

GRC 2012 Schedule of Events

Workshops

FRIDAY & SATURDAY, SEPTEMBER 28 & 29

Drilling

Naples 6 8:00 a.m.- 5:00 p.m.
Cost: \$400 per person

Led by Bill Livesay, Lou Capuano, Jr. and Lou Capuano, III

Objective: The purpose of the Drilling workshop is to discuss and explain the development and implementation of a drilling plan for economic drilling of hydrothermal and Engineered Geothermal System (EGS) wells and to understand the design criteria and its limitations. Of particular interest will be temperature effects on casing and cement; cost estimates and timing; and threaded casing connections.

- 1. Review of Local Geology and Well Records**
Influence on casing points and anticipating trouble
- 2. Well Design Casing Design; Specification of loads; wellheads**
- 3. Drilling Activities**
Bit Selection and performance; Dull bit evaluation; Bit hydraulics; Drilling Fluids; Aerated drilling fluids/under-balanced drilling and Directional drilling
- 4. End of Drilling Interval Activities**
Logging; Running casing or liners; Cementing casing
- 5. Completions**

Key Items:

- ❖ Temperature effects on casing and cement
- ❖ Cost estimates and timing
- ❖ Cost reduction approaches
- ❖ 3 vs. 4 casing strings
- ❖ Threaded casing connections
- ❖ Premium vs. buttress

Reservoir Stimulation

Naples 7 8:00 a.m.-5:00 p.m.
Cost: \$400 per person

Led by Ahmad Ghassemi, Texas A&M University

Objective: The purpose of the Reservoir Stimulation workshop is to provide the attendees a good working knowledge of the theoretical principles and operational aspects of reservoir stimulation. While the workshop will emphasize education, it will incorporate the latest research findings and practical experiences in geothermal and gas shale reservoirs. The workshop instructors are experts from geothermal and petroleum industry, academic institutions and National Labs.

Day 1:

- 1. The Geothermal Resource Base and The Need for Stimulation to Increase Productivity of Marginal Hydrothermal Wells, EGS, etc.**

Speakers: Joel Renner and John Pritchett

- ❖ Geothermal Resources Base
- ❖ Economic Basis of Reservoir Stimulation
- ❖ Discussion/Break

- 2. Fundamentals of Reservoir Stimulation**

Speakers: Ahmad Ghassemi, J.C. Roegiers, Gillian Foulger, Magaly Flores and Derek Elsworth

- ❖ Rock and Fracture mechanics: In-situ Stress; Wellbore Trajectory; Fracture Models, tensile versus shear fracturing; Thermo-porolectric processes
- ❖ Discussion/Break
- ❖ Session A: MEQ Interpretation
- ❖ Session B: Acidizing and Thermal Stimulation; Reactive Flow and Permeability Dynamics
- ❖ Discussion/Break

- 3. Implementation and Modeling aspects of Stimulation**

Speakers: Hugo Morales-Schlumberger, Susan Petty and John McLennan

- ❖ Gas shale stimulation, interpretation, and

stimulated volume; Geothermal Systems-how is it done, differences and similarities with practice in the petroleum sector; Gas shale and geothermal stimulation: where are we?

Day 2:

4. Reservoir Stimulation, Coupled Processes, Induced Seismicity

Speakers: Pete Rose, Sabodh Garg, Gillian Foulger, Bruce Jillian and Thomas Kohl and Ahmad Ghassemi

- ❖ Conceptual models and mechanisms, stimulated volume; MEQ Mechanisms, monitoring, and interpretation; Modeling of reservoir stimulation, permeability enhancements, and induced seismicity

5. Case Studies

Speakers: Kit Bloomfield, Ann Robertson-Tait, John McLennan, Trenton Cladouhos, Julio Garcia and Thomas Kohl

- ❖ Gas shale; Desert Peak; Raft River; Newberry; The Geysers; and Soultz

Workshop Guides, agenda, presentation outlines, technical papers, and other information presented at the workshops will be provided in a binder or handouts for all workshop participants.

