & Allen Sonnevill*

In November 2003, in a novel approach to water reuse, the Geysers Recharge Project began pumping 11 million gallons per day of recycled water from the Laguna Treatment Plant to The Geysers steamfields, high in the Mayacmas Mountains.

On this trip you will see how recycled water from the local communities has helped recharge the geothermal reservoir at The Geysers and sustained the generating capacity of the biggest geothermal field in the world.

Also there will be a visit to one of Calpine's geothermal power plants and a close up view of some of the fumaroles, hot-springs and mud pots in the area.

Over the two days, the fieldtrip will take advantage of traveling through one of the most famous wine regions in the world by enjoying some wine-tasting.

*Trip includes 1 night lodging, snacks, refreshment, transportation, 2 lunches and one dinner.*

SUNDAY OCTOBER 23

## Recharging The Geysers – One Day

*1-Day Southeast Geysers Effluent Pipeline and Northern California Power Agency Geysers Geothermal Operations Tour*

Depart 8am returning to Sacramento by 5:30pm.

Cost: \$200 Limited to 60 only

Led by: *Mark Dellinger*

The Southeast Geysers effluent pipeline system collects an average of 4.5 million gallons per day of recycled water from four wastewater treatment plants serving nine communities, and delivers it via a 53-mile pipeline to The Geysers, where its injection has supported approximately 100 MW of power generation since 1997. This generation exceeds the electrical needs of the communities, making them the first set of net positive energy communities in the country.



## Fieldtrips *continued*

The tour will trace the recycled water route from beginning to end, with stops that include: a wastewater treatment plant; the pipeline route through the Clear Lake volcanic field; an historic resort using the field's low-temperature geothermal resource; a monitoring station for injection-induced seismic activity; a Geysers steamfield where recycled water is injected; and a power plant utilizing recycled water-based steam. A mid-day lunch and wine tasting is also included, and participants will return to Sacramento by 5:30 pm.

*Trip includes snacks, refreshment, transportation, and a lunch.*

**THURSDAY, OCTOBER 27**

### **EGS at The Geysers**

*1-Day Northwest Geysers Enhanced Geothermal System (EGS) Tour*

Depart 8am returning to Sacramento by 5:30pm.  
Cost: \$185      Limited to 12 people

**SOLD OUT - If you would like to be placed on a wait list for this fieldtrip, please contact [alay@geothermal.org](mailto:alay@geothermal.org). If we receive enough interest to fill another van we will contact you.**

**Led by:** *John Avery and Julio Garcia*

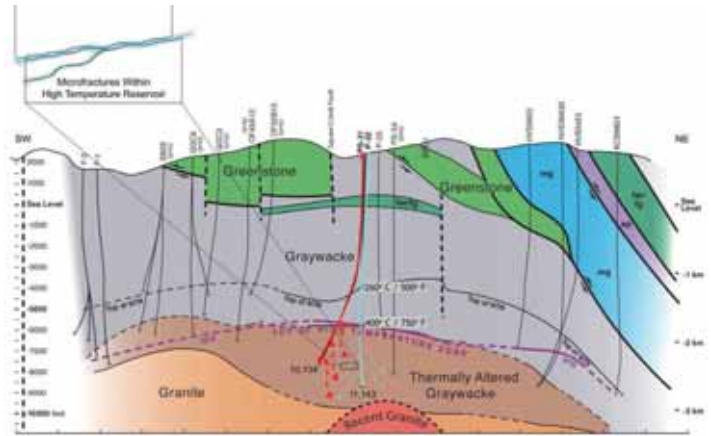
This is a one day comprehensive, technical tour of the Northwest Geysers and will visit Calpine's EGS field demonstration project located in The Geysers field.

The deep temperatures in this part of the field are the hottest seen at The Geysers to date and it has been difficult to develop and produce due to high concentrations of non-condensable and corrosive gases. As part of a DOE-sponsored EGS field demonstration, Calpine reopened and deepened two wells that were drilled in the 1980's and capped and abandoned in 1999.

By injecting recycled water, Calpine is increasing permeability in the rock, increasing steam production, and has seen a reduction

in the concentrations of naturally occurring non-condensable gases. The results of this EGS project to date are very encouraging with important implications at The Geysers as well as other geothermal sites around the world that are dealing with similar problems.

*Please note, due to the rural location of the stops, this tour involves significant travel time. Trip includes snacks, refreshment, transportation, and 1 lunch.*