To reserve your seat, fill out the workshop portion of the Conference Registration Form at the back of this brochure. The form also provides information about registration for other GRC Meeting Optional Events.

GRC workshop attendees are invited to a hosted lunch on Friday and Saturday from 12pm-1pm, and a workshop reception on Friday hosted from 5:00pm-7pm. Held in the Naples 2-4 rooms.

The workshop presentations will be given by experts from private industry, national laboratories and universities.

Visit the GRC Meeting Page on our website for the full Workshop Agendas.

www.geothermal.org

Field Trips

SATURDAY & SUNDAY, SEPTEMBER 29 & 30

Structural Controls on Geothermal Activity in The Western Great Basin – Part I

(Pre-meeting, 2-days) Cost: \$300 per person

This two-day trip will examine favorable structural settings for geothermal activity in the western Great Basin. Fault zones primarily control the locations of geothermal fields in the Great Basin, but many questions remain as to what types of faults and what segments of faults are most favorable for geothermal activity.

Elucidating the most favorable settings has important implications for developing exploration strategies, particularly for blind or hidden geothermal systems (i.e., those with few or no surface manifestations).

We will introduce participants to some of the most favorable settings, including belts of intersecting, overlapping, and terminating faults.

Day 1:

Geothermal systems in the Hot Springs Mountains, including Bradys, Desert Peak, and Patua. Overnight hotel in Fallon.

Day 2:

Geothermal fields in the Carson Sink region, including Salt Wells and Soda Lake.

We will examine the geometries and kinematics of controlling fault zones, as well as surficial expressions of geothermal activity. Several short, easy to moderate hikes will permit hands-on analysis of these features.

This trip includes one night lodging (double occupancy required) in Fallon, two lunches, one dinner hosted at the Overland Hotel, refreshments, and transportation in field trip vehicles.

Field trip participants need to check-in with the GRC at the Tuscany Ballroom Foyer on Saturday, Sept. 29 beginning at 6:30 a.m., followed by a continental breakfast. The field trip will depart the hotel at 7:30 a.m. and will return to the Peppermill on Sunday, Sept. 30, by 5 p.m.

SATURDAY, SEPTEMBER 29

ENEL Stillwater Geothermal/Solar Power Plant and Alterra Power Corp. Geothermal Power Plant Tour with a Stop at Naval Air Station, Fallon

(Pre-meeting, 1 Day) Cost: \$150 per person

The focus of this one-day comprehensive tour will include the first Geothermal/Solar hybrid facility in the world, one of the oldest binary power plants in the U.S., and lunch at the Naval Air Station, Fallon, Top Gun facility followed by a tour of the Navy's program on the base.

Alterra Power's Soda Lake geothermal power plant is located 60 miles east of Reno, Nevada and 10 miles northwest of the city of Fallon. The plant supplies all of its energy to NV Energy under a long-term power purchase agreement. The site is expected to generate 74 GWh in 2012 and 84 GWh in 2013. The plant is also one of the oldest binary power plants in the U.S., but has experienced outstanding availability and durability from the equipment and production pumps.

The Naval Air Station (NAS), Fallon, Nevada is home to the *Fighting Saints* of VFC-13, the *Desert Outlaws* of Strike Fighter Wing Pacific and the Naval Strike Air Warfare Center. NAS Fallon serves as the Navy's premier tactical air warfare training center, *Top Gun* program.

The Navy will host a luncheon at the Navy officers Club, followed by a tour of the Naval facilities. Some locations on the base will be closed off for security reasons.

ENEL Green Power North America, Stillwater Geothermal/Solar Power Plant is the first hybrid renewable energy project in the world that combines the continuous generation capacity of binary-cycle, medium-enthalpy geothermal power with the peak capacity of solar power, allowing NV Energy, which holds a contract to buy all of the energy generated by the plant, to better satisfy the energy needs of its customers.

Field trip participants need to check-in with the GRC at the Tuscany Ballroom Foyer on Saturday September 29 beginning at 7:30 am, followed by a continental breakfast. The field trip will depart the hotel at 8:30 am and returns to the Peppermill by 7 pm. Trip includes: transportation, continental breakfast and lunch.



ENEL GREEN POWER. COURTESY PHOTO.

Please note: All tour participants are required to carry a picture ID to enter the Naval Air Station Fallon. In addition, you will be required to provide copies of photo IDs or passports and/or green cards and to receive Navy security authorization prior to joining the tour. A Release & Waiver form will also have to be signed. Fax Photo IDs, copy of passport and/or green cards to the GRC office at (530) 758-2839.

SATURDAY, SEPTEMBER 29

Ormat's Steamboat Geothermal Power Plant Complex

(Pre-meeting, 1 Day) Cost: \$45 per person

Ormat's Steamboat Geothermal Power Plant Complex located just south of the city of Reno currently produces over 86 MWe (net capacity) — enough renewable energy to meet the residential electrical needs of the city of Reno.

The tour will highlight the unique geology associated with the Steamboat basin and range and the Steamboat geothermal power plant complex including the state-of-the-art Galena III recuperated integrated two-level unit. Knowledgeable field trip guides will provide expert commentary during the trip.

Two trips will be offered on Saturday:

- **Morning tour:** 8 a.m.-11 a.m. Meet at the Tuscany Ballroom Foyer by 7:15 a.m.; return to the Peppermill by 11:00 a.m.
- **Afternoon tour:** 1 p.m.-4 p.m. Meet at the Tuscany Ballroom Foyer by 12:15 p.m.; return to the Peppermill by 4 p.m.

Field trip participants need to check-in with the GRC at the Tuscany Ballroom Foyer on Saturday, Sept. 29, 45 minutes before the bus leaves. Trip includes transportation.



INTERIOR VIEW OF THE GREEN MACHINE. COURTESY PHOTO.

SATURDAY, SEPTEMBER 29

“Behind The Scenes: Manufacturing ElectraTherm's Green Machine”

(Pre-meeting, 1 Day) Cost: \$30 per person

Field trip participants will tour ElectraTherm's *Green Machine* which generates fuel-free, emission-free electricity from low temperature waste heat (190-240 °F) utilizing Organic Rankine Cycle (ORC) and proprietary technologies. Tour guests will get an inside look at the manufacturing plant, where the *Green Machine* is tested, assembled and shipped to customers around the world.

ElectraTherm employs approximately 50 people. In 2011, President Obama visited ElectraTherm to host a town hall meeting where he spoke to an audience of 425 in the manufacturing plant. In 2010, ElectraTherm moved its headquarters from Carson City, Nevada to a 53,000 sq. foot facility in Reno. That same year, ElectraTherm was awarded approx. \$1 Million by the Department of Energy to optimize technology for geothermal applications, including oil & gas wells. ElectraTherm currently has 17 machines in the field and more than 31,000 hours of field run time.

Two trips will be offered both morning and afternoon on Saturday. Space is limited on each tour, so sign up early.

- **Morning tour:** 10 a.m.-12 noon. Meet at the Tuscany Ballroom Foyer by 9:30 a.m.; return to the Peppermill by 1 p.m.
- **Afternoon tour:** 1 p.m.-3 p.m. Meet at the Tuscany Ballroom Foyer by 12:30 p.m., return to the Peppermill by 4 p.m.

Field trip participants need to check in with the GRC at the Tuscany Ballroom Foyer on Saturday, Sept..29, 30 minutes before departure. Trip includes transportation.