*A cross-section through the area around the Prati State 31 and Prati 32 well sites. COURTESY CALPINE CORPORATION*

~~~~~  
Visit the GRC Annual Meeting Web Page for Fieldtrip Schedules:
www.geothermal.org/meet-new.html

Please note: Fieldtrip itineraries are subject to change. Full schedules are available on the GRC Website.

All GRC Field Trips depart from the bus loading bay of the Sacramento Convention Center on J Street. Check-in is required just inside the main entrance to the Sheraton Grand Hotel at the corner of J Street and 13th Street.

Please arrive 30 minutes early to check-in and get continental breakfast (when applicable).

Geothermal Energy

Here and Now: Sustainable, Clean, Flexible



40th GRC Annual Meeting & GEA GEOEXPO+

Sacramento Convention Center | Sacramento, California • USA



OCT 23-26 2016

GRC Annual Meeting Schedule

SUNDAY, OCTOBER 23

GRC Annual Charity Golf Tournament

8:30am - Early Afternoon
William Land Golf Course, Sacramento
Cost: \$125 per individual or \$450 per foursome



**William Land
GOLF COURSE**

New Format! The tournament is a four-man scramble over 9 holes with challenges and contests on each hole. Awards will be given for 1st, 2nd and 3rd place teams, men's and women's closest to hole, longest drive and hole-in-one. **Tournament Fee Includes:** Green Fee, Range Balls, Tournament Service, Continental Breakfast and Awards Lunch. **(No shuttle provided! The golf course is just 10 minutes by car)**



The beautiful William Land Golf Course.

Each player will receive two (2) Raffle Tickets for participating in the Tournament. Additional Raffle Tickets will be sold for \$10 each. **There is no limit on Raffle Ticket purchases!**

We encourage teams to bring a raffle prize! All proceeds will go to support the GRC Scholarship Fund.

Please visit the GRC Annual Meeting Web Page at: www.geothermal.org/meet-new.html to register.

GRC Board Meeting

1:30-5 pm
Hyatt Regency-Ballroom EF



The GRC Board in Burlingame in February 2016. PHOTO BY IAN CRAWFORD

GRC & GEA Opening Reception

6pm - 8pm
Sacramento Convention Center-Hall A
Cost: Free with GRC Registration



The Opening Reception is an excellent opportunity for networking.

Sponsored by Power Engineers



On Sunday evening, all registered meeting attendees are encouraged to join colleagues, friends and old acquaintances at this grand reception hosted by the GRC & GEA in the Expo Hall.

MONDAY, OCTOBER 24

GRC Opening Session

8:30am - 12 Noon
Hyatt-Regency-Ballroom ABC
Cost: Free with GRC Registration

The GRC Opening Session will feature top-ranking government officials and industry representatives from around the world, who will put current geothermal events into perspective for the future.



Attendees pay rapt attention to speakers at last year's a GRC Opening Session

Invited Speakers

Senator Mike McGuire - California 2nd District
Dennis Gilles - CEO U.S. Geothermal
Jim Kluesener - Regional Vice President Geothermal, Calpine
Congressman Mike Thompson - California 5th District
Paul Brophy - President of the Board, Geothermal Resources Council
Randy Keller - Director of Development, Cal Energy Operating Corporation
Isaac Angel - CEO, Ormat Technologies, Inc.
Jan Smutny Jones - CEO, Independent Energy Producers
Andrew Palamateer - Director U.S. Energy Association

Annual Meeting Schedule *continued*

GRC International Luncheon

12 Noon - 1:30pm
Sheraton - Magnolia Room
Cost: \$20

The eighth annual International Luncheon will bring together experts from around the world with U.S. private and public sector stakeholders to discuss geothermal energy developments in developing markets. Attendees will be able to meet and greet these experts, and explore partnership opportunities.

Mexico - International Cooperation - *Emillio Camacho*, California Energy Commission

Mexico - Resource Expansion - *Magalay Flore-Armenta*, CFE

Sponsored by Power Engineers & GeothermEx



GRC International Session

Updates on International Geothermal Development
1:30pm - 4:45pm

Sacramento Convention Center - Room 307
Cost: Free with GRC Registration

Experts from around the world present the latest geothermal energy developments in regional markets: Australasia, Indonesia, Philippines, Japan, Middle East, Europe, South America, Central America, and North America.

Featured Speakers: (as of July 20):

Australasia – Long-Term Progress

Andrea Blair, GNS New Zealand

Indonesia – New Opportunities

Philippines – Prolonged Generation

Paul Cerrullo, EDC (tentative)

Japan – Renewed Emphasis

Toshiyuki Tosha, Kumamoto University

Mid East – Continuing Development

Tefik Kaya, GeothermEx/Schlumberger

Mexico – International Cooperation

David Hochschild – California Energy Commission Representative on Mexican Energy Matters

Mexico – Resource Expansion

East Africa – Developing Capacity

Caribbean Region – New Discoveries and Future Developments

Paul Brophy, EGS

**MONDAY, TUESDAY & WEDNESDAY,
OCTOBER 24, 25, and 26**

GRC Technical Sessions

Monday 1:30 - 5:00pm
Tuesday 8am - 4:00pm
Wednesday 8am - 12 Noon

Sacramento Convention Center - 3rd Floor Meeting Rooms 307, 308, 313, 314

See the Preliminary Technical Session schedule on pages 16 to 25. For more information on the topics, schedule and associated speakers go to the GRC Website at www.geothermal.org.



The GRC Technical Sessions are the source for the latest developments in geothermal energy.

GEA GEOEXPO+

Monday 12 Noon - 5pm
Tuesday 9am - 6pm
Wednesday 9am - 12 Noon

Sacramento Convention Center - Hall A
Cost: Free with GRC Registration

North America's largest gathering of vendors providing support for geothermal resource exploration, characterization, development, production and management. **Please Note:** Entrance to the GEA trade show is free with GRC Annual Meeting registration. See page 28 for a listing of exhibitors.



Catch up with the latest technology and services at the trade show.

Annual Meeting Schedule

MONDAY, OCTOBER 24 *continued*

GRC Student Networking Reception

5:00pm - 7:00pm
Hyatt Regency - Capital View
Cost: \$10



Sponsored by Calpine

Industry leaders will meet informally with students attending the GRC Annual Meeting on Tuesday evening. This is a great opportunity to meet one-on-one with the movers and shakers of the industry and gain information and share ideas on a variety of geothermal topics.



Jim Lovekin gives his advice to a student attendee at last year's Student Leadership Luncheon

GRC's Mixer at the MIX

6:30pm - 9:30pm
Mix Downtown
Cost: \$50 per person

Only a 6 minute walk or just 500 yards from the hotels and convention center.

Meet and greet at one of the most sophisticated nightclubs in Sacramento. Relax among friends and colleagues while listening to the exciting tones of a live Dixie-land jazz band.

Purchase your tickets with your GRC Annual Meeting registration.

Sponsored by: Calpine, Kelly Pipe, Geo Drilling Service, Resource Cementing and Paul Graham Drilling Services



The luxurious surroundings of The Mix.

TUESDAY, OCTOBER 25

GRC Poster Session

4pm - 6pm
Sacramento Convention Center - 3rd Floor Lobby
Cost: Free with GRC Registration

Meet with colleagues in the global geothermal community and view this year's selection of Posters. **Please note:** The posters are also available for viewing at all times during the Annual Meeting.

Sponsored by SMUD & Calpine



Student Poster Competition: 1st, 2nd, & 3rd prizes sponsored by SMUD & Calpine.