THURSDAY & FRIDAY, OCTOBER 4 & 5

Structural Controls on Geothermal Activity in The Western Great Basin – Part II

(Post-meeting, 2-days) Cost: \$375 per person

(For description, see Part I above)

Day 1:

Geothermal systems along and near the I-80 corridor, including Bradys, Rye Patch, and Blue Mountain. Overnight hotel in Winnemucca.

Day 2:

Geothermal fields in the Black Rock Desert region, including McFarlane, Gerlach, Fly Ranch, and San Emidio.

Trip includes: One night lodging (double occupancy required) in Winnemucca, two lunches, one dinner hosted at the Martin Hotel, refreshments, and transportation in field trip vehicles.

Field trip participants need to check-in with the GRC at the Tuscany Ballroom Foyer on Thursday October 4 beginning at 6:30 a.m., followed by a continental breakfast. The field trip will depart the hotel at 7:30 a.m. and will return to the Peppermill on Friday October 5, by 6 p.m. This field trip is limited, so sign up early.

Some meals and beverages will be provided by the GRC and corporate sponsors. All persons under 18 must be accompanied by an adult. Participants should wear sturdy shoes and bring outerwear for cool morning and evening temperatures. Don't forget your camera!

Please arrive 30 minutes before departure time in front of the Tuscany Ballroom Foyer of the Peppermill Resort Spa hotel. All trips return to the hotel.

Limited seating on all field trips so register early!

Visit the GRC Meeting page on our website for Field Trip Schedules.

www.geothermal.org

MONDAY – WEDNESDAY, OCTOBER 1 – 3

Peppermill Geothermal Direct Use Tours

Several Tours will be offered on Monday, Tuesday and Wednesday, October 1-3.

Monday: 12:30 -1:00 p.m., 3:10 - 3:40 p.m.

Tuesday: 9:40-10:10 a.m., 12:30-1:00 p.m.,
3:10 -3:40 p.m.

Wednesday: 9:40-10:10 am, 12:30-1:00 p.m.

Tours will depart and return to the Tuscany Ballroom foyer next to the GRC onsite registration desk.

(Limited to 25 participants per tour)

Peppermill Resort, Compliments of GRC & Peppermill

Located at the north end of the Moana Hot Springs thermal anomaly, the Peppermill currently utilizes low temperature geothermal fluids for direct use heating throughout the resort. The recently renovated system replaces a costly natural gas fired heating system to heat swimming pools and tap water as well as melt snow via heat-exchanger. A new production well drilled in 2009 increased the generating capacity of the facility and supplied over 90% of the Peppermill's current heat generating needs. The tour will highlight the geothermal wells and engineering facilities. Knowledgeable field trip guides will provide interpretive commentary during the trip, and you won't even need to leave the hotel. No advanced registration required, however a sign-up sheet will be available at the GRC onsite registration desk.



PEPPERMILL PHOTO.

Other Events

SUNDAY, SEPTEMBER 30

Charity Golf Tournament

Red Hawk Golf and Resort Golf Club



PHOTO COURTESY OF RED HAWK GOLF AND RESORT GOLF CLUB.

Situated 14 miles from the Peppermill Resort Spa, the Red Hawk Golf and Resort Golf Club in Sparks is host to GRC's annual Charity Golf Tournament. Starting at 7:30 a.m. with breakfast and teeing off at 8:30 with

a shotgun start. An Awards Luncheon follows this fun event, this year supporting the American Lung Association. A shuttle will be available from the front entrance of the Peppermill Hotel at 7:00am.

Please visit the GRC website at www.geothermal.org to register.

SUNDAY, SEPTEMBER 30

Opening Reception

6:00 p.m. – 8:30 p.m.

Tuscany Ballroom

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



GRC 2012 Annual Meeting Schedule

MONDAY, OCTOBER 1

GRC Opening Session

8:30 a.m. – 12:00 noon

Capri Ballroom

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. The following are tentative as of July 3, 2012.

- ❖ Dr. Jim Combs – Opening Session Chairman
- ❖ Bob Cashel – Mayor of Reno (invited)
- ❖ Brian Sandoval – Governor of Nevada (invited)
- ❖ Harry Reid – U.S. Senator, Nevada (invited)
- ❖ Lucien Bronicki – Chairman of the Board, Ormat (confirmed)
- ❖ Doug Hollett – Program Manager, U.S. DOE Geothermal Technologies (confirmed)
- ❖ Greg Raasch – Executive Vice President and Co-Founder, GeoGlobal Energy LLC, (confirmed)
- ❖ Craig Mataczynski – CEO, Gradient Resources (confirmed)
- ❖ Isikeli Taureka – Sr. Vice President Chevron Geothermal and Power Operations (confirmed)
- ❖ Gerardo Hiriart – CEO, ENAL (Mexico) (confirmed)
- ❖ Richard Campbell – GRC President (confirmed)
- ❖ Paul Thomsen – GEA President (confirmed)

Opening Session coffee sponsored by Bakersfield Pipe and Supply.



MONDAY, TUESDAY & WEDNESDAY, OCTOBER 1, 2 & 3

Technical Sessions

Capri Ballroom & Naples 6–7

See the Preliminary Technical Session schedule on pages 12-17 and 22-23. This is an overview of the tracks and subjects.

MONDAY, OCTOBER 1

GRC Annual Banquet

6:00 p.m. – 9:00 p.m.

National Auto Museum Cost: \$105 per person



The National Automobile Museum (The Harrah Collection) sets the standard for world-class automobile museums with its dramatic displays, in-depth historical interpretation and exciting opportunities for visitor participation.

It is ranked one of the “Top Ten” automobile museums in the nation by Car Collector magazine and selected as the “Best Museum in Northern Nevada” by the Nevada Magazine Reader’s Poll.

Join us for a choice of two entrées: either a Grilled Atlantic Salmon/Top Sirloin Steak plate or a Gluten-Free Vegetarian plate. Entertainment in superb surroundings.

Busses depart at 5:30 p.m. – Return to the Peppermill Hotel by 9:30 p.m.

Price includes bus transportation, meal, entry to the National Auto Museum, and one cocktail drink ticket.

Cash-only bar will be available.



ENTRANCE TO THE NATIONAL AUTOMOBILE MUSEUM AND ONE OF THE CARS ON DISPLAY. COURTESY PHOTOS.

TUESDAY, OCTOBER 2

Student Leadership Luncheon

12:00 noon – 1:30 p.m.

Sorento 3-5

Industry leaders will meet with students attending the GRC Annual Meeting during Tuesday's lunch hour. Discussions between the leaders and students over lunch will provide one-on-one opportunities to share ideas about key topics on a variety of geothermal interests. *Only 90 students will be able to attend so register early!*

TUESDAY, OCTOBER 2

Poster Session/Expo Networking Reception

4:00 – 6:00 p.m.

Tuscany Ballroom

Meet with colleagues in the global geothermal community in the Expo Hall and view this year's selection of Posters (Including Posters of the 2012 EERE National Geothermal Student Competition and National Geothermal Academy).

Please note: The posters are also available for viewing during Expo hours.

WEDNESDAY, OCTOBER 3

Annual Membership Meeting & Awards Luncheon

12:00 noon – 2:00 p.m.

The Edge Club Cost: \$45 per person

GRC will honor the best and brightest of the global geothermal community at its Annual Membership Meeting & Awards Luncheon. GRC will present its prestigious Joseph W. Aidlin Award, Ben Holt Geothermal Power Plant Award, Geothermal Pioneer Award, Henry J. Ramey, Jr. Geothermal Reservoir Engineering Award, and the Geothermal Special Achievement Award, as well as awards for Best Technical Session Presentations and Photo Contest.

ENJOYING A MOMENT AT THE AWARDS BANQUET.



LAST YEAR'S GRC AWARD RECIPIENTS.