Lorenzo Trimble explaining the latest in geothermal science to Kate Young

GRC/GEA Networking Reception in the Expo

4pm - 6pm
Sacramento Convention Center - Hall A
Cost: Free with GRC Registration

Meet and greet with exhibitors and colleagues over snacks and drinks.

Annual Meeting Schedule *continued*

WEDNESDAY, OCTOBER 26

GRC Annual Membership Meeting & Awards Luncheon

12:00 - 2:00pm
Sheraton Grand Hotel - Magnolia
Cost: \$55

The GRC will honor the best and brightest of the global geothermal community at its Annual Membership Meeting & Awards Luncheon. The GRC will present its prestigious Aidlin, Holt, Pioneer, Ramey, and Special Achievement awards, as well as awards for Best Technical Session Presentations and Photo Contest.

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Other Events

TUESDAY, OCTOBER 25

Women in Geothermal (WING) Reception

5:30pm - 7pm
Location: TBD – Please check GRC website for updated information.
Cost: Free

Sponsored by: Calpine



The primary objective of WING is to promote the education, professional development, and advancement of women in the geothermal community.

We invite and encourage both women and men in geothermal to join us in a reception to network and discuss WING's mission and activities moving forward.

Note: You do not need to be registered for the GRC/GEA Events to attend this reception.

More information can be found on the WING Facebook page at: www.facebook.com/groups/womeningeothermal/

Geothermal Young Professionals Gathering

Geothermal Young Professionals Gathering at the GRC Annual Meeting - for more information contact Laura Garchar at laura.garchar@gmail.com

Renewable Thermal Facts and Figures - International Direct Use Networking Event

4pm - 5:30pm
Room: Sacramento Convention Center-TBD



Join the IEA Geothermal and US DOE Geothermal Direct Use Networking Event as we provide a unique international B2B

Networking platform. Meet experts and company representatives from all over the world, strengthen your international network and get insight in the manifold opportunities of international cooperation and information exchange.

Regardless of which country you are from: Of greatest interest are "costs, benefits and other facts and figures of geothermal direct use installations". Share information and learn about other projects. We invite participants to provide 3 minute flash presentations focused on location, capacity, costs and benefits of direct use installations, share trivia, or ask questions to those attending. Participants will receive, the updated Direct Use Installations Database currently under development at the National Renewable Energy Lab as part of the DOE Geothermal Vision Study.

Pre-registration is required. More information on the IEA Geothermal website soon: <http://iea-gia.org/>

ROOM 307	
INTERNATIONAL SESSION Chair: Gene Suemnicht	
1:30	<i>Austral/Asia Region – Long-term Progress</i> Andrea Blair, GNS New Zealand
1:50	<i>Indonesia Region – New Opportunities</i> Fazil Erwin Alfitri - MEDCO
2:10	<i>Philippine Region – Prolonged Generation</i> Paul Cerrullo, EDC (tentative)
2:30	<i>Japan – Renewed Emphasis</i> Toshiyuki Tosha, Kumamoto University
2:50	<i>Mid East Region – Continuing Development</i> Tevfik Kaya, GeothermEx/Schlumberger
3:10	Break (3:10-3:20)
INTERNATIONAL II	
3:20	<i>East Africa Region – African Union Programs</i> Rashid Ali Abdallah – African Union
3:40	<i>East Africa Region – Expanding Resource Capacity</i> David Muthike – Ken Gen (tentative)
4:00	<i>Central America Region – Added Generation and Future Plans</i> Paul Moya – WestJec Inc. (tentative)
4:20	<i>Caribbean Region – Discoveries and Future Developments</i> Paul Brophy, EGS

ROOM 308	
GEOLOGY I Chair:	
1:30	<i>Soda Lake Geothermal Field Case History 1972 to 2016</i> , Benoit, Dick
1:50	<i>Summary of Phase 1 and Plans for Phase 2 of the Washington State Geothermal Play-Fairway Analysis</i> , Forson, Corina & Czajkowski, Jessica L. & Norman, David K. & Swyer, Michael W. & Cladouhos, Trenton T. & Davatzes, Nicholas
2:10	<i>Phase 2 Activities to Improve a 2015 Play Fairway Analysis of Geothermal Potential Across the State of Hawaii</i> , Lautze, Nicole & Thomas, Donald & Hill, Graham & Wallin, Erin & Whittier, Robert & Martel, Stephen & Ito, Garrett & Frazer, Neil & Hinz, Nicholas
2:30	<i>The Nevada Play Fairway Project: Review of Highly Prospective Areas for New Discoveries of Potentially Viable Geothermal Systems in the Great Basin Region, Western USA</i> , Faulds, James E. & Hinz, Nicholas H. & Coolbaugh, Mark F. & Shevenell, Lisa A. & Siler, Drew
2:50	<i>Intersecting Fracture Geometries in Control of Geothermal Spring Occurrences in Circumferences of the Madra Mountain, Aegean Region of Turkey</i> , Turan, Aysegul & Saner, Salih & Artun, Emre
3:10	Break (3:10-3:40)
DRILLING I Chair:	
3:40	<i>Self-repairing Geothermal Well Cement Composites</i> , Pyatina, Tatiana & Sugama, Toshifumi & Ronne, Arthur
4:00	<i>The Deepest Geothermal Well in Indonesia: A Success Story of Aerated Drilling Utilization</i> , Toni, Apriyansah & Pratama, Raka Aditya & Prasetyo, Imam M. & Saputra, Muhamad Bayu
4:20	<i>Numerical Analysis of Flow Field in Multiple Hydrothermal jet Drilling for Geothermal Wells</i> , Song, Xianzhi & Lv, Zehao & Cui, Liu & Li, Gensheng & Ji, Guodong & Hu, Xiaodong & Shi, Yu
4:40	<i>Innovative Conical Diamond Element Bit in Conjunction with Novel Drilling Practices Increases Performance in Hard-Rock Geothermal Applications, California</i> , Graham, Paul & Krough, Bradley & Nelson, Thomas & White, Allen & Self, Jordan

All GRC Technical Sessions are to be held on the 3rd floor of the Sacramento Convention Center.

	ROOM 313	ROOM 314
	POWER PLANT 1 Chair:	CASE STUDIES 1 Chair:
1:30	<i>Review of Hybrid Geothermal and Solar Energy Systems</i> , Li, Kewen & Liu, Changwei & Chen, Youguang & Liu, Guochen & Chen, Jinlong	<i>Early-Phase Evaluation of CO2 Recovery at Geothermal Facilities</i> , McIntush, Kenneth & Fisher, Kevin & Mamrosh, Darryl & McKaskle, Ray & Beitler, Carrie & Fridriksson, Thrainn & Audinet, Pierre & Merino, Almudena Mateos
1:50	<i>Axial Exhaust Steam Turbine and Low Level Type Direct Contact Condenser for Kamojang Geothermal Power Plant Unit5 in Indonesia</i> , Asano, Tsuyoshi & Muto, Toshie	<i>Energy and Exergy Analysis of Geothermal Steam Binary Power Generation</i> , Jalilinasrabad, Saeid & Itoi, Ryuichi & Uchihori, Nobuo & Okamura, Yoshihiro
2:10	<i>Off Design Operation of Hybrid Noncondensable Gas Removal Systems For Flash Steam Cycle Geothermal Power Plants</i> , Devinney, Jason	<i>Olkaria (Kenya) Geothermal Projects Case Study</i> , Mukeu, Pharis & Langa't, Reuben
2:30	<i>A Novel Retrofit to Improve Efficiency of a Condensate H2S Abatement System at the Aidlin Power Plant: "Ski Slopes"</i> , Benn, Brian & Sonnevill, Allen & Morrison, Leslie & Bahning, Tom	<i>Simulation Study of Downhole Heat Exchanger With Thermal Conduction in Rock Mass For Small-Scale Sower Generation System</i> , Yamato, Asada & Kato, M. & Sato, K.
2:50	<i>Advantages of Dual Enhanced Heat Transfer Tubes in Organic Rankine Cycle Based Geothermal Plants</i> , Moreno, Jesus & Lang, Thomas	<i>The Importance of Caprock Heating for Geothermal Heat in Place Calculations: An Appalachian Basin Case Study</i> , Smith, Jared & Axelsson, Gudni & Camp, Erin
3:10	Break	Break
	GEOCHEMISTRY Chair:	EGS 1 Chair:
3:40	<i>Tracer Testing in the Svartsengi Geothermal Field in 2015</i> , Sverrisdottir, Sigrun Bra & Axelsson, Gudni	<i>Optimizing for Large Planar Fractures in Multistage Horizontal Wells in Enhanced Geothermal Systems Using a Coupled Fluid and Geomechanics Simulator</i> , Hu, Xiexiaomen & Tutuncu, Azra & Eustes, Alfred & Augustine, Chad
4:00	<i>New Insight Into the Evolution of the West Coast Geothermal Province: Trace Element Signature in the Thermal Waters</i> , Chandrasekhar, Varun & Chandrasekhar, Trupti & Chandrasekharam, D.	<i>Experimental Simulation of Enhanced Geothermal Reservoir Stimulation</i> , Hu, Lianbo, Ahmad & Pritchett, John & Garg, Sabodh
4:20	<i>Cumulative Injection Effects on Well 66A-7 in the Coso Geothermal Field</i> , Buck, Cliff	<i>Transport Mechanism Within Thermally-Shocked Region of the Enhanced Geothermal System (EGS)</i> , Jahan Bakhsh, Kamran & Nakagawa, Masami & Arshad, Mahmood & Dunnington, Lucila
4:40	<i>Geothermometry of West Coast Geothermal Province, Maharashtra, India</i> , Chandrasekhar, Varun & Chandrasekhar, Trupti & Chandrasekharam, D.	<i>Hydraulic Fracturing of Multiple Horizontal Wells and Shear Stimulation of Natural Fractures for EGS Reservoir Creation</i> , Kumar, Dharmendra & Ghassemi, Ahmad



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	ROOM 307	ROOM 308
	TOOLS & INSTRUMENTS Chair:	GEOPHYSICS Chair:
8:00	<i>Geo-Nuclear Concept Paper</i> , Ronoh, Kibet	<i>3D Geophysical Inversion Modelling of Gravity Data as a Subsurface Geothermal Exploration Tool With an Example From Akutan (Alaska, USA)</i> , Witter, Jeffrey & Stelling, Pete & Knapp, Paige & Hinz, Nicholas
8:20	<i>Heat Exchanger for Down-hole Condensation Process - Theoretical and Experimental Investigation, Considering Surrounding Fluid Properties</i> , Holbein, Benedict & Isele, Jorg & Spatafora, Luigi & Hagenmeyer, Veit & Schulenberg, Thomas	<i>Muang Rae Geothermal System: Drilling and borehole geophysics, 1000-m core hole into granitic rock, Amphoe Pai, Mae Hong Son Province, Northern Thailand</i> , Wood, Spencer H. & Pirarai, Kriangsak & Fuangswasdi, Aranya & Kaentao, Wiboon & Waibel, Albert & Singharajwarapan, Fongsaward S.
8:40	<i>Development of a Geothermal Well Inspection Camera With Active CO2 Cooling</i> , Normann, Randy & Normann, Charles & Henfling & Glowka, David & Soares, Marshall	<i>Using Seismic Networks to Explore for Geothermal Resources in Western Saudi Arabia</i> , Mellors, Robert J. & Camp, Victor & Harris, David & Al-Amri, Abdullah
9:00	<i>Development of a Wrieline Tool Containing an Electrochemical Sensor for Real-time pH and Tracer Concentratin Measurement</i> , Cieslewski, Grzegorz & Hess, Ryan F. & Boyle, Timothy J. & Yelton, Wiliam G. & Klamm, Bonnie E. & Goldfarb, Lauren & Stork, Isabella N.	<i>Resource Conceptual Models of Volcano-Hosted Geothermal Reservoirs for Exploration Well Targeting and Resource Capacity Assessment: Construction, Pitfalls and Challenges</i> , Cumming, William
9:20	<i>Performance Evaluation of Mineral Additive-free Perfluoropolymer Nanocomposite O-ring in Simulated Geothermal Environments at 300°C</i> , Sugama, Toshifumi & Pyatina, Tatiana	<i>Preliminary Three-Dimensional Temperature Structure of the Williston Basin</i> , Gosnold, Will & Colby, Chris & McLaughlin, Samantha
9:40	Break	Break
	DIRECT USE Session Chair:	GEOLOGY 2 Chair:
10:10	<i>DOE-GTO Low Temperture Projects Evaluation and Lessons Learned</i> , Williams, Tom & Snyder, Neil & Gosnold, Will	<i>The Geologic Framework of the Fallon FORGE Site</i> , Siler, Drew L. & Hinz, Nicholas H. & Faulds, James E. & Tobin, Brett & Blake, Kelly & Tiedeman, Andrew & Sabin, Andrew & Lazaro, Mike & Blankenship, Douglas & Kennedy, Mack & Rhodes, Greg & Akerely, John & Hickman, Stephen & Glen, Jonathan & Williams, Colin & Robertson-Tait, Ann & Calvin, Wendy & Pettitt, Will
10:30	<i>Low Enthalpy Geothermal Food Dehydrator</i> , Avina-Jimenez, Hector M. & Perez-Gonzalez, Eduardo & Severiano-Perez, Patricia & Valazquez-Madrado, Olga & Jasso-Rivera, Andrea	<i>The Geologic Framework of the West Flank FORGE site</i> , Siler, Drew L. & Blake, Kelly & Sabin, Andrew & Lazaro, Mike & Meade, Dave & Blankenship, Douglas & Kennedy, Mack & McCulloch, Jess & DeOreo, Steve & Hickman, Stephen & Glen, Jonathan & Kaven, Ole & Schoenball, Martin & Williams, Colin & Phelps, Geoff & Faulds, James E. & Hinz, Nick & Robertson-Tait, Ann & Pettitt, Will
10:50	<i>Geothermal Energy in Munich (and beyond) A Geothermal City Case Study</i> , Farquharson, Neil & Schubert, Achim & Steiner, Ulrich	<i>A New Look at the Thermal Regime Around Roosevelt Hot Springs</i> , Gwynn, Mark & Allis, Rick & Hardwick, Christian & Hill, Jay & Moore, Joe
11:10	<i>A Thermoelectric Powered Quadruped Robotic System for Remote Monitoring of Geothermal Open Field Heated Gardens in Iceland</i> , Dell, Robert & Wei, C.S. & Unnthorsson, Runar & Mitchell, Nicholas	<i>Constraining Subsurface Model Resolution at Newberry Volcano Using A Weighted Spatial Analysis</i> , Mark-Moser, MacKenzie & Cameron, Emily & Rose, Kelly & Romeo, Lucy & Schultz, Jeremy & Schultz, Adam
11:30	<i>Thermally Enhanced Open Field Heating Agricultural System Using Waste Geothermal Hot Water and low Temperature Steam in Iceland and Waste Municipal Steam in New York City</i> , Dell, Robert & Wei, C.S. & Unnthorsson, Runar & Mitchell, Nicholas	<i>A Workflow for 3D Geothermal Conceptual Models - Moving Beyond the Flat Cartoon</i> , Stimac, Jim & Mandeno, Petronilla Esther

	ROOM 313 GEO VISION 1 Chair:	ROOM 314 CASE STUDIES 2 Chair:
8:00	<i>An Overview of Geothermal Heat Pump Applications and a Preliminary Assessment of Its Technical Potential in the United States</i> , Liu, Xiaobing & Hughes, Patrick & Anderson, Arlene	<i>McGinness Hills - Case Study of a Successful Expansion</i> , Lovekin, James & Delwiche, Benjamin & Spielman, Paul
8:20	<i>Characterizing U.S. Heat Demand Market for Potential Application of Geothermal Direct Use</i> , McCabe, Kevin & Reber, Tim & Gleason, Michael & Young, Katherine R.	<i>Development of Hybrid Geothermal - Biomass Power Plant in Japan</i> , Nakao, Yoshinobu
8:40	<i>An Estimate of Shallow, Low-Temperature Geothermal Resources of the United States</i> , Mullane, Michelle & Gleason, Michael & Reber, Tim & McCabe, Kevin & Mooney, Meghan & Young, Katherine R.	<i>Update on the Conceptual Model of Olkaria Geothermal System</i> , Saitet, Daniel
9:00	<i>Strategies For Increasing Geothermal Direct Use in New Zealand</i> , Climo, Melissa & Carey, Brian & Seward, Anya & Bendall, Simon	<i>Updated Conceptual Model and Reserve Estimate for the Salton Sea Geothermal Field, Imperial Valley, California</i> , Kaspereit, Dennis & Mann, Mary & Sanyal, Subir & Rickard, Bill & Hulen, Jeff & Osborn, William
9:20	<i>Geothermal District Heating Systems: Country Case Studies from China, Germany, Iceland, United States of America and Schemes to Overcome the Gaps</i> , Sander, Marietta	<i>Geothermal Production From Oil/Gas Wells and Transportation With Two-Step Absorption System</i> , Wang, Honggang & Liu, Xiaobing
9:40	Break	Break
	POWER PLANT 2 Chair:	EGS 2 Chair:
10:10	<i>Increased Generation Performances by Using Sulfur Dispersant in the Cooling Tower at the Wayang Windu Geothermal Power Plant</i> , Hidayat, Ismail & Kuntoaji, Mahendra & Falah, Dea Nurivawati	<i>Optimization of Well Configuration For a Sedimentary Enhanced Geothermal Reservoir</i> , Zhou, Mengnan & Cho, JaeKyoung & Zerpa, Luis E. & Augustine, Chad
10:30	<i>Gumuskoj Repowering Case Study</i> , Fiterman, Anton & Shoshan, Gad	<i>Reservoir Geomechanics Model for EGS</i> , Janis, Michael & Liu, Jiman & Ghassemi, Ahmad
10:50	<i>Advancements in Turbine and Direct Contact Condenser Configurations, and Balance of Plant Considerations</i> , Harvey, William & Fishman, Matt & Gunderson, Josh	<i>Thermal Stresses Around EGS</i> , Arshad, Mahmood & Nakagawa, Masami & Jahan Bakhsh, Kamran & Dunnington, Lucila
11:10	<i>Binary ORC Turbogenerators for Small and Medium Scale Plants in the Eastern Caribbean Islands</i> , Rossi Di Schio, Clotilde & Bonafin, Joseph	<i>The South Hungary Enhanced Geothermal System (SHEGS) Demonstration Project</i> , Garrison, Geoffrey H. & Gudlaugsson, Steinar & Adam, Laszlo & Ingimundarson, Ari & Cladouhos, Trenton T. & Petty, Susan
11:30	<i>MHPS Axial Flow Turbine & Direct Contact Condenser, and Recent Projects in Mexico</i> , Morita, Yu & Kawahara, Katsunori & Saito, Shojiro	

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	ROOM 307	ROOM 308
	RESERVOIR MODELING 1 Chair:	DESALINATION Chair:
1:30	<i>A Numerical Method For Fractured Reservoir Poromechanics Using a Mixed-Continuum Embedded Fracture Model</i> , Norbeck, Jack H. & Horne, Roland N.	<i>Produced Water Treatment Using the Switchable Polarity Solvent Forward Osmosis (SPS FO) Desalination Process: Preliminary Engineering Design Basis</i> , Wendt, Daniel & Adhikari, Birendra & Orme, Christopher & Wilson, Aaron
1:50	<i>Improvements to the AUTOUGH2 Supercritical Simulator With Extension to the Air-Water Equation of State</i> , O'Sullivan, John & O'Sullivan, Mike & Croucher, Adrian	<i>Desalination Using Geothermal Energy</i> , Avina-Jimenez, Hector & De La Rosa-Urbalejo, Daniel & Garcia-Gutierrez, Alfonso
2:10	<i>Update of Injection Benefit Model For the Geysers</i> , Eney, Steve	<i>Low Temperature Geothermal Resource Assessment for Membrane Distillation (MD) Desalination in United States</i> , Akar, Sertac & Turchi, Craig
2:30	Break	Break
	RESERVOIR MODELING 2 Chair:	FIELD OPERATIONS Chair:
3:00	<i>Complexity Analysis of Generalized Tank Models</i> , Li, Yuxi & Juliusson, Egill & Palsson, Halldor & Stefansson, Hlynur & Valfell, Agust	<i>Mitigation of Calcium Sulfate Scaling in Geothermal Production Wells</i> , Gill, Jasbir S. & Jacobs, Gregory & Butler, Steven
3:20	<i>A 2-D Numerical Method For Tracking a Moving Water Table</i> , Clearwater, Emily & O'Sullivan, Michael & Archer, Rosalind	<i>Silica Deposits Can Be Controlled</i> , Weres, Oleh
3:40	<i>OLGA Modeling Results for Single Well Reinjection of Non-Condensable Gases (NCGs) and Water</i> , Stacey, Robert & Norris, Lee & Lisi, Simone	<i>Measurement of Two Phase and Other Flows Using Radio Frequency (RF) Power Measurements: Experimental Results</i> , Sisler, John R. & Zarrouk, Sadiq J.
4:00	Poster Session	Poster Session



The GRC Geothermal Library continues to serve as the premier source for geothermal publications. It currently holds over 40,000 citations, and provides access to nearly 21,000 PDF files.

All the papers from this year's GRC Annual Meeting Technical Session will be made available to members in the GRC Geothermal Library before the end of October.

Papers from 2014 and earlier are available to all.

The GRC Library can be accessed at www.geothermal-library.org

If you have any questions about the GRC Library, please contact the GRC Librarian, Brian Schmidt, at bschmidt@geothermal.org.

	ROOM 313	ROOM 314
	GEYSERS UPDATE Chair: Karl Urbank	ENVIRONMENTAL/REGULATORY Chair:
1:30	Jim Kluesener – <i>Overview and Fire Update</i>	<i>Getting Paid for Grid Services and Supply Diversity: Are the Regulators Recognizing these Services?</i> , Luckhardt, Jane & Flake, Scott
1:50	Mark Walters – <i>Geology</i>	<i>Geothermal Energy Reform in Mexico, Legal Framework, Tools and Outcome</i> , Ramirez Bueno, Michell Alejandra & Rocha Ruiz, David Alejandro
2:10	Craig Hartline - <i>Seismicity</i>	<i>Experience of Constructing the Resettlement Village Facilities for the 280MW Geothermal Power Project at Olkaria, Kenya</i> , Nthiga, Moses & Barasa, Cedrick
2:30	Break	Break
	GEYSERS UPDATE Chair: Danielle Matthews Seperas	EGS 3 Chair:
3:00	Melinda Wright – <i>Geochemistry</i>	<i>Reservoir Stimulation in Naturally Fractured Geothermal Systems</i> , Kamali, Amirhossein & Ghassemi, Ahmad
3:20	John Farison – <i>Steamfield and Wells</i>	<i>The Effect of Well Density on Resource Depletion for a Vertical Closed-Loop SCO2 Geothermal Well Systems</i> , Fox, Don & Higgins, Brian
3:40	Tim Conant - <i>Plants</i>	<i>High Energy Stimulations Imaged With Geophysical Change Detection Techniques</i> , Knox, Hunter & Ajo-Franklin, Jonathan & Johnson, Timothy & Morris, Joseph & Grubelich, Mark & Preston, Leiph & Knox, James & King, Dennis
4:00	Poster Session	Poster Session

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Geothermal Energy

Here and Now: Sustainable, Clean, Flexible



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Sacramento Convention Center (3rd Floor, East Lobby) Chair: Patrick Hanson

BUSINESS & COUNTRY UPDATES

- *Colombian Geothermal Energy Development: Technical and Economic Factors Favoring Foreign Investment*, Hernandez, Jonathan A. & Cardona, Juan F. & Vega Salazar, Elsa Juliana*
- *Present Status and Planning of the Geothermal Energy Master Program of NEP-II in Taiwan*, Wu, Shu-Yao & Shen, Min-Lin & Chen, Wei-An & Huang, Bor-Shouh
- *Recent Developments with GETEM (Geothermal Electricity Technology Evaluation Model)*, Mines, Greg

CASE STUDIES

- *Olkaria (Kenya) Geothermal Projects Case Study*, Mukeyu, Pharis & Langa't, Reuben*
- *The Importance of Caprock Heating for Geothermal Heat in Place Calculations: An Appalachian Basin Case Study*, Smith, Jared & Axelsson, Gudni & Camp, Erin*

DESALINATION

- *Desalination Using Geothermal Energy*, Avina-Jimenez, Hector & De La Rosa-Urbalejo, Daniel & Garcia-Gutierrez, Alfonso*

DIRECT USE

- *A Thermoelectric Powered Quadruped Robotic System for Remote Monitoring of Geothermal Open Field Heated Gardens in Iceland*, Dell, Robert & Wei, C.S. & Unnthorsson, Runar & Mitchell, Nicholas*
- *Analysis of Influence Factors on Aquifer Thermal Energy Storage Performance*, Jiang, Xin & Liu, Xueling & Liu, Jinsong
- *Cascade Use of Geothermal Energy in Mexico*, Avina-Jimenez, Hector Miguel & Benitez-Torreblanca, Miguel Angel & Garcia-Gutierrez, Alfonso
- *Thermally Enhanced Open Field Heating Agricultural System Using Waste Geothermal Hot Water and low Temperature Steam in Iceland and Waste Municipal Steam in New York City*, Dell, Robert & Wei, C.S. & Unnthorsson, Runar & Mitchell, Nicholas*

DRILLING

- *Innovative Conical Diamond Element Bit in Conjunction with Novel Drilling Practices Increases Performance in Hard-Rock Geothermal Applications, California*, Graham, Paul & Krough, Bradley & Nelson, Thomas & White, Allen & Self, Jordan*
- *Numerical Analysis of Flow Field in Multiple Hydrothermal jet Drilling for Geothermal Wells*, Song, Xianzhi & Lv, Zehao & Cui, Liu & Li, Gensheng & Ji, Guodong & Hu, Xiaodong & Shi, Yu*

- *Optimization and Characterization of the Self-Degradable Cement for Geothermal Wells*, Tan, Huijing & Zheng, Xiuhua & Li, Feiyue & Duan, Chenyang
- *The Deepest Geothermal Well in Indonesia: A Success Story of Aerated Drilling Utilization*, Toni, Apriyansah & Pratama, Raka Aditya & Prasetyo, Imam M. & Saputra, Muhamad Bayu*

EGS

- *Thermal Stresses Around EGS*, Arshad, Mahmood & Nakagawa, Masami & Jahan Bakhsh, Kamran & Dunnington, Lucilaa*
- *Transport Mechanism Within Thermally-Shocked Region of the Enhanced Geothermal System (EGS)*, Jahan Bakhsh, Kamran & Nakagawa, Masami & Arshad, Mahmood & Dunnington, Lucila*
- *High Energy Stimulations Imaged With Geophysical Change Detection Techniques*, Knox, Hunter & Ajo-Franklin, Jonathan & Johnson, Timothy & Morris, Joseph & Grubelich, Mark & Preston, Leiph & Knox, James & King, Dennis*

EMERGING/PRODUCTION TECHNOLOGIES

- *Sensitivity Analysis of Ambient Temperature on ORC Energy and Exergy Analysis*, Mohammadzadeh Bina, Saeid & Jalilinasrabad, Saeid & Fujii, Hikari
- *The Exploration of Comprehensive Anti-scale Measures for Ground Pipeline in Geothermal Well*, Yang, Shiwei & Yang, Guoxing & Wang, Quanyang & Zhang, Zhen

ENVIRONMENTAL/REGULATORY

- *Adding Impacts and Mitigation Measures to OpenEI's RAPID Toolkit*, Vogel, Erin

EXPLORATION

- *Kinematic and Deformative Analysis for the Santa Rosa and La Talarana Faults*, Acosta Ospina, Lucrecia & Quintero Loaiza, Jaider A.*
- *Using Infrared Spectrometry to Deduce Fluid History From an Exploration Core, Emigrant Peak Geothermal Prospect, Northern Fish Lake Valley, Nevada, U.S.A.*, Madubuike, Chinomso & Brikowski, Tom & Moulding*

GEOCHEMISTRY

- *²²²Rn Production in Geothermal Fluids and its Application to Quantifying Fracture Attributes*, Brown, Shaun T. & Ding, Xin & Sturchio, Neil C. & Christensen, John N. & Sonnenthal, Eric & Kennedy, B. Mack, Depaolo, Donald J.
- *Scaling Tendency Prediction of the Southeast Geothermal Field in Beijing*, Duan, Chenyang & Zheng, Xiuhua & Yang, Shiwei

*Also an oral presentation

GEOLOGY

- *A New Look at the Thermal Regime Around Roosevelt Hot Springs*, Gwynn, Mark & Allis, Rick & Hardwick, Christian & Hill, Jay & Moore, Joe*
- *Constraining Subsurface Model Resolution at Newberry Volcano Using A Weighted Spatial Analysis*, Mark-Moser, MacKenzie & Cameron, Emily & Rose, Kelly & Romeo, Lucy & Schultz, Jeremy & Schultz, Adam*

GEOPHYSICS

- *Muang Rae Geothermal System: Drilling and borehole geophysics, 1000-m core hole into granitic rock, Amphoe Pai, Mae Hong Son Province, Northern Thailand*, Wood, Spencer H. & Pirarai, Kriangsak & Fuangswasdi, Aranya & Kaentao, Wiboon & Waibel, Albert & Singharajwarapan, Fongsaward S.*
- *Resource Conceptual Models of Volcano-Hosted Geothermal Reservoirs for Exploration Well Targeting and Resource Capacity Assessment: Construction, Pitfalls and Challenges*, Cumming, William*

GEOVISION

- *Strategies For Increasing Geothermal Direct Use in New Zealand*, Climo, Melissa & Carey, Brian & Seward, Anya & Bendall, Simon*
- *Future Scenario Development From Disruptive Exploration Technologies and Business Models in the U.S. Geothermal Industry*, Wall, Anna*

OIL & GAS

- *Enhancing Energy Recovery From Abandoned Oil Wells Through Geothermal Technology*, Aniodoh, Chukwuemeka

POWER PLANT

- *Active Disturbance Rejection Control of Waste Heat Recovery Systems With Organic Rankine Cycles*, Zhang, Jing & Wang, Yan & Wang, Zhigang & Fu, Wencheng
- *Fuzzy PID Control Applied in Evaporator of Organic Rankine Cycle System*, Li, Xiuli & Wang, Zhigang & Wang, Yan & Fu, Wencheng

RESERVOIR MODELING

- *A 2-D Numerical Method For Tracking a Moving Water Table*, Clearwater, Emily & O'Sullivan, Michael & Archer, Rosalind*



*Also an oral presentation

Preliminary Technical Program Wednesday Morning, October 26

	ROOM 307	ROOM 308
	BUSINESS & COUNTRY UPDATES Chair:	EXPLORATION Chair:
8:00	<i>Colombian Geothermal Energy Development: Technical and Economic Factors Favoring Foreign Investment</i> , Hernandez, Jonathan A. & Cardona, Juan F. & Vega Salazar, Elsa Juliana	<i>Seismic Reflection and Magnetotelluric Imaging of Southwestern Dixie Valley Basin, Nevada</i> , Unruh, Jeffrey & Gray, Brian & Christopherson, Karen & Pullammanappallil, Satish & Alm, Steve & Blake, Kelly
8:20	<i>Geothermal Market Analysis of Indonesia</i> , Roque, Raysa & Robertson-Tait, Ann & Camargo, Marcelo A.	<i>Using Infrared Spectrometry to Deduce Fluid History From an Exploration Core, Emigrant Peak Geothermal Prospect, Northern Fish Lake Valley, Nevada, U.S.A.</i> , Madubuike, Chinomso & Brikowski, Tom & Moulding
8:40	<i>Business Finance and Development in the Future Markets for Geothermal Energy</i> , Shnell, Jim	<i>Structural Complexity of the Pirouette Mountain and Elevenmile Canyon Geothermal Systems</i> , Alm, Steve & Walker, Douglas & Blake, Kelly
9:00	Geothermal Energy in Hungary, Toth, Aniko N.	<i>Geothermal Field Work Using a Drone With Thermal Camera: Aerial Photos, Digital Elevation Models and Heat Flow</i> , Harvey, Mark
9:20	BLM Geothermal Program Update	<i>Kinematic and Deformative Analysis for the Santa Rosa and La Telarana Faults</i> , Acosta Ospina, Lucrecia & Quintero Loaiza, Jaider A.
9:40	Break	Break
	GEO 101 WORKSHOP Chair: Gene Suemnicht	DRILLING 2 Chair:
10:10		<i>Development of a Directional Drilling System for Operation at 300°C for Geothermal Applications</i> , Chatterjee, Kamallesh & Macpherson, John & Dick, Aaron & Grimmer, Harald & Klotzer, Sundai & Schroder, Jon & Epplin, Dave & Hohl, Carsten & Gacek, Sobieslaw
10:30		<i>Drill-In Fluids and Drilling Practices Drilling More Productive, Less Costly Geothermal Wells</i> , Tuttle, John & Listi, Renan
10:50		<i>Performance Evaluation of Polycrystalline Diamond cutter (PDC) Bits used in the Production Interval of Well AW-01 in the Akiira Ranch Field, East African Rift Valley, Central Kenya</i> , Letvin, Amelia & Stroud, Paul & Scagliarini, Stefano
11:10		<i>Water: As a Drilling Fluid in Production Zone of Geothermal Wells</i> , Erincik, Mehmet Zeki

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ROOM 313	
GEO VISION 2	
Chair:	
8:00	<i>Updates to Enhanced Geothermal System Resource Potential Estimate, Augustine, Chad</i>
8:20	<i>A Methodology for Calculating EGS Electricity Generation Potential Based on the Gringarten Model for Heat Extraction From Fractured Rock, Augustine, Chad</i>
8:40	<i>Findings From the DOE GeoVision Reservoir Management and Development Task, Lowry, Thomas & Kennedy, Mack & Carrigan, Charles</i>
9:00	<i>Survey of recent market trends for geothermal with a snapshot of potential additional research areas to expand deployment, Speer, Bethany & Young, Kate</i>
9:20	
9:40	Break
GEOVISION 3	
Chair:	
10:10	<i>Geothermal Vision Study - GRC Annual Meeting Brief, Richard, Christopher & Vigalys, Max & Reinhardt, Timothy</i>
10:30	<i>Geothermal Value Proposition, Richard, Christopher & Eugeni, Edward & Makalinao, Aloysius & Vigalys, Max & Jelacic, Allan</i>
10:50	<i>Future Scenario Development From Disruptive Exploration Technologies and Business Models in the U.S. Geothermal Industry, Wall, Anna</i>
11:10	<i>A Review of Exploration Methods For Discovering Hidden Geothermal Systems, Dobson, Pat</i>



GEOTHERMAL LIBRARY

The GRC Geothermal Library continues to serve as the premier source for geothermal publications. It currently holds over 40,000 citations, and provides access to nearly 21,000 PDF files.

All the papers from this year's GRC Annual Meeting Technical Session will be made available to members in the GRC Geothermal Library before the end of October.

Papers from 2014 and earlier are available to all.

The GRC Library can be accessed at www.geothermal-library.org

If you have any questions about the GRC Library, please contact the GRC Librarian, Brian Schmidt, at bschmidt@geothermal.org.

37th Annual GRC Amateur Photography Contest

Do you work somewhere beautiful? Is your site too amazing to keep to yourself? Do you have an eye for steam? The GRC is looking for your pictures of geothermal energy: areas of geological interest, well testing, drilling, geothermal equipment, power plants, EGS, direct use, and geothermal heat pumps.

1st Place - \$150 prize; 2nd Place - \$100 prize; 3rd Place - \$75 prize; Honorable Mention - certificate

The purpose of the contest is to showcase quality photography featuring geothermal energy around the world. All entries and the winning photos will be displayed in the Tuscany Ballroom registration area throughout the meeting.

Awards for the winners will be presented at the GRC Annual Member Meeting and Awards Luncheon.

Last year's winners:



1st Place: *Drill Casings for New Geothermal Well* by Cari Covell, Reykjavik University - Iceland School of Energy, Reykjavik, Iceland



2nd Place: *Geothermal Mist* by Paweł Krok, Lubawka, Poland

3rd Place: *Champaign Pool Divide* by Ning Tai (aka Nelly Alison), Albert Park, Victoria, Australia



Entries must be received by the GRC office no later than September 16, to qualify for this year's contest.

More information including an Entry Form can be found at: www.geothermal.org/Annual_Meeting/photo.html

Geothermal Energy

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40th GRC Annual Meeting & GEA GEOEXPO+

Sacramento Convention Center | Sacramento, California • USA



OCT 23-26 2016

Hotel Accommodations

There are two official hotels for the GRC Annual Meeting & GEA GEOEXPO+. The **Hyatt Regency Sacramento** and the **Sheraton Grand Sacramento Hotel**. Both hotels are a short walk (200-500 yards) from the Sacramento Convention Center, the location for most of the events.

The GRC has contracted for a discounted block of rooms. At both hotels there is a choice of rooms with either two double beds or a king bed starting at \$145 a night excluding taxes and fees.

The discount ends September 28.

- We strongly recommend making your hotel reservations on-line through the dedicated Webpages listed for each hotel available from the GRC website. The preferred rate is automatically applied.

OR

- If you make your reservations over the phone make sure you mention you are part of the **Geothermal Resources Council/ Geothermal Energy Association group** to get the special rate.

Make your hotel reservation through the GRC website:

www.geothermal.org

Sheraton Grand Sacramento Hotel

The Sheraton Grand Sacramento Hotel is a contemporary hotel situated in the beautifully restored Public Market Building on the main thoroughfare of J Street. The hotel offers sophisticated accommodations, top-of-the-line amenities and facilities, and essential conveniences for executive and leisure travelers.



A king bed guestroom at the Sheraton Grand Sacramento Hotel

Hyatt Regency Sacramento

Situated across from the California State Capitol, the Hyatt Regency Sacramento is a AAA Four Diamond luxury hotel that offers passionate hospitality and inviting spaces where everyone gets the VIP treatment. With a top-to-bottom refresh recently completed, the hotel features modern rooms and suites, a StayFit™ Gym, a wellness spa and a resort-style pool with a hot tub and cabanas.



A double bed guestroom at the Hyatt Regency Sacramento



IMPORTANT: Other companies may try to contact attendees offering a discount on hotel rooms.

We are not affiliated with these companies and believe it is a scam. Do not provide any credit card or payment information!!!

Use the dedicated website for GRC and GEA hotel room reservations available from the GRC website at www.geothermal.org. The preferred rate is automatically applied.



GEA GEOEXPO+

Every year, the GEA GEOEXPO+ hosts North America's largest gathering of vendors providing support for geothermal resource exploration, characterization, development, production and management.

It provides a unique opportunity for exhibitors to showcase their projects, equipment, services and state of the art technology to the geothermal community. More than 100 exhibitors. For more information please visit: www.geothermalenergy2016.com.

Please note: Entry to the GEA Expo is free with GRC Annual Meeting registration.

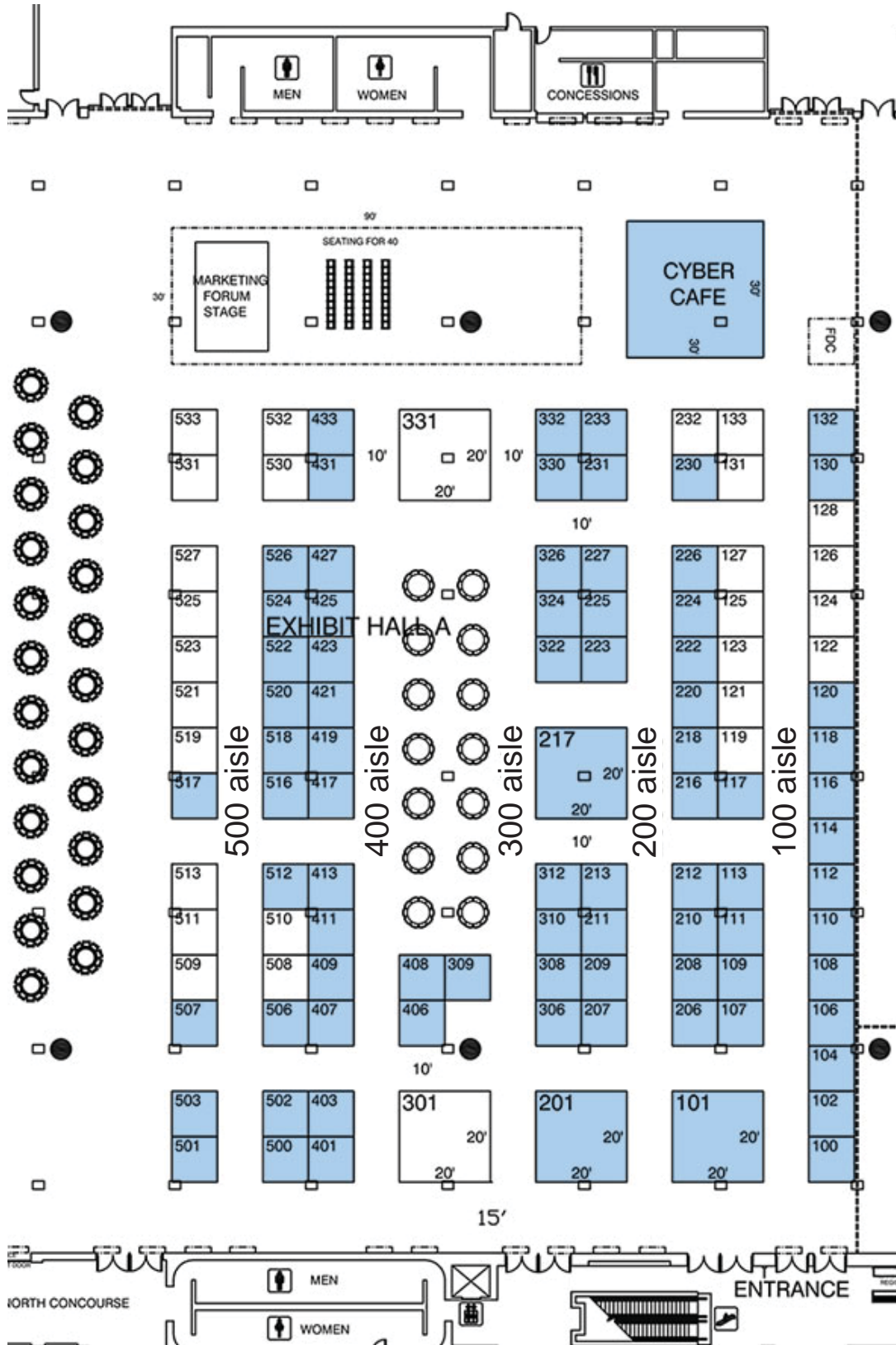
GEA GEOEXPO+ (as of July 7). Please check on the GEA website for current information.

COMPANY	BOOTH Number(s)	COMPANY	BOOTH Number(s)
3J Tech	106	Nalco Company	407,506
AltaRock Energy Inc.	110	Nevada Division of Minerals	507
AMSA, Inc.	423	Ormat Technologies, Inc.	101
Baseload Power Generation Parts and Service, LLC	227	Phoenix Geophysics Ltd.	118,120
BS&B Safety Systems, LLC	503	PM International Suppliers, LLC	431,433
Butting	431,433	POWER Engineers, Inc.	306
Capuano Engineering Company	520	PowerChem Technology	417,516
C-FER Technologies	114,116	Quantec Geosciences Ltd.	230
Cooling Tower Depot, Inc.	223	Reed Electric & Field Service	127
Dewhurst Group	411,413	REXA	409
DOSECC Exploration Services (DES)	530	Rotork Controls Inc.	208
EGS Consulting Inc.	522	Sinclair Well Products	406
EvapTech, Inc	206	SNC-Lavalin Power	117
Exergy SpA	102	SPX Corporation	210,212
Expro	217	Tetra Tech	518
Fuji Electric Co., Ltd.	401,500	Thermochem, Inc.	403,502
Gardner Denver Nash	232	TIMET	107
Geologica Geothermal Group	225	TIX-IKS Corporation	332
Geothermal Development Associates	309,408	TNG Energy Services	216,218,220
Geothermal Resources Council (GRC)	130,132	Torishima Pump Mfg. Co., Ltd	113
Geothermal Resource Group, Inc. (GRG)	Cyber Area	Toshiba American Energy Systems Corporation (TAES)	100
GeothermEx	207,209	Turboden	201
Global Power Solutions	213	US Department of Energy Geothermal Technologies Office	524,526
Horizon Well Logging	517	U.S.-East Africa Geothermal Partnership (EAGP)	419,421
Hydro Resources	233	Val-Matic Valves	109
Indar Electric, S.L.	222	Veizades & Associates, Inc.	211
Industrial Cooling Solutions	310,312	Vooner FloGard Corporation	425,427
International Cooling Tower USA, Inc.	108	Well Analysis Corporation	322,324,326
John M Phillips	111	Wieland Thermal Solutions	308
Kelly Pipe & Supply	127	Wolseley Industrial Group	104
KMS Technologies	501	WWT International	224
Kuster Company	226		
Mill Man Steel, Inc	512		
Mitsubishi Hitachi Power Systems	201		

DON'T MISS OUT!

Booths still available!!

Reserve your space at www.geothermalenergy2016.org



THE BEST OF SACRAMENTO

> Farm-to-Fork Capital

No major city in America is more centrally located amid such a diverse range of high-quality farms, ranches and vineyards. 70 percent of the region's land is agricultural, forest or other open space. Additionally, the region contains 7,000 to 8,000 acres of boutique farms and provides numerous public sales platforms at more than 50 regional farmers markets, many of which are year-round fixtures. In September, a weeklong culinary festival will make its debut bringing together the regional restaurant and farming communities.

> Old Sacramento Historic District

28-acre historic riverfront district with more than 125 boutique shops, restaurants and attractions

> California State Railroad Museum

North America's most popular railroad museum features 21 restored locomotives and railroad cars.

> Crocker Art Museum

A 125,000 sq. ft., \$100 million expansion is the new jewel of Sacramento. The Crocker displays Californian, European and Asian works of art.

> California State Capitol, Museum and Grounds

The museum features changing exhibits and historical rooms that offer a view of California's political past; the rest of the building acts as a living museum.

> The California Museum

The home of the California Hall of Fame is a cultural destination dedicated to telling the rich history of California and its unique influence on the world of ideas, art and culture.

> Outdoor Recreation:

23-mile American River Parkway is a biking/walking trail surrounded by natural protected habitats, scenic bridges, acres of parks, fishing spots, kayaking and tubing areas. White water rapids of every class are just minutes from Sacramento, and white water rafting companies 'deposit' you right into the parkway.

> Northern California's Other Wine Country

The region is home to one of California's oldest wine-producing areas. Over 200 wineries in the region and most offer free tastings and intimate access to the winemaking process and the winemakers. Visit sacramentowineguide.com

> Urban Sacramento

Cool without the pretention – that's Downtown and Midtown Sacramento where the city's main theaters, art galleries and cultural venues are found, plus boutique shops and entertainment venues.

> Dining & Nightlife

Surrounding farmers and growers keep Sacramento restaurants serving up the freshest ingredients via creative and unbelievable menus. After dinner, take a walk Downtown where you'll find mermaids and mermen, wine bars, dancing and mechanical bulls. Seriously.

> The Delta

Popular boating and recreation area features thousands of miles of navigable waterways and is home to hundreds of species of birds, fish and other wildlife.

> Gold Country

Famous Hwy 49 lies only 45 minutes outside of Sacramento, taking you to picturesque Gold Rush-era towns and cities. Today, many celebrate their heritage of both gold and agriculture while showcasing their modern era, with wineries, shopping areas and restaurants serving local foods.



What's Happening in Sacramento

Visit Sacramento365.com the year-round source for Sacramento events.

HOW TO GET TO SACRAMENTO:

Car	Highways 5, 99 and 80
Plane	Direct flights into Sacramento International Airport
Amtrak	Capital Corridor, San Joaquin, Coast Starlight, California Zephyr
Boat	San Francisco Bay up through the Delta

For More Information

Sacramento Convention & Visitors Bureau
1608 I St., Sacramento, CA 95814
800-292-2334
www.visitsacramento.com

Old Sacramento Visitors Center

1002 Second St., Sacramento, CA 95814
Open daily 10 a.m. – 5 p.m.
916-442-7644

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GRC 2016 ANNUAL MEETING REGISTRATION FORM



OCTOBER 23 - 26 | SACRAMENTO, CA | SACRAMENTO CONVENTION CENTER

5 EASY WAY TO REGISTER:

1. my.geothermal.org
2. Fax: 530.758.2836
3. Phone: 530-758-2360 ext. 100
4. Email: alay@geothermal.org
5. Mail: GRC, PO Box 1350, Davis, CA 95817

REGISTRATION INFORMATION

FIRST & LAST NAME _____

NAME ON BADGE _____

NAME OF COMPANY OR INSTITUTION _____

ADDRESS _____

CITY _____ STATE/PROVINCE _____ POSTAL CODE _____

COUNTRY _____

PHONE _____

FAX _____

E-MAIL _____

NAME(S) OF ACCOMPANYING GUEST(S) (NON-MEETING REGISTRANTS) _____

Guest(s) are allowed access to GEA Energy Expo only. Guest Passes can **only** be picked up by paid registrant.

REGISTER EARLY!

- 3-Day: Current GRC Member (**includes Transactions**, Vol. 40 on Flash Drive **and** does not include 2017 Membership Dues) (early bird rate) \$795 \$ _____
(after Sept. 23) \$945 \$ _____
- 3-Day: Non-GRC Member (**includes** a complimentary GRC Partial 2016 and 2017 full year membership **and Transactions**, Vol. 40 on Flash Drive) (early bird rate) \$995 \$ _____
(after Sept. 23) \$1095 \$ _____
- Do not want membership
- 3-Day: Student Registration: (*must fax a copy of current academic identification/class schedule*) Plus a complimentary partial 2016 and 2017 Full-Year Membership and **Transactions**, Vol. 40 on Flash Drive \$5 \$ _____
- 1-Day: Registration: (*CHECK ONE OR MORE*) (early bird rate) \$375 \$ _____
(after Sept. 23) \$475 \$ _____
- Monday Tuesday \$200 \$ _____
- Wednesday

REGISTRATION TOTAL: \$ _____

ADDITIONAL copies of **Transactions**, Vol. 40 on Flash Drive: (*picked up at conference*)
(Post-meeting price is \$50) Additional Flash Drive# _____ @ \$35 ea. \$ _____

PAGE 1 SUBTOTAL: \$ _____

Lunch is not provided. There are many dining opportunities in the surrounding area.

REGISTER EARLY!

As of September 24, registration will require an additional fee of up to \$150 per person.

The 3-day registration includes entry to the Opening Reception, the GEA Expo and a copy of the Transactions Flash Drive.

On-site registration will be charged an additional \$50 late fee.

Early Bird Registration Expires: September 23, 2016
(must be postmarked or faxed by 9/23/16)

REGISTRATION FORM

2017 MEMBERSHIP RENEWAL

	U.S.	Int.	
<input type="checkbox"/> Regular	\$130	\$150	\$ _____
<input type="checkbox"/> Retired	\$65	\$100	\$ _____
<input type="checkbox"/> Benefactor	\$230	\$230	\$ _____
<input type="checkbox"/> Company/Institutional	\$650	\$650	\$ _____
<input type="checkbox"/> Supporting	\$1,300	\$1,300	\$ _____
<input type="checkbox"/> Sustaining	\$2,275	\$2,275	\$ _____
<input type="checkbox"/> Patron	\$3,250	\$3,250	\$ _____
<input type="checkbox"/> Group Membership	please call		

OPTIONAL EVENTS:

Provide total based on number of persons.

Monday, Oct. 24, 12-1:30pm

- GRC International Luncheon, \$20 \$ _____
- Check here if you would like vegetarian meals.

Monday, Oct. 24, 6:30pm-9:30pm

- GRC Mixer at the MIX, \$50 \$ _____

Monday, Oct. 24, 5pm-7pm

- GRC Student Networking Reception, \$10 (students only) \$ _____

Wednesday, Oct. 26, 12 Noon-2pm

- GRC Membership Meeting & Awards Luncheon, \$55 \$ _____
- Check here if you would like vegetarian meals.

FIELD TRIPS:

Friday, October 21

- CAISO: Managing the Golden State's Electrical Grid, \$30 \$ _____

Saturday & Sunday, October 22-23

- Recharging The Geysers - Two Day, \$625 \$ _____

Sunday, October 23

- Recharging The Geysers - One Day, \$200 (limited to 60 only) \$ _____

Thursday, October 27

- EGS at The Geysers, \$185 **\$SOLD OUT**
(limited to 12 only)

CANCELLATIONS: If you must cancel your registration for the GRC Annual Meeting, Optional Events or Field Trips, please notify the GRC by September 23 in order to receive a refund (minus a \$100.00 handling fee). Cancellations received after September 23 can not be refunded. Substitution(s) can be made at any time, with prior approval.

WORKSHOPS:

Provide total based on number of persons.

Friday & Saturday, October 21 & 22

Conceptual Models of Geothermal Systems

- \$525 Member \$575 Non-Member \$ _____
- \$150 Student \$ _____

Friday & Saturday, October 21 & 22

Reservoir Stimulation

- \$550 Member \$595 Non-Member \$ _____
- \$150 Student \$ _____

Sunday, October 23

Best Practices in Operation and Maintenance (O&M)

- \$175 per person \$ _____

Wednesday, October 26

- GEO 101 Workshop and Expo Tour \$ FREE

Total This Page	\$ _____
Total Previous Page	\$ _____
TOTAL ENCLOSED	\$ _____

PAYMENT INFORMATION:

Pre-payment by one of the following methods must accompany this form. The GRC cannot bill participants.

- Check payable to Geothermal Resources Council in U.S. currency through a U.S. bank.
- Government Purchase Order (*please enclose*)

Please charge my:

- VISA MasterCard American Express

NAME ON CARD (please print)	
BILLING ADDRESS	
CREDIT CARD NO.	EXPIRATION DATE
SIGNATURE	

Return Completed Registration Form to:

GEO THERMAL RESOURCES COUNCIL
PO Box 1350
Davis, CA 95617-1350

Phone: (530) 758-2360 x100
Fax: (530) 758-2839

E-mail: alay@geothermal.org

Website: www.geothermal.org